

# **Statistical Modelling Final Project Report**

## **Analysis of Life Expectancy Dataset**

MDA 9159A

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## *Introduction*

This report aims to provide some basic statistical analysis into the life expectancy dataset from World Health Organization (WHO). The dataset contains 2938 records and 22 columns including 21 predictor variables and 1 response variables (i.e. the life expectancy in ages). Our goal is to build a simple predictive model which takes predictor variables and output a reasonable accurate prediction with regards to the life expectancy in ages. In addition, we will provide analysis and inference of the resulting model and discuss our findings.

The predictors can be grouped into 5 categories: immunization factors (e.g. Hepatitis B), mortality factors (e.g. adult and infants mortality measures), economic factors (e.g. country, GDP), social factors (e.g. years of schooling), and other health related factors (e.g. average Body Mass Index). We will attempt to understand how each of the factors can cause the life expectancy to vary through traditional multilinear regression. Many science studies may have indicated certain correlations between some factors and the life expectancy through analysis of the biological indicators for example. In this report, we wish to find correlations through pure numerical analysis.

## *Comparing Predictive Models*

Based on an overview of the dataset, we found 2563 null values which could greatly interfere with our statistical analysis. Since these values are unknown, we can either replace them by the median/mode from the predictor or exclude those predictors from our analysis. The shortfall of the first option is that if there were too many null values in the category (e.g., 30-50%), the replacement could distort the analysis and predictive power of those predictors. Consider replacing 448 missing GDPs (likely to be small countries) by the median GDP (likely to be median size country). This could produce inaccurate representation of data because a small country cannot have GDP that is the same level as the median-sized country. Consequently, we decided to drop Hepatitis (with 553 missing values), GDP (with 448 missing values), and population (with 652 missing values). There are 18 predictors left.

After briefly cleaning the data, we can start to use multilinear regression to fit models. However, the question is which predictors to use. It is highly unlikely that all of the predictors are important in explaining the variation of life expectancy. Therefore our goal is to implement some techniques to find a relatively simple and predictive model by attempting to balance the variance with bias introduced from models with different predictors.

The idea behind the process is that with more parameters, our model could become more flexible in explaining the variation among the life expectancies resulting while resulting in a more complex model which could overfit the data. The term “overfitting” refers to the phenomenon that the model fits the data overly well that it took the random errors of the response into consideration. Random error refers to the assumption that the underlying response variables (i.e. the life expectancies) independently follow an identical normal distribution and consists of the expected values of the response from the “true model”. Note that this expected value is the mean of the normal distribution that the response follows. Random errors also

follow an identical normal distribution with mean 0 and constant variance (the variance is also the variance of the normal distribution followed by the response variable). Our goal is to try to find a model which provide reasonable insights into the “true model” (i.e. the expected values of the response, rather than the random errors). As implied by the name, random errors are random, independently different for each response variable. Therefore, if our resulting model is so complex that it starts to explain the random errors for the data that used to train the model, it would produce a large variance for predictions on new datasets because the random errors in the new data would have completely different behaviours than what’s considered in the training data. In other words, the model could not produce a reasonably accurate prediction which is something that we need to avoid.

On the other hand, if we don’t consider enough predictors, although the resulting model would be simple, it would not correctly represent the relationship between the predictors and the life expectancy. As an extreme example, consider a model without any predictors. We predict the life expectancy solely on the average of the data. This would be an extremely uninformative model because it assumes everyone would have the same life expectancy. In this case, we are underfitting and this is another undesirable result that we need to avoid.

It should be noted that due to the categorical nature of the country predictor which included 193 unique countries, our model used one hot encoding which included a large number of dummy variables to indicate which country a given observation is located. This inherently introduced a lot of variances into the model (because the complexity of the model has increased significantly).

## *Naïve Approach*

Considering the two issues mentioned above, we need to decide modelling techniques that would take the number of parameters in the model into account while trying to minimize the squared differences between the fitted values from the model and the true response values (i.e., the errors in predicting the response using the model. This value is often referred to as Sum of Squared Error (SSE). So, how do we decide which predictors to include? The naïve approach is to consider all combination of predictors and choose the one with the best adjusted  $R^2$ . Note that since adding new predictors can make the model better in terms of explaining the response variable with existing data (not new data), it would only make the deviance between the predicted response value and true response value smaller, hence always reducing the  $R^2$ . As such, using  $R^2$  is not appropriate for us as it cannot help in distinguishing if a model is overfitting. Therefore, we will use adjusted  $R^2$ . This naïve approach is not realistic considering we have to fit  $2^{21} \approx 2$  million models which is impossible to train without supercomputers. Therefore, we would use more sophisticated techniques.

## *Selection Algorithms*

Firstly, since our goal is to determine how much additional explanatory power a predictor needs to provide to be considered important, we can utilize the Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC) to find a balance between 1) the regular SSE measure, and 2) the penalty for including parameters. The basic logic is that, if a predictor is providing enough explanatory power for the response (reducing the SSE) that outweighs the penalty for including this predictor, then we should keep that predictor in the model. There is an important parameter for us to decide, how large would the penalty be. If the penalty is too large, then predictors with enormous explanatory power would not be included (risk of

underfitting!). If the penalty is too small, then even predictors with negligible explanatory power would be included in the model (risk of overfitting!). Due to limited experience working with data, we decided to use the widely recognized criteria AIC and BIC in our model selection process. Note that AIC has a lower penalty than BIC for large sample sizes. There are three techniques we can apply that explicitly punishes complex models: forward, backward, or stepwise selection. Since stepwise selection incorporate both forward and backward selection algorithms and it ignores the flaw from forward selection where added predictor could be redundant as the algorithm move forward (e.g. due to the correlation between the predictors), we chose to implement the stepwise selection. The basic mechanism is that we start with null model without any predictors, then at each step, we calculate the criteria value (e.g. AIC) for including each of the predictors not considered yet and excluding each of the predictors in the model. Then we choose the one which would bring the highest decrease in the criteria value (i.e. bring the most explanatory power for the model by decreasing SSE for the highest magnitude). If none of the options produce a lower criteria value, we stop.

In order to test the predictive performance of the model, we split the data set into 70% training data and 30% testing data. We fit the null model without any predictors as the base model to implement stepwise selection. After implementing the procedure with AIC and BIC, we tested the prediction accuracy by comparing the average of sum of squared difference between the predicted life expectancy and the actual life expectancy in the test set. We found that the error was 4.60 for AIC and 4.6122 for BIC. This implies that on average, the model from stepwise selection with AIC predicted 4.6 years higher or lower than the actual life expectancy, and selection with BIC made predictions with error of 4.61 years. Note that this represents the raw predicting power of the model because we did not optimize the model on the test set (which would produce the lowest SSE). Therefore, so far, the model produced by stepwise selection with AIC is performing marginally better than that of BIC.

## *Shrinkage Methods*

Secondly, we can use shrinkage methods to minimize the SSE as well as the complexity of the model. The biggest difference between the shrinkage methods and stepwise selection process is that stepwise selection looks at each variable and consider how much explanatory power the variable brings versus the penalty whereas shrinkage methods look at the model in general and minimizing the combination of SSE and complexity of the model. For shrinkage methods, we considered Ridge regression, LASSO regression and elastic net. Generally, LASSO regression is preferred because it can actually eliminate variables whereas Ridge regression only shrinks the coefficients of predictors without ever eliminating any of them. On the other hand, if there are correlations among the predictors, LASSO cannot handle it well while Ridge can deal with correlations perfectly. Note that the biggest difference between LASSO and Ridge is how they define the penalty term that they are minimizing. Ridge is focusing on the sum of coefficients squared while LASSO considers the sum of absolute value of coefficients. Similar to carefully choosing penalty criteria with stepwise selection, we also need to decide the strength of penalty in shrinkage methods which is represented by the lambda factor. The larger the lambda, the harder the penalty. Luckily for us, we could use the cross-validation technique to find an optimal lambda. Note that since LASSO has absolute values in the argument that we try to minimize, simply taking derivative and set it to 0 would not do the trick like the case of Ridge regression. Therefore coefficient estimates for LASSO regression has no close-form solution, which could lead to a less efficient optimization procedure as coordinate descent algorithms have to be used instead of numerical methods.

After finding the optimal lambda for each regression by implementing cross validation procedures on

a range of lambdas, we fitted both LASSO regression and Ridge regression on the training data, and tested the predictive performance on the test set. Note that after graphing out the optimal lambdas, we found that both algorithms did not shrink the parameters significantly with small optimal lambdas (0.68 for Ridge and 0.002 for LASSO) which suggested that weak penalty is applied and the advantage of regularization of the algorithms is not fully utilized. The testing results showed that the mean SSE on the test set is 5.38 for Ridge and 4.83 for LASSO, implying that LASSO produced a more predictive model. However, none of these models outperformed the stepwise selection procedure with AIC mentioned in the previous section.

A combination of the Ridge and LASSO, elastic net, was implemented to investigate if a better predictive model can be built. We used a for loop initially to test models with different alpha parameters (i.e. the percentage of weight put in LASSO against Ridge, for example, 0.8 means 80% weight was assigned to LASSO while 20% weight was assigned to Ridge). We used a sequence starting from 0 to 1 with step-size of 0.1 (i.e. 0, 0.1, 0.2, ..., 1), tested models with 10-fold cross-validation (considering the amount of models that we need to try, 10 seems like a good compromise) to find a best lambda parameter for each of the alphas, and determine the performance of prediction using the test set. The search results reveal that alphas between 0.1 and 0.3 produced best prediction results. Therefore, another search with alphas starting from 0.1 to 0.3 with incremental step of 0.02 was conducted. We were able to reduce the mean squared error to 4.81 with alpha of 0.28, however, this still could not outperform the results from stepwise selection with AIC, which has the mean squared error of 4.6 on the test set.

The summarized model performance is as follows:

Model selection method	Predictive performance (MSE)
Stepwise selection with AIC	4.60
Stepwise selection with BIC	4.61
Ridge regression	5.38
LASSO regression	4.83
Elastic net	4.81

Consequently, we chose the model from stepwise selection with AIC to advance our analysis. The summary output are as follows:

Regression type	Multilinear regression
Parameters used	208 (includes 195 dummy variables)
$R^2$	96.39%
Adjusted $R^2$	96.12%
Residual standard error ( $\hat{\sigma}$ )	1.874
Degree of freedom	2732

A brief examination of the summary output from the model revealed an astonishing 96.39% as  $R^2$  and 96.12% as adjusted  $R^2$ . This implies that the 96.39% of variation in the life expectancy was explained by the 14 predictors in the model. The adjusted  $R^2$  value indicated that there is unlikely to be any overfitting issues. The result is surprisingly optimistic which is edging to unrealistic. Before we can use the model for inference or prediction, we have to perform a model diagnostic to verify if the assumptions of the model hold.

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## Model Diagnostic

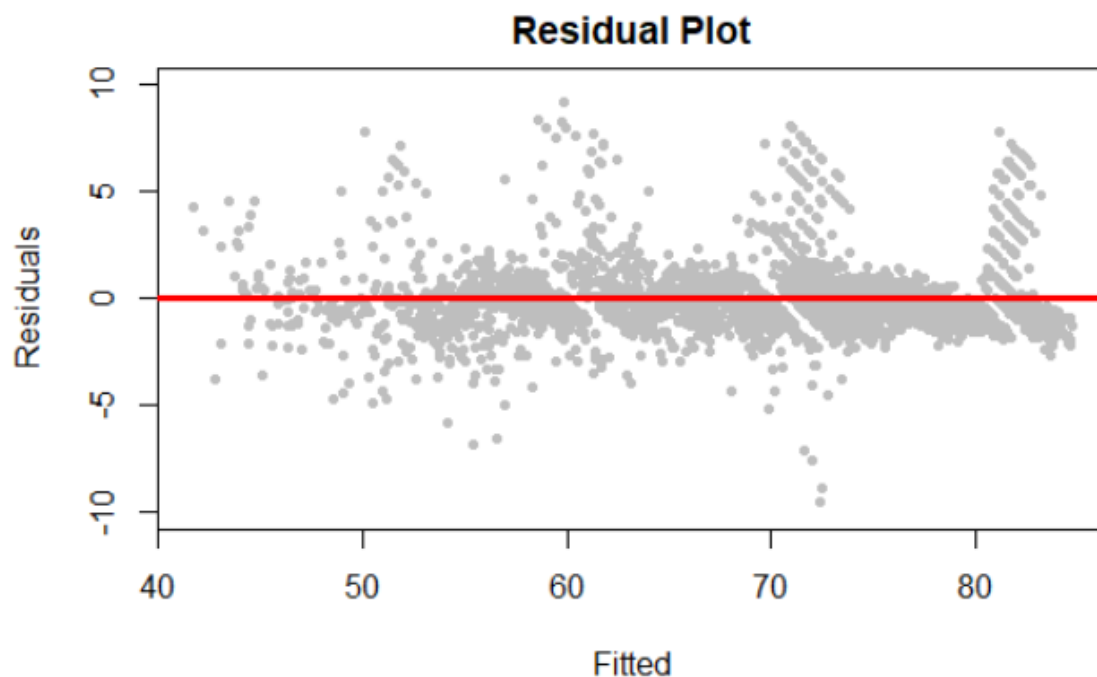
So far, we have been finding models that are simple (contains only a small number of predictors) and predictive (able to explain a large portion of the variation in the response variable, life expectancy). We used multilinear regression process to try to capture the relationship between the life expectancy and the other predictors. As a result of comparing the predictive power of models built from both stepwise selection process and shrinkage methodologies, we have found a best model that is a combination of accurate predictive power and simple. However, by implementing a multilinear regression model, what we have assumed so far, is that life expectancy (response variable) is linearly correlated to the linear combination of the explanatory variables and follows an independent identically (*iid*) distributed normal distribution with a constant variance (which is mentioned in the first section). Specifically, the random errors are *iid* normal with mean 0 and constant variance. Furthermore, we assumed that the random errors are independent. If any of these assumptions are violated, our inferences about the model would be compromised. Since our ultimate goal is not to build a "perfect model", rather, we aim to use a reasonably good model that explains the data well to make inferences about the relationship between the predictors and the response variable. As such, this section of the report investigates these model assumptions and determines whether our inferences drawn from the model are reliable.

Note that using the cooks distance measure, we found that there are 190 influential points which have high leverage (the predictors take on values far away from the averages of predictors) and high standardized residual (the return life expectancy is far away from the model prediction). Since we have no way to examine if they are made by errors in the data gathering process, we will need to utilize some transformation techniques and multicollinearity analysis.

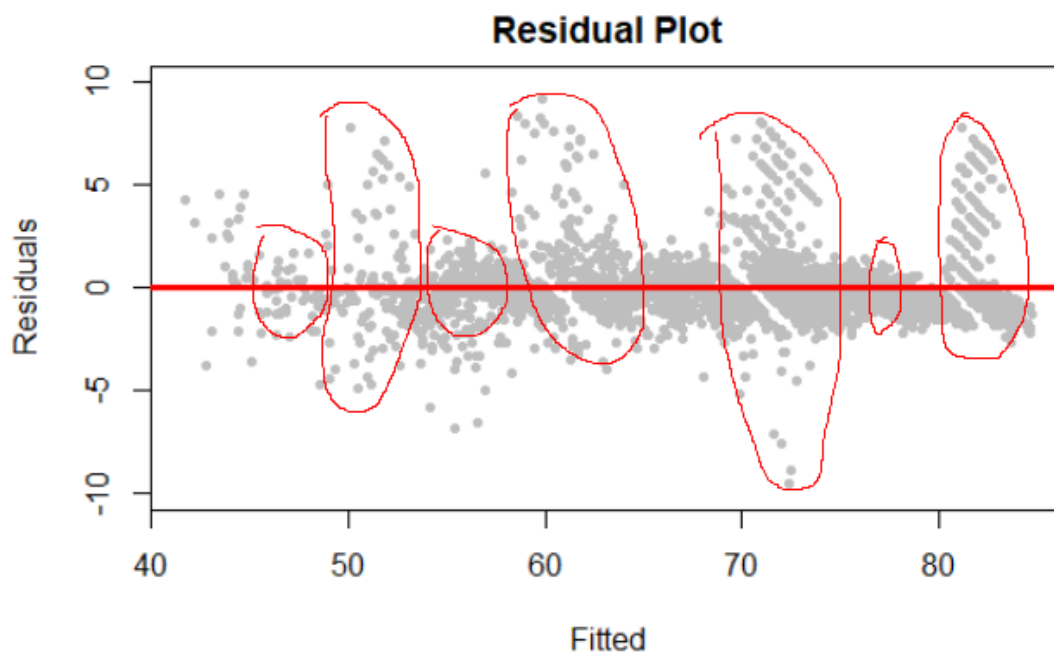
### The Linearity and Equal Variance Assumption

As mentioned in the previous section, we want the response to be a linear combination of the predictors so that we can safely apply the multilinear regression model without worrying about the bias (e.g. fitting an exponential relationship with a quadratic model introduce a log of bias, or in other words, the model cannot describe the relationship accurately). Also, the variance of the random errors should exhibit a constant variance (i.e. the dispersion of the random errors should be approximately equal).

We can start the model diagnostic by checking the residual plot which would reveal the residual pattern against the fitted values from the multilinear model. The residual plot is indicated as follows. (Note that I purposely remove 1 outlier which has residual around -20 so that we can have a more focused plot to examine).



For starters, we need to see if the residuals are randomly distributed with 0 mean and a constant variance. We can see that there is no particularly discernable pattern (i.e. they are somewhat randomly scattered) and the mean of the residuals is approximately 0 for most blocks we select in the range of fitted values. This could be a sign that the linearity assumption of the response variable is not violated because the linear model reasonably explained the relationship between the response and the predictors. However, the spread of the residuals is not consistent which is an indication that the equal variance assumption is violated. We can observe the following discrepancies in the dispersion of residuals.



Note that it might be argued that the mean doesn't seem to be 0 in some blocks indicated above. Consider the heavily clustered residuals around zero, we believe that the overall average of the blocks would still be

close to 0. Due to the unequal variance in the residual, it is safe to say that the equal variance assumption is violated. To determine this numerically, we could perform a Breusch-Pagan test which investigates whether the squared residual (i.e. the estimated variance of the random error) could be explained linearly by the predictors (if this is true, then the variance is a function of the predictors, this is a strong indication that the equal variance assumption is violated). The computed p-value from a chi-squared distribution was extremely small (less than 0.01), we observed strong evidence against the null hypothesis that the equal variance assumption holds. Therefore, we can conclude that the equal variance assumption is violated and we need to consider some transformation techniques to resolve this issue.

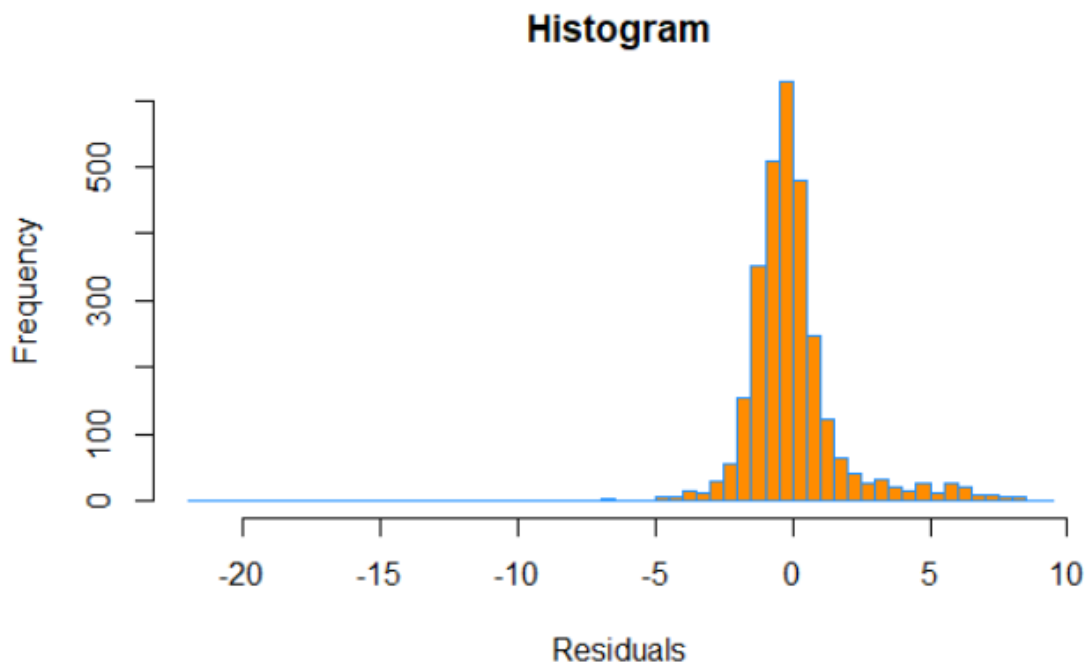
## Normality Assumption

As mentioned in the previous sections, one of the key assumptions is that the response variable (i.e. life expectancy) follows a normal distribution. Since it can be shown that in the simple linear regression,

$$\hat{\beta}_1 = \frac{\sum (x_i - \bar{x})Y_i}{S_{xx}}$$

This implies that beta is a linear combination of normal distributed random variables (hence normally distributed). Consequently, the inferences about betas (e.g. the hypothesis tests) are valid as long as they follow a normal distribution, or in other words, response variables follow a normal distribution. Therefore, if this normality assumption is violated, we can't make concrete inferences based on the model.

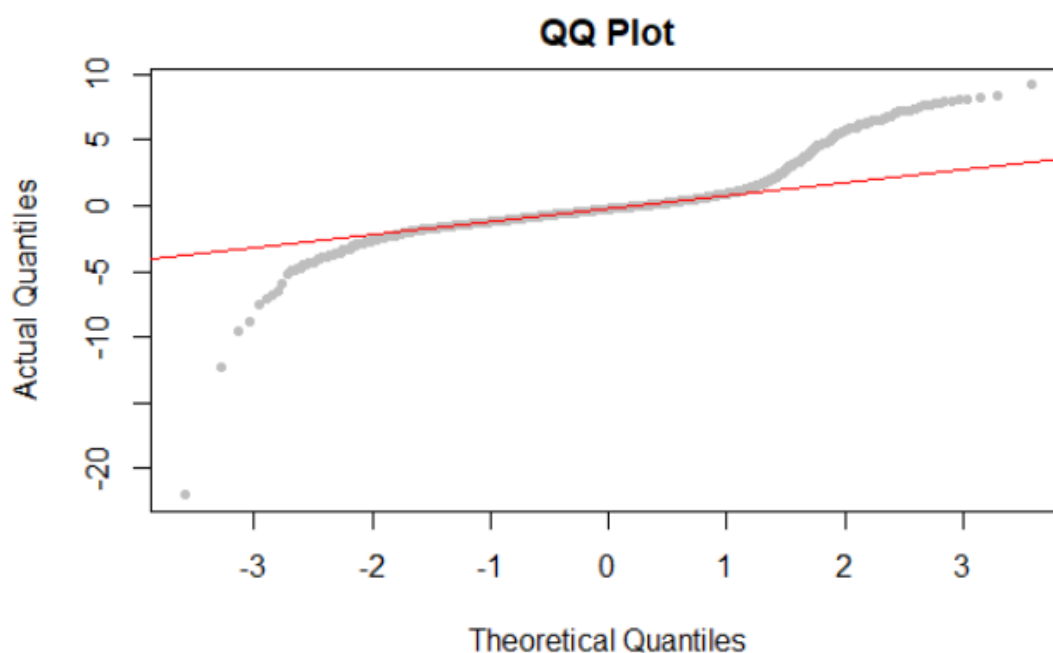
To assess the normality assumption, we could first check the histogram of residuals. Recall that the response variable is just a constant plus a random error that follows a normal distribution. Therefore, if the residuals (i.e. estimated random errors) are not normally distributed, we have evidence that the response is not normally distributed. We obtained the following graph.



We observed strong evidence against normality assumption. Most noticeably, the distribution is highly negatively skewed. We can further confirm our argument by comparing the quantiles of the residuals to the theoretical quantiles from a normal distribution via a Quantile-Quantile (QQ) plot. If the sample distribution of the residuals were normally distributed, then the quantiles should be changing in the same rate as the



changes of quantiles from a normal distribution. In case that the sample 5% quantile is smaller than the 5% quantile of a normal distribution, we expect that the sample distribution would have a heavier left tail than the normal distribution. The logic is that if the 5% sample quantile is -4 while the 5% theoretical quantile is -1.96. Then at -1.96, the sample quantile would be larger than 5% (e.g. 8%). This suggests that the sample distribution would have more area under the distribution curve (i.e. proportion of observations) to the left of -1.96 than a normal distribution (i.e. the heavy left tail). Therefore, any pattern other than a linear relationship between the sample and theoretical quantiles would be a strong indication that the sample does not follow a normal distribution. The QQ plot for our model is as below



This further confirms our suspicion that the residuals are not normally distributed. A Shapiro-wilk normality test was carried out to finalize our argument that the normality assumption is violated.

Next step, we will implement some transformations to the response and possibly to the predictors and try to find solutions to the violation of equal variance assumption.

## Summary of Model Assumptions

Model assumption	Violated?
Linearity	Unlikely
Equal variance	Yes
Normality	Yes

## Transformation

With Attempts to stabilize the variance, we considered the variance of the response variable ( $Var(Y)$ ) at any given predictors' level ( $x$ ) to be a function of the fitted value (i.e.  $Var(Y) = \sigma^2 f(\mu_x)$  at  $x$ ). Our goal

is to transform the response variable with another function (i.e.  $g(Y)$ ) so that the variance is stable and is not dependent on the predicted values by the model. The mathematical approach is working from a second degree Taylor's expansion on the transformation and got  $g(Y) \approx g(\mu_x) + (Y - \mu_x)g'(\mu_x)$ . Therefore, we have the following

$$Var(g(Y)) = Var(g(\mu_x)) + Var(Yg'(\mu_x)) - Var(\mu_x g'(\mu_x))$$

Since  $\mu_x$  is expected value of the response at  $x$ , it is a constant, applying a deterministic function  $g(\cdot)$  or  $g'(\cdot)$  to  $\mu_x$  would still result in a constant. Therefore,  $Var(g(\mu_x)) = Var(\mu_x g'(\mu_x)) = 0$  because variance of a constant is 0 (i.e. there is no variation!). Then the variance became

$$Var(g(Y)) = Var(Yg'(\mu_x)) = (g'(\mu_x))^2 Var(Y) = (g'(\mu_x))^2 * \sigma^2 f(\mu_x)$$

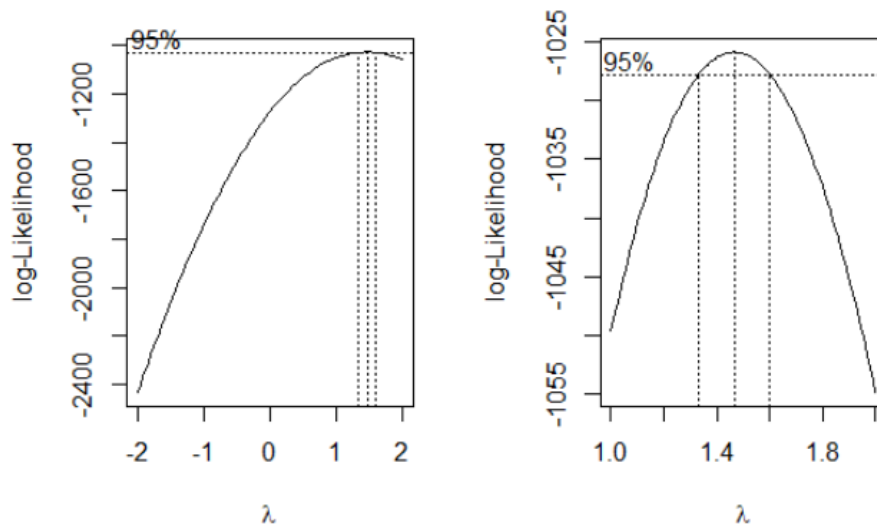
We wish to set the variance of transformed response to be a constant (e.g.  $c \sim \mathbb{R}$ ). This leads to

$$(g'(\mu_x))^2 * \sigma^2 f(\mu_x) = c$$

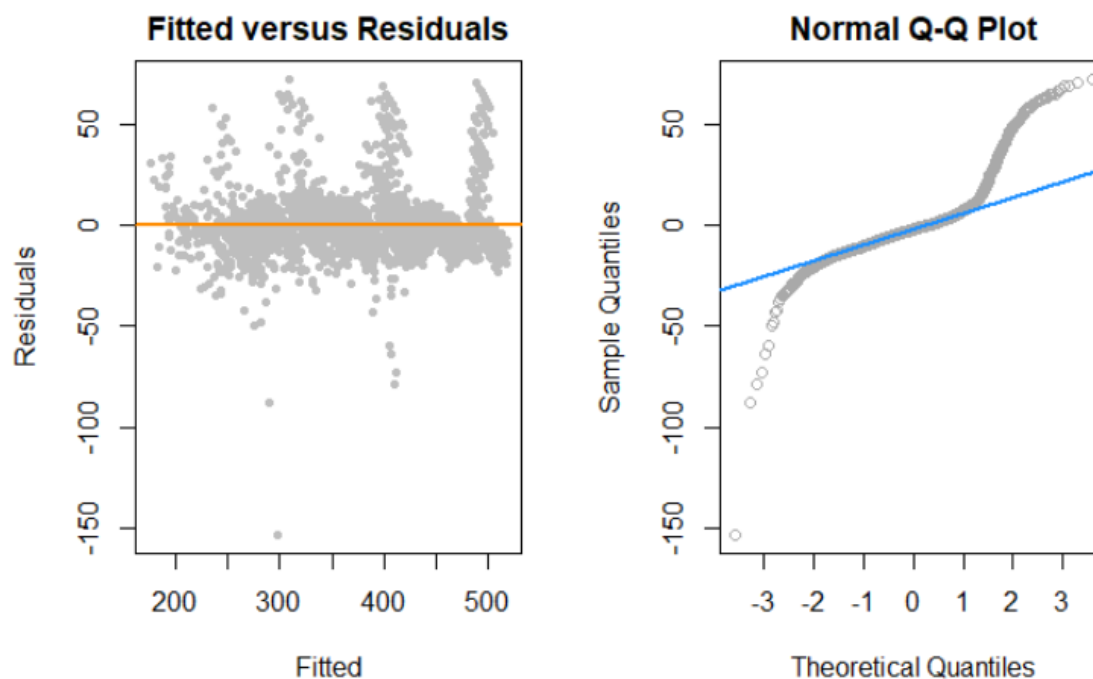
$$g(\mu_x) = \frac{c}{\sigma^2} \int \frac{1}{\sqrt{f(\mu_x)}} d\mu_x$$

Therefore, as long as  $f(\mu_x)$  (i.e. the function between residual and fitted value) is determined, we can determine the form of transformation of response (i.e.  $g(Y)$ ) to stabilize the variance of the residuals, and consequently stabilize the variance of the response variables.

We utilized the most general approach for determining the form of transformation by finding an optimal parameter, lambda, for a Box-Cox transformation. We chose lambda to be 1.5 after examining the following plots.



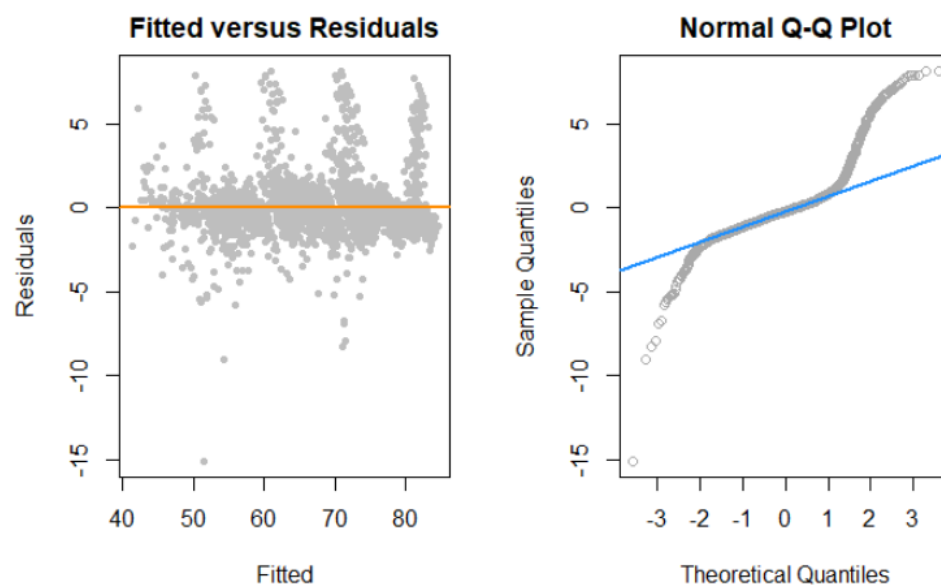
After refitting the multilinear regression with  $g(Y) = \frac{Y^\lambda - 1}{\lambda}$ , we obtained the following diagnostic plots.



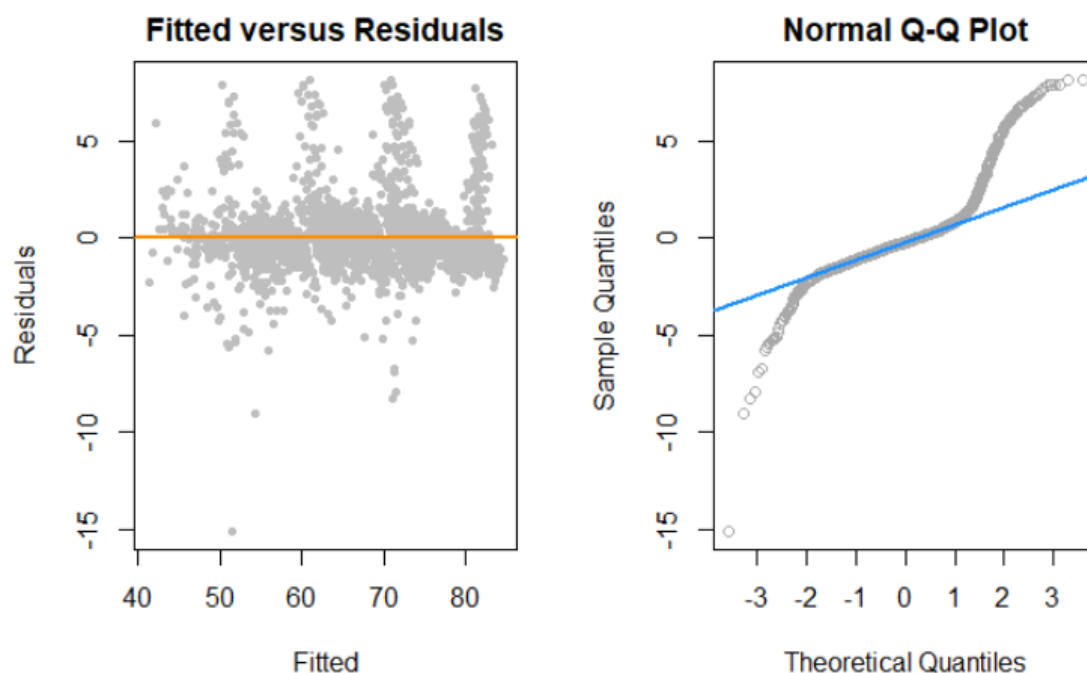
It is safe to assume that the transformation did not resolve the violation of equal variance assumption. This is not too surprising because the variance of the residuals does not seem to follow a pattern that is dependent on the fitted values. We will try some predictor transformation next.

### *Predictor transformation*

We can first try to include polynomial predictors (e.g. include all a quadratic term for each predictor). After fitting a quadratic model, we obtained the following model diagnostic plots



Clearly, this predictor transformation did not improve our issue. We also did a cubic fit just to be sure. The plots are as follows.



This result is not surprising because we cannot observe any discernable pattern on the residual plot. If there were such patterns, then it implies that our linear model is not good enough to explain the relationship between the response and predictors. In addition, we observed an unusual result. The adjusted  $R^2$  went up by including the quadratic terms and went up again by including the cubic terms while there were only marginal gains (e.g. 0.1%) increase in the  $R^2$  value. This is alarming because by including cubic terms, we increased 12 extra predictors which brought 0.1% increase in  $R^2$ , this implies that we increase a lot of predictors for a neglectable increase in predicting power. Adjusted  $R^2$  should be able to reflect this phenomenon by decreasing in its value. We observed some increase in adjusted  $R^2$  instead. Although, this could be understandable considering once all the countries have been dummy-coded into binary variables, 12 increase in predictors would seem insignificant. This actually revealed a situation where adjusted  $R^2$  is ineffective in determining the balance between predictive power and the complexity of the model.

Our next step is checking if there is any collinearity issue which could greatly influence the statistical significance of the beta parameters.

## *Multicollinearity*

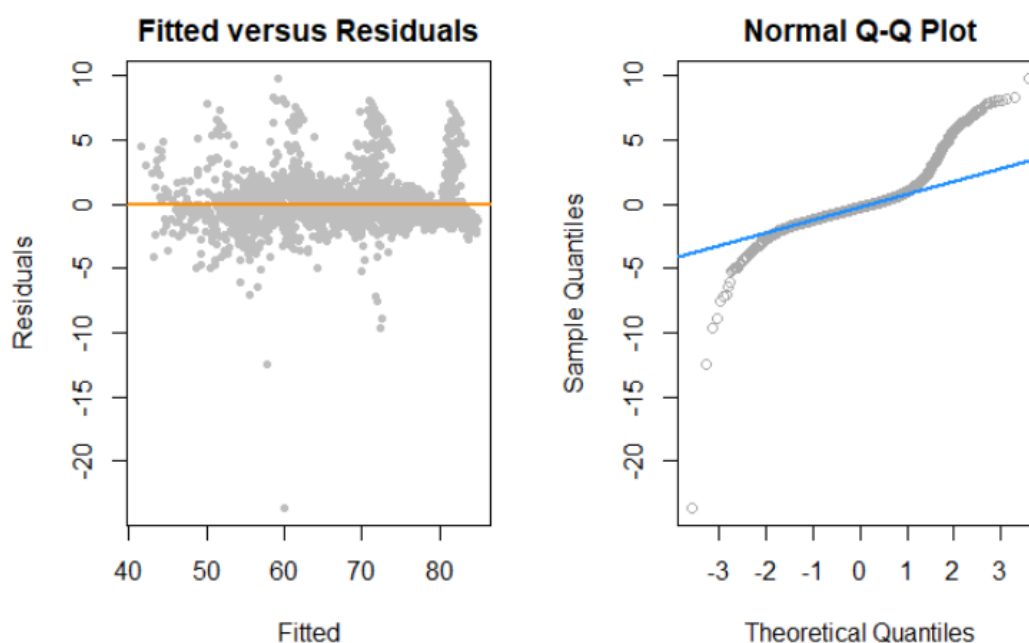
Multicollinearity describes the undesirable phenomenon in the model that some particular predictors (denoted explainable predictors) can be fairly explained by the other predictors in the model. In this case, even if the explainable predictors contribute to explaining the variation in the response variable, that portion could actually be explained by the other predictors since the variation in the explainable predictors themselves are explained by the other predictors. The danger of including such predictors is that it makes the standard error of its beta large so that we would fail to reject the null hypothesis that they are not important even if they are truly not important. Therefore, dropping the correlated predictors might be a good idea.

We tried to detect the multicollinearity through the calculation of variance inflation factor (VIF) which is one over the difference between 1 and the  $R^2$  which is derived from modelling a multilinearly regression of a predictor against the rest. If the VIF for a particular predictor is high, it signals that the  $R^2$  is high,

which implies other predictors could explain the predictor well (collinearity!).

There are three variables that have high VIFs, “Country India” has 23.38, “under five deaths” is 1275.47, and “infant deaths” is 1410.8. While we are unable to delete the first variable (because it is automatically dummy-coded), its VIF is inconsequential compared to the VIFs of the other variables. We decided to drop “under five deaths” and “infant deaths” to help improve the strength of the inference of beta parameters.

After removing the predictors, we obtained a better predictive performance with MSE of 3.95 compared to the previous best MSE, 4.6. Therefore, by removing those predictors that are high correlated with other predictors, we were able to remove the adverse effect that they had on the predictive power of our model. On the other hand, this action failed to adjust the model assumption. The resulting diagnostic plots are as follows



A summary of our attempts to resolve the violation of model assumptions are as follows.

Transformation	Stabilized variance?	Fixed normality assumption?
Box-cox transformation	No	No
Include quadratic terms	No	No
Include cubic terms	No	No
Remove predictors with high VIF	No	No

Next, we investigate whether there is interaction effect between the categorical and numerical variables that could help us interpret the relationship between the life expectancy and the predictors more thoroughly.

## Interactions

Finally, we wish to consider the possibility that the life expectancy of people in different countries would be affected differently from other predictors. For example, the rate of change in life expectancy of people resulted from change in schooling might be more rapid for people who live in the US than those who live in the UK. Therefore, we included the two way interaction terms between country and other predictors

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to see how did this impact our model.

This would add a few thousand predictors into the model which could introduce lots of variance for the model. On the other hand, the adjusted  $R^2$  increased all the way to 98.24% from 96.12%. We now need to perform a F test to see if those added interaction terms are statistically significant. The extremely-small p-value confirmed that at least one of the interaction terms are statistically significant. The SSE was decreased from 9594.7 to 1455.8 from adding the additional 1822 predictors. We highly suspect that this is overfitting. Therefore, we fitted the model to a training set and checked the predicting performance to a testing set. The resulting mean squared error is very large which confirms our suspicion. While the interaction model could be helpful in explaining the dataset better than the original multilinear regression model, the interaction model would perform extremely bad at making predictions on new data.

A comparison of models are as follows.

Results	Model without interaction	Model with interaction
# of parameters	206 (including 195 dummy variables)	2028
$R^2$	96.29%	99.45%
Adjusted $R^2$	96.02%	98.24%

## Conclusion

After performing analysis and trying various models for predicting the life expectancy, we conclude that even though our model with interaction gives exceptionally good results in terms of  $R^2$  and adjusted  $R^2$ , it is not good at predicting new data which is evident from the large MSE value. Also, our inferences about the regression coefficients are less accurate due the fact that our assumptions of equal variance and normality are violated even after trying various transformations on both response and predictor variables.

## Appendix

Project Code:

## Prepare Data

```
# read in data
```

```
dataLife = read.csv("Life Expectancy Data.csv")
```

```
# identify the missing values
```

```
summary(dataLife)
```

```
##      Country          Year      Status      Life.expectancy
## Length:2938      Min.   :2000 Length:2938      Min.   :36.30
## Class :character 1st Qu.:2004 Class :character 1st Qu.:63.10
## Mode  :character Median :2008 Mode  :character Median :72.10
##                      Mean   :2008                      Mean   :69.22
##                      3rd Qu.:2012                      3rd Qu.:75.70
##                      Max.   :2015                      Max.   :89.00
##                      NA's   :10
## Adult.Mortality infant.deaths      Alcohol      percentage.expenditur
## e
## Min.   : 1.0   Min.   : 0.0   Min.   : 0.0100   Min.   : 0.000
## 1st Qu.:74.0   1st Qu.: 0.0   1st Qu.: 0.8775   1st Qu.: 4.685
## Median :144.0   Median : 3.0   Median : 3.7550   Median : 64.913
## Mean   :164.8   Mean   :30.3   Mean   : 4.6029   Mean   : 738.251
## 3rd Qu.:228.0   3rd Qu.:22.0   3rd Qu.: 7.7025   3rd Qu.:441.534
##
## Max.   :723.0   Max.   :1800.0   Max.   :17.8700   Max.   :19479.912
## NA's   :10                      NA's   :194
## Hepatitis.B      Measles          BMI      under.five.deaths
## Min.   : 1.00   Min.   : 0.0   Min.   : 1.00   Min.   : 0.00
## 1st Qu.:77.00   1st Qu.: 0.0   1st Qu.:19.30   1st Qu.: 0.00
## Median :92.00   Median :17.0   Median :43.50   Median : 4.00
## Mean   :80.94   Mean   :2419.6   Mean   :38.32   Mean   :42.04
## 3rd Qu.:97.00   3rd Qu.:360.2   3rd Qu.:56.20   3rd Qu.:28.00
## Max.   :99.00   Max.   :212183.0   Max.   :87.30   Max.   :2500.00
## NA's   :553                      NA's   :34
## Polio      Total.expenditure      Diphtheria      HIV.AIDS
## Min.   : 3.00   Min.   : 0.370   Min.   : 2.00   Min.   : 0.100
## 1st Qu.:78.00   1st Qu.: 4.260   1st Qu.:78.00   1st Qu.: 0.100
```

```
## Median :93.00   Median : 5.755   Median :93.00   Median : 0.100
## Mean    :82.55   Mean    : 5.938   Mean    :82.32   Mean    : 1.742
## 3rd Qu.:97.00   3rd Qu.: 7.492   3rd Qu.:97.00   3rd Qu.: 0.800
## Max.    :99.00   Max.    :17.600   Max.    :99.00   Max.    :50.600
## NA's    :19     NA's    :226     NA's    :19
##      GDP      Population      thinness..1.19.years
## Min.   :    1.68   Min.   :3.400e+01   Min.   : 0.10
## 1st Qu.:   463.94   1st Qu.:1.958e+05   1st Qu.: 1.60
## Median :  1766.95   Median :1.387e+06   Median : 3.30
## Mean    :  7483.16   Mean    :1.275e+07   Mean    : 4.84
## 3rd Qu.:  5910.81   3rd Qu.:7.420e+06   3rd Qu.: 7.20
## Max.    :119172.74   Max.    :1.294e+09   Max.    :27.70
## NA's    :448       NA's    :652       NA's    :34
## thinness.5.9.years Income.composition.of.resources Schooling
## Min.    : 0.10     Min.    :0.0000     Min.    : 0.00
## 1st Qu.: 1.50     1st Qu.:0.4930     1st Qu.:10.10
## Median : 3.30     Median :0.6770     Median :12.30
## Mean    : 4.87     Mean    :0.6276     Mean    :11.99
## 3rd Qu.: 7.20     3rd Qu.:0.7790     3rd Qu.:14.30
## Max.    :28.60     Max.    :0.9480     Max.    :20.70
## NA's    :34       NA's    :167       NA's    :163
```

*# drop the Hepatitis, GDP, and population predictor, and replace the remaining missing values with the median/mode of the other records*

```
dataLife$Life.expectancy[is.na(dataLife$Life.expectancy)] <- median(dataLife$Life.expectancy, na.rm=TRUE)
dataLife$Adult.Mortality[is.na(dataLife$Adult.Mortality)] <- median(dataLife$Adult.Mortality, na.rm=TRUE)
dataLife$Alcohol[is.na(dataLife$Alcohol)] <- median(dataLife$Alcohol, na.rm=TRUE)
dataLife$BMI[is.na(dataLife$BMI)] <- median(dataLife$BMI, na.rm=TRUE)
dataLife$Polio[is.na(dataLife$Polio)] <- median(dataLife$Polio, na.rm=TRUE)
dataLife$Total.expenditure[is.na(dataLife$Total.expenditure)] <- median(dataLife$Total.expenditure, na.rm=TRUE)
dataLife$Diphtheria[is.na(dataLife$Diphtheria)] <- median(dataLife$Diphtheria, na.rm=TRUE)
dataLife$thinness..1.19.years[is.na(dataLife$thinness..1.19.years)] <- median(dataLife$thinness..1.19.years, na.rm=TRUE)
dataLife$thinness.5.9.years[is.na(dataLife$thinness.5.9.years)] <- median(dataLife$thinness.5.9.years, na.rm=TRUE)
dataLife$Income.composition.of.resources[is.na(dataLife$Income.composition.of.resources)] <- median(dataLife$Income.composition.of.resources, na.rm=TRUE)
dataLife$Schooling[is.na(dataLife$Schooling)] <- median(dataLife$Schooling
```



```
, na.rm=TRUE)
drop = c("Hepatitis.B", "GDP", "Population")
dataLife = dataLife[,!(names(dataLife) %in% drop)]
summary(dataLife)
```

##	Country	Year	Status	Life.expectancy
##	Length:2938	Min. :2000	Length:2938	Min. :36.30
##	Class :character	1st Qu.:2004	Class :character	1st Qu.:63.20
##	Mode :character	Median :2008	Mode :character	Median :72.10
##		Mean :2008		Mean :69.23
##		3rd Qu.:2012		3rd Qu.:75.60
##		Max. :2015		Max. :89.00
##	Adult.Mortality	infant.deaths	Alcohol	percentage.expenditure
##	Min. : 1.0	Min. : 0.0	Min. : 0.010	Min. : 0.000
##	1st Qu.: 74.0	1st Qu.: 0.0	1st Qu.: 1.093	1st Qu.: 4.685
##	Median :144.0	Median : 3.0	Median : 3.755	Median : 64.913
##	Mean :164.7	Mean : 30.3	Mean : 4.547	Mean : 738.251
##	3rd Qu.:227.0	3rd Qu.: 22.0	3rd Qu.: 7.390	3rd Qu.: 441.534
##	Max. :723.0	Max. :1800.0	Max. :17.870	Max. :19479.912
##	Measles	BMI	under.five.deaths	Polio
##	Min. : 0.0	Min. : 1.00	Min. : 0.00	Min. : 3.00
##	1st Qu.: 0.0	1st Qu.:19.40	1st Qu.: 0.00	1st Qu.:78.00
##	Median : 17.0	Median :43.50	Median : 4.00	Median :93.00
##	Mean : 2419.6	Mean :38.38	Mean : 42.04	Mean :82.62
##	3rd Qu.: 360.2	3rd Qu.:56.10	3rd Qu.: 28.00	3rd Qu.:97.00
##	Max. :212183.0	Max. :87.30	Max. :2500.00	Max. :99.00
##	Total.expenditure	Diphtheria	HIV.AIDS	thinness..1.19.years
##	Min. : 0.370	Min. : 2.00	Min. : 0.100	Min. : 0.100
##	1st Qu.: 4.370	1st Qu.:78.00	1st Qu.: 0.100	1st Qu.: 1.600
##	Median : 5.755	Median :93.00	Median : 0.100	Median : 3.300
##	Mean : 5.924	Mean :82.39	Mean : 1.742	Mean : 4.822
##	3rd Qu.: 7.330	3rd Qu.:97.00	3rd Qu.: 0.800	3rd Qu.: 7.100
##	Max. :17.600	Max. :99.00	Max. :50.600	Max. :27.700
##	thinness.5.9.years	Income.composition.of.resources	Schooling	
##	Min. : 0.100	Min. :0.0000		Min. : 0.00
##	1st Qu.: 1.600	1st Qu.:0.5042		1st Qu.:10.30
##	Median : 3.300	Median :0.6770		Median :12.30
##	Mean : 4.852	Mean :0.6304		Mean :12.01
##	3rd Qu.: 7.200	3rd Qu.:0.7720		3rd Qu.:14.10
##	Max. :28.600	Max. :0.9480		Max. :20.70

# Find most predictive model

use stepwise selection

```
# we can split the data into train and test to evaluate performance

# now get the index of training set
set.seed(251203021)
n = nrow(dataLife)
idx_tr = sample(n, round(0.70*n), replace=FALSE)

# now separate training and testing set from the whole dataset
dataLife_tr = dataLife[idx_tr,]
dataLife_ts = dataLife[-idx_tr,]

# add records present in test set but not in training set to training set so
# that the model know what to do with those records when making prediction
# in the test set (possible leaking of information)
dataLife_tr = rbind(dataLife_tr, dataLife_ts[which(dataLife_ts$Country=='Cook Islands' | dataLife_ts$Country=='San Marino'),])

# now fit the stepwise selection with AIC on training set

# null model
fit_null2 = lm(Life.expectancy~1, data=dataLife_tr)

# stepwise AIC with forward selection
fit_step_AIC = step(fit_null2, direction="both",
                    scope=Life.expectancy~Year+Adult.Mortality+infant.deaths
                    +Alcohol
                    +percentage.expenditure+Measles+BMI+under.five.deaths
                    +Polio+Total.expenditure+Diphtheria+HIV.AIDS
                    +thinness..1.19.years+thinness.5.9.years+Income.composit
                    ion.of.resources
                    +Schooling+Country+Status, trace=FALSE)
#summary(fit_step_AIC)
AIC(fit_step_AIC)
```

```
## [1] 8452.656

# stepwise BIC with forward selection
fit_step_BIC = step(fit_null2, direction="both",
                    scope=Life.expectancy~Year+Adult.Mortality+infant.deaths
+Alcohol
                    +percentage.expenditure+Measles+BMI+under.five.deaths
+Polio+Total.expenditure+Diphtheria+HIV.AIDS
                    +thinness..1.19.years+thinness.5.9.years+Income.composit
ion.of.resources
                    +Schooling+Country+Status, trace=FALSE, k=log(nrow(dataLi
fe_tr)))
#summary(fit_step_BIC)
BIC(fit_step_BIC)

## [1] 9585.281

# assess the performance of stepwise with AIC and BIC
ypr_step_AIC = predict(fit_step_AIC, newdata=dataLife_ts[, -4])
mse_step_AIC = mean((ypr_step_AIC - dataLife_ts[, 4])^2)
mse_step_AIC

## [1] 4.60087

ypr_step_BIC = predict(fit_step_BIC, newdata=dataLife_ts[, -4])
mse_step_BIC = mean((ypr_step_BIC - dataLife_ts[, 4])^2)
mse_step_BIC

## [1] 4.6122
```

comment: they both are pretty good

## use shrinkage methods

```
# fist separate the x and y
X = model.matrix(Life.expectancy~., dataLife)[, -1] # exclude the intercept c
olumn
y = dataLife$Life.expectancy

# define the training and testing set
X_tr = X[idx_tr,]
y_tr = y[idx_tr]
```

```

X_ts = X[-idx_tr,]
y_ts = y[-idx_tr]

# now try to use shrinkage methods

# Ridge Regression
library(glmnet)

## Loading required package: Matrix

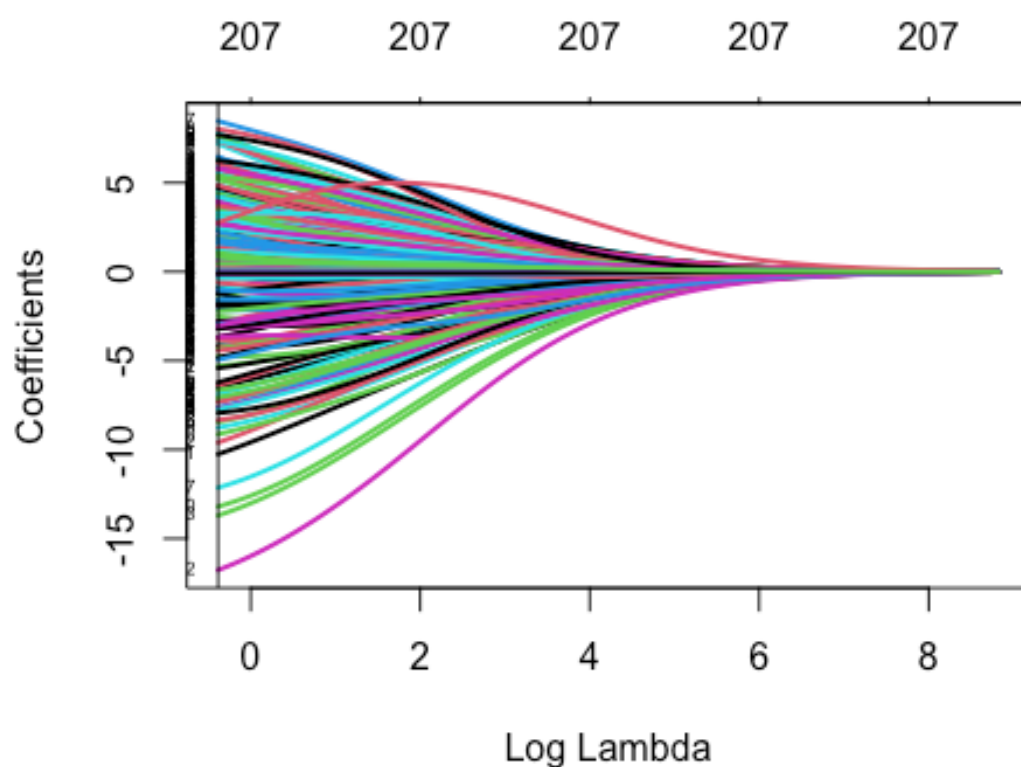
## Loaded glmnet 4.1-3

# try to find the best lambda (strength of penalty)
fit_ridge_cv = cv.glmnet(X_tr,y_tr,alpha=0,nfolds=20)
bestlam = fit_ridge_cv$lambda.min
bestlam

## [1] 0.6801249

# plot the best lambda with ridge regression
fit_ridge = glmnet(X_tr, y_tr, alpha=0)
plot(fit_ridge, xvar="lambda",label=TRUE,lwd=2)
abline(v=log(bestlam))

```



```
# now fit the data with the best lambda
fit_ridge_best = glmnet(X_tr, y_tr, alpha=0, lambda=bestlam)

# assess performance
ypr_ridge = predict(fit_ridge_best, newx=X_ts)
mse_ridge = mean((ypr_ridge - y_ts)^2)
mse_ridge

## [1] 5.383279
```

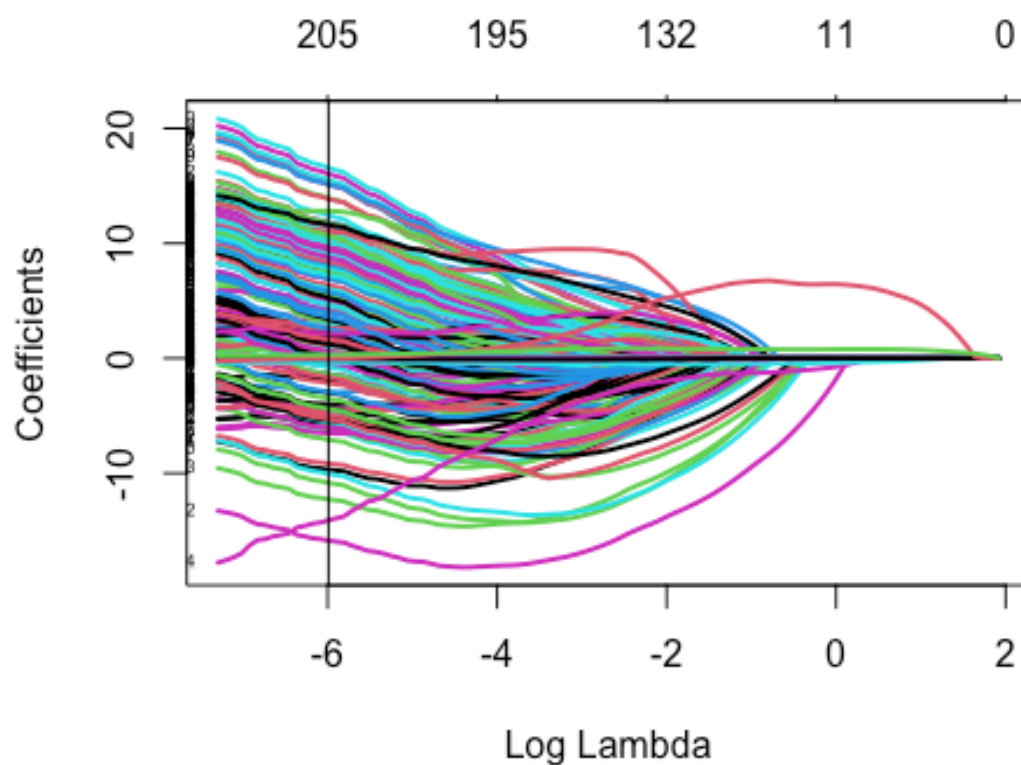
comment: ridge is not better than models from stepwise selection algorithm

```
# LASSO regression

# again, find the best parameter
fit_lasso_cv = cv.glmnet(X_tr, y_tr, alpha=1, nfolds=20)
bestlam = fit_lasso_cv$lambda.min
bestlam

## [1] 0.002501758

# see the plot
fit_lasso = glmnet(X_tr, y_tr, alpha=1)
plot(fit_lasso, xvar="lambda", label=TRUE, lwd=2)
abline(v=log(bestlam))
```



```
fit_lasso_best = glmnet(X_tr, y_tr, alpha=1, lambda=bestlam)
```

```
# assess performance
```

```
ypr_lasso = predict(fit_lasso_best, newx=X_ts)
```

```
mse_lasso = mean((ypr_lasso - y_ts)^2)
```

```
mse_lasso
```

```
## [1] 4.833505
```

comment: lasso is not better than models from step-wise selection

## elastic net

```
# grid search for best alpha to use in the elastic net
```

```
set.seed(251203021)
```

```
alphas = seq(0,1,0.1)
```

```
lowest_error=1000000
```

```

for (i in alphas) {
  fit_cv = cv.glmnet(X_tr,y_tr,alpha=i,nfolds=10)
  bestlam = fit_cv$lambda.min

  fit_elastic = glmnet(X_tr, y_tr, alpha=i, lambda=bestlam)
  ypr_elastic = predict(fit_elastic,newx=X_ts)
  mse_elastic = mean((ypr_elastic - y_ts)^2)

  if (mse_elastic < lowest_error) {
    lowest_error = mse_elastic
    best_mse = mse_elastic
    best_alpha = i
    best_lambda = bestlam
  }
}

```

comment: find that around  $\alpha = 0.2$  produced lowest mse, will look into more detail

## investgate further

```

# grid search for best alpha to use in the elastic net

alphas = seq(0.1,0.3,0.02)

lowest_error=1000000

for (i in alphas) {
  fit_cv = cv.glmnet(X_tr,y_tr,alpha=i,nfolds=10)
  bestlam = fit_cv$lambda.min

  fit_elastic = glmnet(X_tr, y_tr, alpha=i, lambda=bestlam)
  ypr_elastic = predict(fit_elastic,newx=X_ts)
  mse_elastic = mean((ypr_elastic - y_ts)^2)

  if (mse_elastic < lowest_error) {
    lowest_error = mse_elastic
    best_mse = mse_elastic
    best_alpha = i
    best_lambda = bestlam
  }
}

```

```

    }
}

# best parameters
best_alpha

## [1] 0.3

best_lambda

## [1] 0.005237256

# fit the final elastic net model with optimum parameters and assess the performance
fit_elastic_final = glmnet(X_tr, y_tr, alpha=best_alpha, lambda=best_lambda)
ypr_elastic = predict(fit_elastic_final, newx=X_ts)
mse_elastic = mean((ypr_elastic - y_ts)^2)
mse_elastic

## [1] 4.815191

```

choose a model

```

# choose model from stepwise selection with BIC
# now fit the whole model

# null model
my_null = lm(Life.expectancy~1, data=dataLife)

# stepwise AIC with forward selection
my_fit = step(my_null, direction="both",
              scope=Life.expectancy~Year+Adult.Mortality+infant.deaths
+Alcohol
+percentage.expenditure+Measles+BMI+under.five.deaths
+Polio+Total.expenditure+Diphtheria+HIV.AIDS
+thinness..1.19.years+thinness.5.9.years+Income.composit
ion.of.resources
+Schooling+Country+Status, trace=FALSE)
options(max.print=4000)
summary(my_fit)

##
## Call:

```



```
## lm(formula = Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
##   Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +
##   Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +
##     percentage.expenditure, data = dataLife)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -21.9448  -0.8910  -0.2353   0.4299   9.1831
##
## Coefficients:
##                                     Estimate
## (Intercept)                      -4.578e+02
## CountryAlbania                     1.610e+01
## CountryAlgeria                     1.399e+01
## CountryAngola                      -6.681e+00
## CountryAntigua and Barbuda         1.664e+01
## CountryArgentina                   1.572e+01
## CountryArmenia                     1.449e+01
## CountryAustralia                   2.205e+01
## CountryAustria                     2.228e+01
## CountryAzerbaijan                  1.178e+01
## CountryBahamas                     1.572e+01
## CountryBahrain                     1.604e+01
## CountryBangladesh                  9.769e+00
## CountryBarbados                    1.525e+01
## CountryBelarus                     1.134e+01
## CountryBelgium                     2.136e+01
## CountryBelize                      1.048e+01
## CountryBenin                       7.463e-02
## CountryBhutan                      7.035e+00
## CountryBolivia (Plurinational State of) 8.688e+00
## CountryBosnia and Herzegovina      1.716e+01
## CountryBotswana                    2.950e+00
## CountryBrazil                      1.342e+01
## CountryBrunei Darussalam           1.668e+01
## CountryBulgaria                    1.411e+01
## CountryBurkina Faso                -2.463e-01
## CountryBurundi                    -1.273e+00
## CountryCabo Verde                  1.355e+01
## CountryCambodia                    5.802e+00
## CountryCameroon                   -1.348e+00
## CountryCanada                      2.228e+01
## CountryCentral African Republic   -6.056e+00
```

---

## CountryChad	-4.801e+00
## CountryChile	2.028e+01
## CountryChina	1.284e+01
## CountryColombia	1.433e+01
## CountryComoros	3.052e+00
## CountryCongo	2.424e+00
## CountryCook Islands	1.150e+01
## CountryCosta Rica	1.969e+01
## CountryCôte d'Ivoire	-6.239e+00
## CountryCroatia	1.734e+01
## CountryCuba	1.851e+01
## CountryCyprus	2.075e+01
## CountryCzechia	1.820e+01
## CountryDemocratic People's Republic of Korea	1.014e+01
## CountryDemocratic Republic of the Congo	-1.521e+00
## CountryDenmark	1.985e+01
## CountryDjibouti	4.082e+00
## CountryDominica	1.146e+01
## CountryDominican Republic	1.389e+01
## CountryEcuador	1.576e+01
## CountryEgypt	1.188e+01
## CountryEl Salvador	1.289e+01
## CountryEquatorial Guinea	-6.815e-01
## CountryEritrea	3.096e+00
## CountryEstonia	1.581e+01
## CountryEthiopia	4.325e+00
## CountryFiji	9.241e+00
## CountryFinland	2.127e+01
## CountryFrance	2.302e+01
## CountryGabon	6.373e+00
## CountryGambia	1.884e+00
## CountryGeorgia	1.470e+01
## CountryGermany	2.179e+01
## CountryGhana	3.250e+00
## CountryGreece	2.204e+01
## CountryGrenada	1.419e+01
## CountryGuatemala	1.320e+01
## CountryGuinea	-9.105e-01
## CountryGuinea-Bissau	-1.397e+00
## CountryGuyana	7.498e+00
## CountryHaiti	2.924e+00
## CountryHonduras	1.447e+01
## CountryHungary	1.495e+01
## CountryIceland	2.273e+01

## CountryIndia	3.850e+00
## CountryIndonesia	7.690e+00
## CountryIran (Islamic Republic of)	1.414e+01
## CountryIraq	1.148e+01
## CountryIreland	2.085e+01
## CountryIsrael	2.173e+01
## CountryItaly	2.287e+01
## CountryJamaica	1.574e+01
## CountryJapan	2.321e+01
## CountryJordan	1.363e+01
## CountryKazakhstan	7.724e+00
## CountryKenya	2.564e+00
## CountryKiribati	6.348e+00
## CountryKuwait	1.418e+01
## CountryKyrgyzstan	1.003e+01
## CountryLao People's Democratic Republic	4.106e+00
## CountryLatvia	1.465e+01
## CountryLebanon	1.495e+01
## CountryLesotho	-1.639e+00
## CountryLiberia	1.016e-01
## CountryLibya	1.278e+01
## CountryLithuania	1.376e+01
## CountryLuxembourg	2.170e+01
## CountryMadagascar	4.791e+00
## CountryMalawi	-2.380e+00
## CountryMalaysia	1.424e+01
## CountryMaldives	1.602e+01
## CountryMali	-1.236e+00
## CountryMalta	2.133e+01
## CountryMarshall Islands	1.384e+01
## CountryMauritania	4.907e+00
## CountryMauritius	1.335e+01
## CountryMexico	1.634e+01
## CountryMicronesia (Federated States of)	9.838e+00
## CountryMonaco	1.141e+01
## CountryMongolia	6.933e+00
## CountryMontenegro	1.573e+01
## CountryMorocco	1.282e+01
## CountryMozambique	-5.796e-01
## CountryMyanmar	5.469e+00
## CountryNamibia	6.260e+00
## CountryNauru	1.201e+01
## CountryNepal	7.284e+00
## CountryNetherlands	2.157e+01

## CountryNew Zealand	2.189e+01
## CountryNicaragua	1.480e+01
## CountryNiger	2.007e+00
## CountryNigeria	3.480e+00
## CountryNiue	1.163e+01
## CountryNorway	2.218e+01
## CountryOman	1.526e+01
## CountryPakistan	3.433e+00
## CountryPalau	1.165e+01
## CountryPanama	1.775e+01
## CountryPapua New Guinea	3.949e+00
## CountryParaguay	1.438e+01
## CountryPeru	1.469e+01
## CountryPhilippines	8.558e+00
## CountryPoland	1.653e+01
## CountryPortugal	2.091e+01
## CountryQatar	1.747e+01
## CountryRepublic of Korea	2.177e+01
## CountryRepublic of Moldova	1.158e+01
## CountryRomania	1.509e+01
## CountryRussian Federation	9.001e+00
## CountryRwanda	2.668e+00
## CountrySaint Kitts and Nevis	1.183e+01
## CountrySaint Lucia	1.510e+01
## CountrySaint Vincent and the Grenadines	1.450e+01
## CountrySamoa	1.493e+01
## CountrySan Marino	1.140e+01
## CountrySao Tome and Principe	6.743e+00
## CountrySaudi Arabia	1.363e+01
## CountrySenegal	4.723e+00
## CountrySerbia	1.507e+01
## CountrySeychelles	1.325e+01
## CountrySierra Leone	-1.097e+01
## CountrySingapore	2.187e+01
## CountrySlovakia	1.590e+01
## CountrySlovenia	2.053e+01
## CountrySolomon Islands	9.283e+00
## CountrySomalia	-3.917e+00
## CountrySouth Africa	5.494e+00
## CountrySouth Sudan	-1.590e+00
## CountrySpain	2.279e+01
## CountrySri Lanka	1.366e+01
## CountrySudan	4.566e+00
## CountrySuriname	1.164e+01

## CountrySwaziland	3.804e+00
## CountrySweden	2.308e+01
## CountrySwitzerland	2.284e+01
## CountrySyrian Arab Republic	1.201e+01
## CountryTajikistan	7.760e+00
## CountryThailand	1.392e+01
## CountryThe former Yugoslav republic of Macedonia	1.496e+01
## CountryTimor-Leste	5.667e+00
## CountryTogo	-4.868e-01
## CountryTonga	1.342e+01
## CountryTrinidad and Tobago	1.251e+01
## CountryTunisia	1.459e+01
## CountryTurkey	1.453e+01
## CountryTurkmenistan	5.875e+00
## CountryTuvalu	1.451e+01
## CountryUganda	1.462e+00
## CountryUkraine	1.134e+01
## CountryUnited Arab Emirates	1.615e+01
## CountryUnited Kingdom of Great Britain and Northern Ireland	2.226e+01
## CountryUnited Republic of Tanzania	5.641e-01
## CountryUnited States of America	1.939e+01
## CountryUruguay	1.696e+01
## CountryUzbekistan	8.852e+00
## CountryVanuatu	1.277e+01
## CountryVenezuela (Bolivarian Republic of)	1.471e+01
## CountryViet Nam	1.530e+01
## CountryYemen	5.095e+00
## CountryZambia	-8.635e-02
## CountryZimbabwe	4.654e-01
## Year	2.564e-01
## HIV.AIDS	-3.276e-01
## Schooling	1.350e-01
## Diphtheria	5.015e-03
## Adult.Mortality	-1.930e-03
## under.five.deaths	-6.298e-02
## infant.deaths	8.555e-02
## Measles	-1.183e-05
## Alcohol	-5.608e-02
## Polio	4.497e-03
## thinness.5.9.years	3.485e-02
## Total.expenditure	-3.889e-02
## percentage.expenditure	3.943e-05
##	Std. Error t valu
e	

## (Intercept)	1.981e+01	-23.1
02		
## CountryAlbania	7.688e-01	20.9
39		
## CountryAlgeria	7.296e-01	19.1
78		
## CountryAngola	7.257e-01	-9.2
05		
## CountryAntigua and Barbuda	7.563e-01	22.
003		
## CountryArgentina	8.176e-01	19.
232		
## CountryArmenia	7.560e-01	19.1
63		
## CountryAustralia	8.904e-01	24.
760		
## CountryAustria	8.323e-01	26.7
68		
## CountryAzerbaijan	7.380e-01	15.
957		
## CountryBahamas	7.807e-01	20.1
30		
## CountryBahrain	7.544e-01	21.2
63		
## CountryBangladesh	6.996e-01	13.
965		
## CountryBarbados	7.806e-01	19.5
42		
## CountryBelarus	8.186e-01	13.8
47		
## CountryBelgium	8.445e-01	25.2
89		
## CountryBelize	7.582e-01	13.8
25		
## CountryBenin	6.962e-01	0.1
07		
## CountryBhutan	6.882e-01	10.2
23		
## CountryBolivia (Plurinational State of)	7.729e-01	11
.241		
## CountryBosnia and Herzegovina	7.505e-01	22
.871		
## CountryBotswana	7.660e-01	3.8
51		

## CountryBrazil	7.736e-01	17.3
51		
## CountryBrunei Darussalam	7.591e-01	21.
974		
## CountryBulgaria	7.953e-01	17.7
39		
## CountryBurkina Faso	7.294e-01	-0.
338		
## CountryBurundi	7.035e-01	-1.8
09		
## CountryCabo Verde	7.200e-01	18.
817		
## CountryCambodia	6.842e-01	8.4
80		
## CountryCameroon	7.190e-01	-1.8
75		
## CountryCanada	8.236e-01	27.0
54		
## CountryCentral African Republic	7.204e-01	-8
.407		
## CountryChad	7.200e-01	-6.6
67		
## CountryChile	7.976e-01	25.4
27		
## CountryChina	9.809e-01	13.0
93		
## CountryColombia	7.526e-01	19.0
45		
## CountryComoros	7.032e-01	4.3
40		
## CountryCongo	7.081e-01	3.4
23		
## CountryCook Islands	1.972e+00	5.
831		
## CountryCosta Rica	7.591e-01	25.
940		
## CountryCôte d'Ivoire	7.192e-01	-8.
675		
## CountryCroatia	8.115e-01	21.3
70		
## CountryCuba	7.745e-01	23.8
98		
## CountryCyprus	8.044e-01	25.8
01		

## CountryCzechia 16	8.048e-01	22.6
## CountryDemocratic People's Republic of Korea 3.867	7.311e-01	1
## CountryDemocratic Republic of the Congo .959	7.761e-01	-1
## CountryDenmark 80	8.490e-01	23.3
## CountryDjibouti 56	7.218e-01	5.6
## CountryDominica 36	1.963e+00	5.8
## CountryDominican Republic 387	7.554e-01	18.
## CountryEcuador 77	7.657e-01	20.5
## CountryEgypt 88	7.383e-01	16.0
## CountryEl Salvador 038	7.568e-01	17.
## CountryEquatorial Guinea 931	7.323e-01	-0.
## CountryEritrea 29	7.152e-01	4.3
## CountryEstonia 42	8.092e-01	19.5
## CountryEthiopia 64	7.504e-01	5.7
## CountryFiji 88	7.645e-01	12.0
## CountryFinland 70	8.418e-01	25.2
## CountryFrance 57	8.444e-01	27.2
## CountryGabon 04	7.494e-01	8.5
## CountryGambia 63	7.076e-01	2.6
## CountryGeorgia 73	7.549e-01	19.4
## CountryGermany 76	8.485e-01	25.6
## CountryGhana 29	7.021e-01	4.6



## CountryGreece 02	8.193e-01	26.9
## CountryGrenada 20	7.872e-01	18.0
## CountryGuatemala 779	7.426e-01	17.
## CountryGuinea 01	6.998e-01	-1.3
## CountryGuinea-Bissau 974	7.073e-01	-1.
## CountryGuyana 92	7.357e-01	10.1
## CountryHaiti 26	7.264e-01	4.0
## CountryHonduras 27	7.450e-01	19.4
## CountryHungary 73	8.138e-01	18.3
## CountryIceland 40	8.499e-01	26.7
## CountryIndia 95	2.272e+00	1.6
## CountryIndonesia 127	7.593e-01	10.
## CountryIran (Islamic Republic of) .708	7.173e-01	19
## CountryIraq 78	7.096e-01	16.1
## CountryIreland 07	8.686e-01	24.0
## CountryIsrael 18	7.985e-01	27.2
## CountryItaly 42	8.214e-01	27.8
## CountryJamaica 62	7.617e-01	20.6
## CountryJapan 77	8.039e-01	28.8
## CountryJordan 23	7.478e-01	18.2
## CountryKazakhstan 920	7.786e-01	9.
## CountryKenya 11	7.100e-01	3.6

## CountryKiribati 14	7.636e-01	8.3
## CountryKuwait 52	7.726e-01	18.3
## CountryKyrgyzstan 465	7.451e-01	13.
## CountryLao People's Democratic Republic .771	7.116e-01	5
## CountryLatvia 75	8.014e-01	18.2
## CountryLebanon 88	7.444e-01	20.0
## CountryLesotho 70	7.917e-01	-2.0
## CountryLiberia 45	6.993e-01	0.1
## CountryLibya 03	7.603e-01	16.8
## CountryLithuania 712	8.235e-01	16.
## CountryLuxembourg 948	8.362e-01	25.
## CountryMadagascar 895	6.950e-01	6.
## CountryMalawi 54	7.545e-01	-3.1
## CountryMalaysia 74	7.239e-01	19.6
## CountryMaldives 75	7.002e-01	22.8
## CountryMali 15	7.205e-01	-1.7
## CountryMalta 43	7.947e-01	26.8
## CountryMarshall Islands 927	1.998e+00	6.
## CountryMauritania 944	7.066e-01	6.
## CountryMauritius 139	7.358e-01	18.
## CountryMexico 07	7.595e-01	21.5
## CountryMicronesia (Federated States of) .993	7.572e-01	12

## CountryMonaco 15	1.962e+00	5.8
## CountryMongolia 48	7.579e-01	9.1
## CountryMontenegro 106	7.454e-01	21.
## CountryMorocco 46	7.141e-01	17.9
## CountryMozambique 781	7.419e-01	-0.
## CountryMyanmar 10	6.827e-01	8.0
## CountryNamibia 04	7.275e-01	8.6
## CountryNauru 09	1.966e+00	6.1
## CountryNepal 40	6.782e-01	10.7
## CountryNetherlands 753	8.374e-01	25.
## CountryNew Zealand 299	8.653e-01	25.
## CountryNicaragua 744	7.494e-01	19.
## CountryNiger 76	7.499e-01	2.6
## CountryNigeria 87	1.249e+00	2.7
## CountryNiue 07	1.969e+00	5.9
## CountryNorway 92	8.372e-01	26.4
## CountryOman 44	7.356e-01	20.7
## CountryPakistan 42	9.175e-01	3.7
## CountryPalau 98	1.976e+00	5.8
## CountryPanama 25	7.645e-01	23.2
## CountryPapua New Guinea 352	7.378e-01	5.
## CountryParaguay 08	7.567e-01	19.0

## CountryPeru	7.709e-01	19.0
59		
## CountryPhilippines	7.025e-01	12.
181		
## CountryPoland	8.056e-01	20.5
13		
## CountryPortugal	8.402e-01	24.8
88		
## CountryQatar	7.562e-01	23.1
08		
## CountryRepublic of Korea	7.871e-01	27.
653		
## CountryRepublic of Moldova	7.677e-01	15.
085		
## CountryRomania	7.790e-01	19.3
72		
## CountryRussian Federation	7.907e-01	11.
383		
## CountryRwanda	7.194e-01	3.7
08		
## CountrySaint Kitts and Nevis	1.970e+00	6.
003		
## CountrySaint Lucia	7.736e-01	19.
522		
## CountrySaint Vincent and the Grenadines	7.636e-01	18
.993		
## CountrySamoa	7.695e-01	19.4
08		
## CountrySan Marino	1.966e+00	5.8
00		
## CountrySao Tome and Principe	7.177e-01	9.
395		
## CountrySaudi Arabia	7.363e-01	18.
511		
## CountrySenegal	7.006e-01	6.7
41		
## CountrySerbia	7.813e-01	19.2
83		
## CountrySeychelles	7.474e-01	17.
729		
## CountrySierra Leone	6.998e-01	-15.
677		
## CountrySingapore	7.816e-01	27.
976		

## CountrySlovakia 20	8.062e-01	19.7
## CountrySlovenia 38	8.266e-01	24.8
## CountrySolomon Islands 467	7.446e-01	12.
## CountrySomalia 51	7.186e-01	-5.4
## CountrySouth Africa 246	7.581e-01	7.
## CountrySouth Sudan 048	7.762e-01	-2.
## CountrySpain 57	8.332e-01	27.3
## CountrySri Lanka 62	7.128e-01	19.1
## CountrySudan 93	7.256e-01	6.2
## CountrySuriname 64	7.429e-01	15.6
## CountrySwaziland 67	8.712e-01	4.3
## CountrySweden 22	8.149e-01	28.3
## CountrySwitzerland 539	8.608e-01	26.
## CountrySyrian Arab Republic 804	7.145e-01	16.
## CountryTajikistan 663	7.278e-01	10.
## CountryThailand 68	7.298e-01	19.0
## CountryThe former Yugoslav republic of Macedonia 9.800	7.554e-01	1
## CountryTimor-Leste 103	6.994e-01	8.
## CountryTogo 91	7.045e-01	-0.6
## CountryTonga 84	7.852e-01	17.0
## CountryTrinidad and Tobago 101	7.312e-01	17.
## CountryTunisia 18	7.476e-01	19.5

## CountryTurkey 78	7.309e-01	19.8
## CountryTurkmenistan 926	7.412e-01	7.
## CountryTuvalu 58	1.999e+00	7.2
## CountryUganda 66	7.436e-01	1.9
## CountryUkraine 02	7.769e-01	14.6
## CountryUnited Arab Emirates 494	7.513e-01	21.
## CountryUnited Kingdom of Great Britain and Northern Ireland 27.705	8.035e-01	
## CountryUnited Republic of Tanzania .770	7.326e-01	0
## CountryUnited States of America .479	7.922e-01	24
## CountryUruguay 95	7.927e-01	21.3
## CountryUzbekistan 982	7.388e-01	11.
## CountryVanuatu 62	7.486e-01	17.0
## CountryVenezuela (Bolivarian Republic of) 9.083	7.707e-01	1
## CountryViet Nam 26	6.913e-01	22.1
## CountryYemen 81	6.721e-01	7.5
## CountryZambia 18	7.344e-01	-0.1
## CountryZimbabwe 88	7.916e-01	0.5
## Year 0	9.944e-03	25.79
## HIV.AIDS 20	1.494e-02	-21.9
## Schooling 09	3.640e-02	3.7
## Diphtheria 99	2.280e-03	2.1
## Adult.Mortality 06	4.483e-04	-4.3

## under.five.deaths	7.697e-03	-8.
183		
## infant.deaths	1.101e-02	7.7
67		
## Measles	4.293e-06	-2.7
56		
## Alcohol	2.302e-02	-2.4
36		
## Polio	2.236e-03	2.01
1		
## thinness.5.9.years	2.094e-02	1.
664		
## Total.expenditure	2.205e-02	-1.
764		
## percentage.expenditure	2.627e-05	1.
501		
##	Pr(> t )	
## (Intercept)	< 2e-16 ***	
## CountryAlbania	< 2e-16 ***	
## CountryAlgeria	< 2e-16 ***	
## CountryAngola	< 2e-16 ***	
## CountryAntigua and Barbuda	< 2e-16 ***	
## CountryArgentina	< 2e-16 ***	
## CountryArmenia	< 2e-16 ***	
## CountryAustralia	< 2e-16 ***	
## CountryAustria	< 2e-16 ***	
## CountryAzerbaijan	< 2e-16 ***	
## CountryBahamas	< 2e-16 ***	
## CountryBahrain	< 2e-16 ***	
## CountryBangladesh	< 2e-16 ***	
## CountryBarbados	< 2e-16 ***	
## CountryBelarus	< 2e-16 ***	
## CountryBelgium	< 2e-16 ***	
## CountryBelize	< 2e-16 ***	
## CountryBenin	0.914635	
## CountryBhutan	< 2e-16 ***	
## CountryBolivia (Plurinational State of)	< 2e-16 ***	
## CountryBosnia and Herzegovina	< 2e-16 ***	
## CountryBotswana	0.000120 ***	
## CountryBrazil	< 2e-16 ***	
## CountryBrunei Darussalam	< 2e-16 ***	
## CountryBulgaria	< 2e-16 ***	
## CountryBurkina Faso	0.735579	
## CountryBurundi	0.070546 .	

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## CountryCabo Verde	< 2e-16 ***
## CountryCambodia	< 2e-16 ***
## CountryCameroon	0.060921 .
## CountryCanada	< 2e-16 ***
## CountryCentral African Republic	< 2e-16 ***
## CountryChad	3.14e-11 ***
## CountryChile	< 2e-16 ***
## CountryChina	< 2e-16 ***
## CountryColombia	< 2e-16 ***
## CountryComoros	1.48e-05 ***
## CountryCongo	0.000628 ***
## CountryCook Islands	6.15e-09 ***
## CountryCosta Rica	< 2e-16 ***
## CountryCôte d'Ivoire	< 2e-16 ***
## CountryCroatia	< 2e-16 ***
## CountryCuba	< 2e-16 ***
## CountryCyprus	< 2e-16 ***
## CountryCzechia	< 2e-16 ***
## CountryDemocratic People's Republic of Korea	< 2e-16 ***
## CountryDemocratic Republic of the Congo	0.050188 .
## CountryDenmark	< 2e-16 ***
## CountryDjibouti	1.71e-08 ***
## CountryDominica	5.97e-09 ***
## CountryDominican Republic	< 2e-16 ***
## CountryEcuador	< 2e-16 ***
## CountryEgypt	< 2e-16 ***
## CountryEl Salvador	< 2e-16 ***
## CountryEquatorial Guinea	0.352148
## CountryEritrea	1.56e-05 ***
## CountryEstonia	< 2e-16 ***
## CountryEthiopia	9.13e-09 ***
## CountryFiji	< 2e-16 ***
## CountryFinland	< 2e-16 ***
## CountryFrance	< 2e-16 ***
## CountryGabon	< 2e-16 ***
## CountryGambia	0.007782 **
## CountryGeorgia	< 2e-16 ***
## CountryGermany	< 2e-16 ***
## CountryGhana	3.85e-06 ***
## CountryGreece	< 2e-16 ***
## CountryGrenada	< 2e-16 ***
## CountryGuatemala	< 2e-16 ***
## CountryGuinea	0.193319
## CountryGuinea-Bissau	0.048443 *



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## CountryGuyana	< 2e-16 ***
## CountryHaiti	5.83e-05 ***
## CountryHonduras	< 2e-16 ***
## CountryHungary	< 2e-16 ***
## CountryIceland	< 2e-16 ***
## CountryIndia	0.090204 .
## CountryIndonesia	< 2e-16 ***
## CountryIran (Islamic Republic of)	< 2e-16 ***
## CountryIraq	< 2e-16 ***
## CountryIreland	< 2e-16 ***
## CountryIsrael	< 2e-16 ***
## CountryItaly	< 2e-16 ***
## CountryJamaica	< 2e-16 ***
## CountryJapan	< 2e-16 ***
## CountryJordan	< 2e-16 ***
## CountryKazakhstan	< 2e-16 ***
## CountryKenya	0.000310 ***
## CountryKiribati	< 2e-16 ***
## CountryKuwait	< 2e-16 ***
## CountryKyrgyzstan	< 2e-16 ***
## CountryLao People's Democratic Republic	8.78e-09 ***
## CountryLatvia	< 2e-16 ***
## CountryLebanon	< 2e-16 ***
## CountryLesotho	0.038577 *
## CountryLiberia	0.884473
## CountryLibya	< 2e-16 ***
## CountryLithuania	< 2e-16 ***
## CountryLuxembourg	< 2e-16 ***
## CountryMadagascar	6.68e-12 ***
## CountryMalawi	0.001630 **
## CountryMalaysia	< 2e-16 ***
## CountryMaldives	< 2e-16 ***
## CountryMali	0.086396 .
## CountryMalta	< 2e-16 ***
## CountryMarshall Islands	5.33e-12 ***
## CountryMauritania	4.74e-12 ***
## CountryMauritius	< 2e-16 ***
## CountryMexico	< 2e-16 ***
## CountryMicronesia (Federated States of)	< 2e-16 ***
## CountryMonaco	6.75e-09 ***
## CountryMongolia	< 2e-16 ***
## CountryMontenegro	< 2e-16 ***
## CountryMorocco	< 2e-16 ***
## CountryMozambique	0.434728

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## CountryMyanmar	1.68e-15 ***
## CountryNamibia	< 2e-16 ***
## CountryNauru	1.15e-09 ***
## CountryNepal	< 2e-16 ***
## CountryNetherlands	< 2e-16 ***
## CountryNew Zealand	< 2e-16 ***
## CountryNicaragua	< 2e-16 ***
## CountryNiger	0.007497 **
## CountryNigeria	0.005350 **
## CountryNiue	3.93e-09 ***
## CountryNorway	< 2e-16 ***
## CountryOman	< 2e-16 ***
## CountryPakistan	0.000186 ***
## CountryPalau	4.13e-09 ***
## CountryPanama	< 2e-16 ***
## CountryPapua New Guinea	9.41e-08 ***
## CountryParaguay	< 2e-16 ***
## CountryPeru	< 2e-16 ***
## CountryPhilippines	< 2e-16 ***
## CountryPoland	< 2e-16 ***
## CountryPortugal	< 2e-16 ***
## CountryQatar	< 2e-16 ***
## CountryRepublic of Korea	< 2e-16 ***
## CountryRepublic of Moldova	< 2e-16 ***
## CountryRomania	< 2e-16 ***
## CountryRussian Federation	< 2e-16 ***
## CountryRwanda	0.000213 ***
## CountrySaint Kitts and Nevis	2.20e-09 ***
## CountrySaint Lucia	< 2e-16 ***
## CountrySaint Vincent and the Grenadines	< 2e-16 ***
## CountrySamoa	< 2e-16 ***
## CountrySan Marino	7.40e-09 ***
## CountrySao Tome and Principe	< 2e-16 ***
## CountrySaudi Arabia	< 2e-16 ***
## CountrySenegal	1.91e-11 ***
## CountrySerbia	< 2e-16 ***
## CountrySeychelles	< 2e-16 ***
## CountrySierra Leone	< 2e-16 ***
## CountrySingapore	< 2e-16 ***
## CountrySlovakia	< 2e-16 ***
## CountrySlovenia	< 2e-16 ***
## CountrySolomon Islands	< 2e-16 ***
## CountrySomalia	5.45e-08 ***
## CountrySouth Africa	5.54e-13 ***

## CountrySouth Sudan	0.040683 *
## CountrySpain	< 2e-16 ***
## CountrySri Lanka	< 2e-16 ***
## CountrySudan	3.63e-10 ***
## CountrySuriname	< 2e-16 ***
## CountrySwaziland	1.31e-05 ***
## CountrySweden	< 2e-16 ***
## CountrySwitzerland	< 2e-16 ***
## CountrySyrian Arab Republic	< 2e-16 ***
## CountryTajikistan	< 2e-16 ***
## CountryThailand	< 2e-16 ***
## CountryThe former Yugoslav republic of Macedonia	< 2e-16 ***
## CountryTimor-Leste	8.03e-16 ***
## CountryTogo	0.489667
## CountryTonga	< 2e-16 ***
## CountryTrinidad and Tobago	< 2e-16 ***
## CountryTunisia	< 2e-16 ***
## CountryTurkey	< 2e-16 ***
## CountryTurkmenistan	3.27e-15 ***
## CountryTuvalu	5.11e-13 ***
## CountryUganda	0.049442 *
## CountryUkraine	< 2e-16 ***
## CountryUnited Arab Emirates	< 2e-16 ***
## CountryUnited Kingdom of Great Britain and Northern Ireland	< 2e-16 ***
## CountryUnited Republic of Tanzania	0.441431
## CountryUnited States of America	< 2e-16 ***
## CountryUruguay	< 2e-16 ***
## CountryUzbekistan	< 2e-16 ***
## CountryVanuatu	< 2e-16 ***
## CountryVenezuela (Bolivarian Republic of)	< 2e-16 ***
## CountryViet Nam	< 2e-16 ***
## CountryYemen	4.67e-14 ***
## CountryZambia	0.906408
## CountryZimbabwe	0.556636
## Year	< 2e-16 ***
## HIV.AIDS	< 2e-16 ***
## Schooling	0.000213 ***
## Diphtheria	0.027927 *
## Adult.Mortality	1.72e-05 ***
## under.five.deaths	4.21e-16 ***
## infant.deaths	1.13e-14 ***
## Measles	0.005899 **
## Alcohol	0.014895 *
## Polio	0.044394 *

```
## thinness.5.9.years                0.096135 .
## Total.expenditure                 0.077819 .
## percentage.expenditure            0.133571
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.874 on 2732 degrees of freedom
## Multiple R-squared:  0.9639, Adjusted R-squared:  0.9612
## F-statistic: 355.5 on 205 and 2732 DF,  p-value: < 2.2e-16
```

## model diagnostic

### unusual observations

```
# check for unusual observations

# check cooks distance
influencial_idx = which(cooks.distance(my_fit) > 4 / length(cooks.distance(
my_fit)))

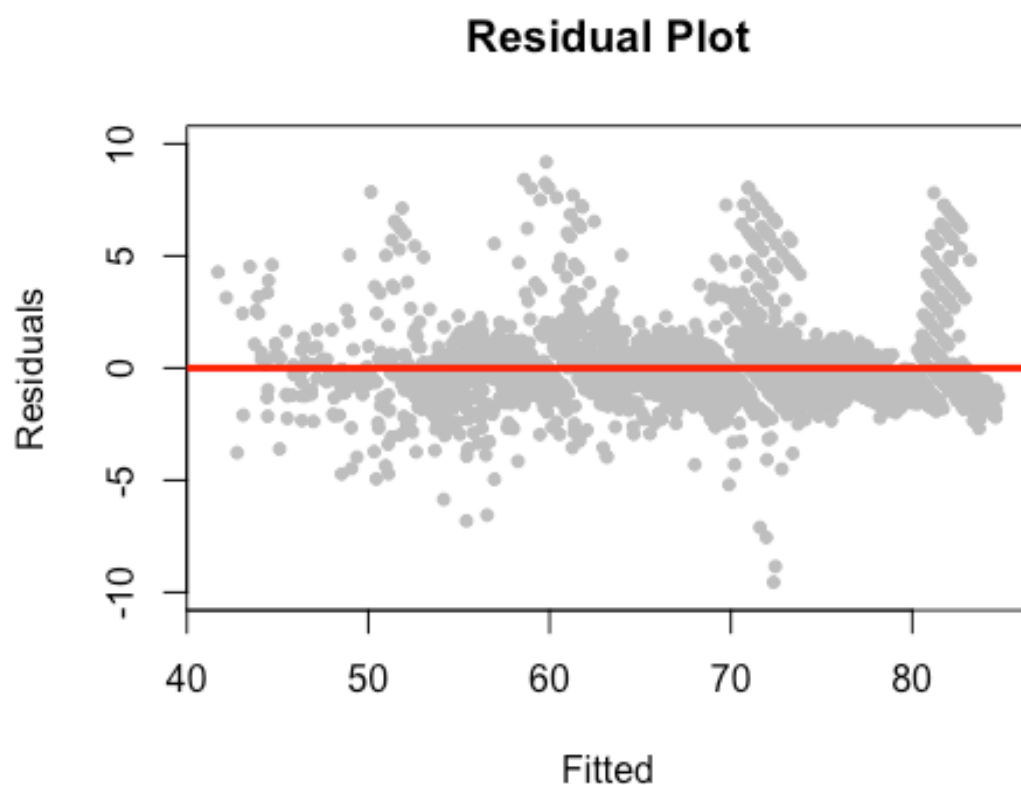
# remove the tags on influencial_idx
influencial_idx = unname(influencial_idx)

#influencial_idx
length(influencial_idx)

## [1] 190
```

### residual plot

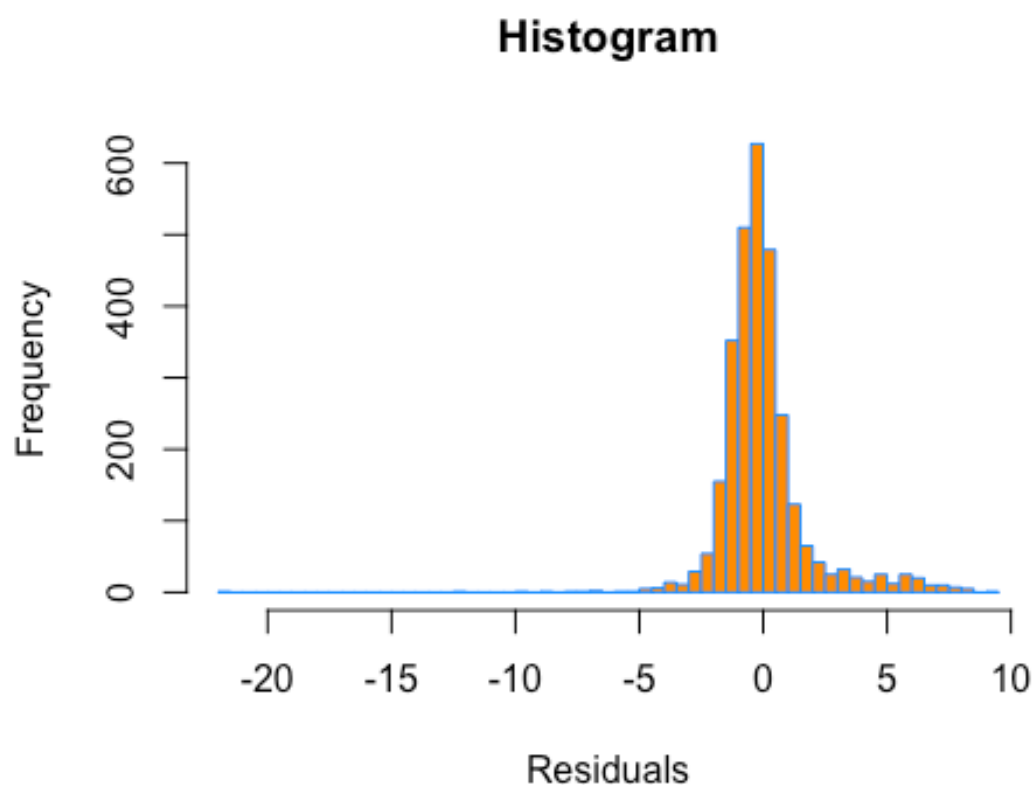
```
# residual plot
plot(fitted(my_fit), resid(my_fit), col="grey", pch=20,
      xlab = "Fitted", ylab = "Residuals", main="Residual Plot", ylim=c(-10,1
0))
abline(h=0, col="red", lwd=3)
```



comment: the residual plot shows evidence against equal variance assumption but the linearity assumption is okay

histogram

```
# histogram of residual  
hist(resid(my_fit), xlab="Residuals", main="Histogram",  
      col = "darkorange", border = "dodgerblue", breaks=70)
```



```
# the distribution is skewed to the left
```

## QQ plot

```
# normal QQ plot  
qqnorm(resid(my_fit),main="QQ Plot",col="grey",pch=20,  
        xlab = "Theoretical Quantiles", ylab = "Actual Quantiles")  
qqline(resid(my_fit),col="red")
```



comment: the normality assumption is violated

test statistics

```
# BP test
library(lmtest)

## Loading required package: zoo

##
## Attaching package: 'zoo'

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

bptest(my_fit)

##
## studentized Breusch-Pagan test
##
```

```
## data: my_fit
## BP = 381.94, df = 205, p-value = 8.445e-13

# SW test
shapiro.test(resid(my_fit))

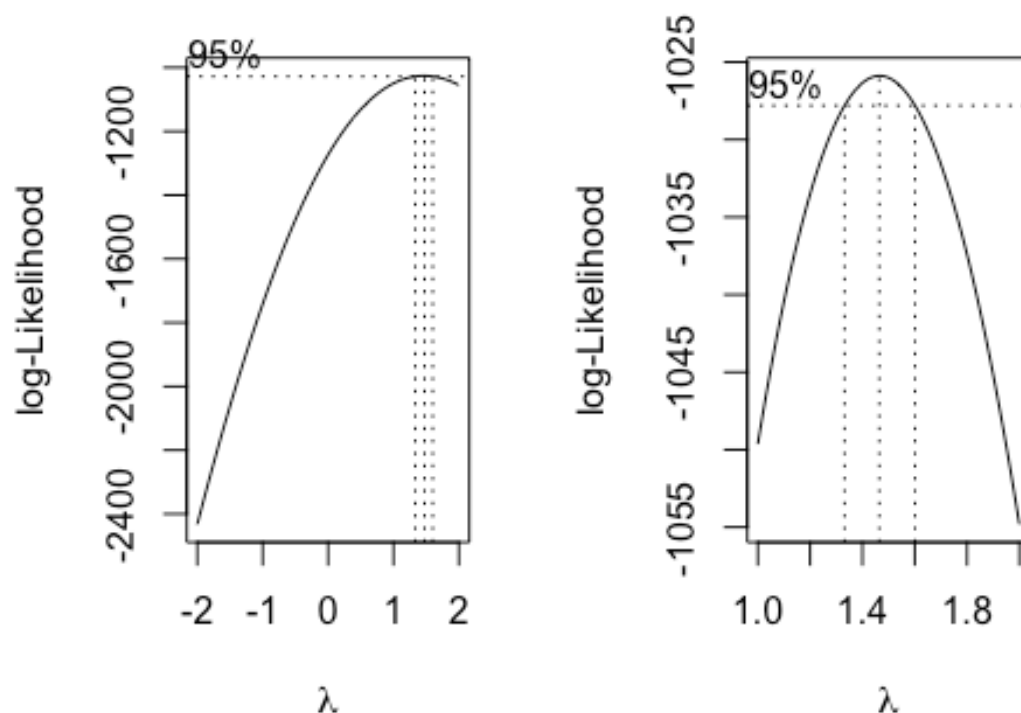
##
##  Shapiro-Wilk normality test
##
## data:  resid(my_fit)
## W = 0.81617, p-value < 2.2e-16
```

comment: we reject both null hypothesis that (equal variance and normality assumption is not violated)

As there are many influential points, it should not be removed

```
# Box-cox transformation
library(MASS)
par(mfrow=c(1,2))
boxcox(object = my_fit)
boxcox(object = my_fit, lambda = seq(1, 2, by = 0.05))
```





```
# assess the result of box-cox transformation
```

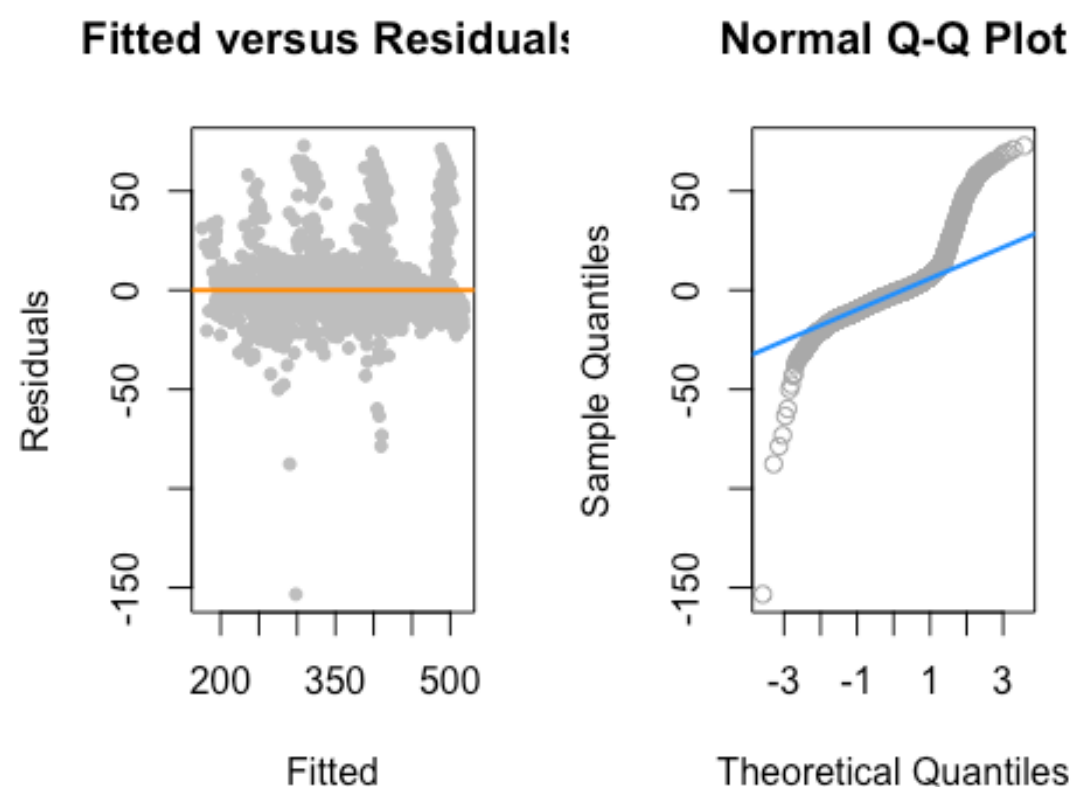
```
lambda = 1.5
```

```
lm_fit_transf <- lm(((Life.expectancy^(lambda)-1)/(lambda))~Country + Year  
+ HIV.AIDS + Schooling +  
  Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +  
  Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +  
  percentage.expenditure, data = dataLife)
```

```
par(mfrow=c(1,2))
```

```
plot(resid(lm_fit_transf)~fitted(lm_fit_transf), col = "grey", pch = 20,  
      xlab = "Fitted", ylab = "Residuals", main = "Fitted versus Residuals")  
abline(h = 0, col = "darkorange", lwd = 2)
```

```
qqnorm(resid(lm_fit_transf), main = "Normal Q-Q Plot", col = "darkgrey")  
qqline(resid(lm_fit_transf), col = "dodgerblue", lwd = 2)
```



polynomial terms

```
# quadratic model
lm_quadratic <- lm(Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
+
+ Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +
+ Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +
+ percentage.expenditure + I(HIV.AIDS^2) + I(Schooling^2) + I(Diphtheria^
2)
+ I(Adult.Mortality^2) + I(under.five.deaths^2) + I(infant.deaths^2) +
+ I(Measles^2) + I(Alcohol^2) + I(Polio^2) + I(thinness.5.9.years^2) + I(Tota
l.expenditure^2) + I(percentage.expenditure^2), data = dataLife)
summary(lm_quadratic)

##
## Call:
## lm(formula = Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
##     Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +
##     Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +
##     percentage.expenditure + I(HIV.AIDS^2) + I(Schooling^2) +
```

```

##      I(Diphtheria^2) + I(Adult.Mortality^2) + I(under.five.deaths^2) +
##      I(infant.deaths^2) + I(Measles^2) + I(Alcohol^2) + I(Polio^2) +
##      I(thinness.5.9.years^2) + I(Total.expenditure^2) + I(percentage.expe
nditure^2),
##      data = dataLife)
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -15.0929  -0.8377  -0.2260   0.3786   8.1598
##
## Coefficients:
##                                     Estimate
## (Intercept)                       -4.009e+02
## CountryAlbania                     1.521e+01
## CountryAlgeria                     1.266e+01
## CountryAngola                      -4.537e+00
## CountryAntigua and Barbuda         1.512e+01
## CountryArgentina                   1.453e+01
## CountryArmenia                     1.337e+01
## CountryAustralia                   2.121e+01
## CountryAustria                     2.157e+01
## CountryAzerbaijan                  1.105e+01
## CountryBahamas                     1.446e+01
## CountryBahrain                     1.486e+01
## CountryBangladesh                  8.560e+00
## CountryBarbados                    1.450e+01
## CountryBelarus                     9.979e+00
## CountryBelgium                     2.029e+01
## CountryBelize                      9.210e+00
## CountryBenin                       9.714e-02
## CountryBhutan                      5.504e+00
## CountryBolivia (Plurinational State of) 7.800e+00
## CountryBosnia and Herzegovina      1.647e+01
## CountryBotswana                    2.962e+00
## CountryBrazil                      1.081e+01
## CountryBrunei Darussalam           1.551e+01
## CountryBulgaria                    1.300e+01
## CountryBurkina Faso                1.234e+00
## CountryBurundi                    -1.387e+00
## CountryCabo Verde                  1.229e+01
## CountryCambodia                    4.774e+00
## CountryCameroon                    2.809e-01
## CountryCanada                      2.135e+01
## CountryCentral African Republic    -4.811e+00

```

---

## CountryChad	-2.729e+00
## CountryChile	1.939e+01
## CountryChina	9.517e+00
## CountryColombia	1.321e+01
## CountryComoros	2.070e+00
## CountryCongo	2.386e+00
## CountryCook Islands	1.026e+01
## CountryCosta Rica	1.887e+01
## CountryCôte d'Ivoire	-4.845e+00
## CountryCroatia	1.636e+01
## CountryCuba	1.751e+01
## CountryCyprus	1.982e+01
## CountryCzechia	1.725e+01
## CountryDemocratic People's Republic of Korea	9.016e+00
## CountryDemocratic Republic of the Congo	-6.429e-01
## CountryDenmark	1.890e+01
## CountryDjibouti	3.630e+00
## CountryDominica	1.032e+01
## CountryDominican Republic	1.319e+01
## CountryEcuador	1.471e+01
## CountryEgypt	9.925e+00
## CountryEl Salvador	1.177e+01
## CountryEquatorial Guinea	-8.547e-01
## CountryEritrea	2.154e+00
## CountryEstonia	1.462e+01
## CountryEthiopia	7.812e+00
## CountryFiji	8.044e+00
## CountryFinland	2.013e+01
## CountryFrance	2.173e+01
## CountryGabon	6.347e+00
## CountryGambia	9.900e-01
## CountryGeorgia	1.374e+01
## CountryGermany	2.067e+01
## CountryGhana	3.201e+00
## CountryGreece	2.094e+01
## CountryGrenada	1.283e+01
## CountryGuatemala	1.241e+01
## CountryGuinea	-2.404e-01
## CountryGuinea-Bissau	-1.337e+00
## CountryGuyana	6.303e+00
## CountryHaiti	3.445e+00
## CountryHonduras	1.321e+01
## CountryHungary	1.358e+01
## CountryIceland	2.179e+01

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## CountryIndia	4.635e+00
## CountryIndonesia	6.117e+00
## CountryIran (Islamic Republic of)	1.247e+01
## CountryIraq	1.078e+01
## CountryIreland	2.008e+01
## CountryIsrael	2.087e+01
## CountryItaly	2.193e+01
## CountryJamaica	1.456e+01
## CountryJapan	2.220e+01
## CountryJordan	1.218e+01
## CountryKazakhstan	6.204e+00
## CountryKenya	3.553e+00
## CountryKiribati	5.579e+00
## CountryKuwait	1.290e+01
## CountryKyrgyzstan	8.636e+00
## CountryLao People's Democratic Republic	3.573e+00
## CountryLatvia	1.342e+01
## CountryLebanon	1.455e+01
## CountryLesotho	-8.337e-01
## CountryLiberia	-3.579e-01
## CountryLibya	1.131e+01
## CountryLithuania	1.281e+01
## CountryLuxembourg	2.074e+01
## CountryMadagascar	4.644e+00
## CountryMalawi	-7.926e-01
## CountryMalaysia	1.285e+01
## CountryMaldives	1.458e+01
## CountryMali	9.828e-01
## CountryMalta	2.063e+01
## CountryMarshall Islands	1.224e+01
## CountryMauritania	4.565e+00
## CountryMauritius	1.179e+01
## CountryMexico	1.468e+01
## CountryMicronesia (Federated States of)	8.919e+00
## CountryMonaco	1.006e+01
## CountryMongolia	5.524e+00
## CountryMontenegro	1.475e+01
## CountryMorocco	1.130e+01
## CountryMozambique	8.551e-01
## CountryMyanmar	4.883e+00
## CountryNamibia	5.882e+00
## CountryNauru	1.132e+01
## CountryNepal	6.316e+00
## CountryNetherlands	2.043e+01

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## CountryNew Zealand	2.100e+01
## CountryNicaragua	1.357e+01
## CountryNiger	5.257e+00
## CountryNigeria	1.036e+01
## CountryNiue	1.039e+01
## CountryNorway	2.130e+01
## CountryOman	1.401e+01
## CountryPakistan	1.933e+00
## CountryPalau	1.028e+01
## CountryPanama	1.675e+01
## CountryPapua New Guinea	3.787e+00
## CountryParaguay	1.330e+01
## CountryPeru	1.369e+01
## CountryPhilippines	7.330e+00
## CountryPoland	1.527e+01
## CountryPortugal	1.996e+01
## CountryQatar	1.629e+01
## CountryRepublic of Korea	2.076e+01
## CountryRepublic of Moldova	1.009e+01
## CountryRomania	1.370e+01
## CountryRussian Federation	7.516e+00
## CountryRwanda	2.427e+00
## CountrySaint Kitts and Nevis	1.063e+01
## CountrySaint Lucia	1.383e+01
## CountrySaint Vincent and the Grenadines	1.303e+01
## CountrySamoa	1.459e+01
## CountrySan Marino	1.122e+01
## CountrySao Tome and Principe	5.434e+00
## CountrySaudi Arabia	1.249e+01
## CountrySenegal	4.657e+00
## CountrySerbia	1.377e+01
## CountrySeychelles	1.165e+01
## CountrySierra Leone	-1.009e+01
## CountrySingapore	2.083e+01
## CountrySlovakia	1.461e+01
## CountrySlovenia	1.953e+01
## CountrySolomon Islands	8.326e+00
## CountrySomalia	-2.723e+00
## CountrySouth Africa	6.124e+00
## CountrySouth Sudan	-1.297e+00
## CountrySpain	2.177e+01
## CountrySri Lanka	1.189e+01
## CountrySudan	4.877e+00
## CountrySuriname	1.090e+01

## CountrySwaziland	5.337e-01
## CountrySweden	2.187e+01
## CountrySwitzerland	2.200e+01
## CountrySyrian Arab Republic	1.113e+01
## CountryTajikistan	6.553e+00
## CountryThailand	1.210e+01
## CountryThe former Yugoslav republic of Macedonia	1.415e+01
## CountryTimor-Leste	4.771e+00
## CountryTogo	-4.677e-01
## CountryTonga	1.264e+01
## CountryTrinidad and Tobago	1.126e+01
## CountryTunisia	1.377e+01
## CountryTurkey	1.328e+01
## CountryTurkmenistan	4.262e+00
## CountryTuvalu	1.234e+01
## CountryUganda	4.327e+00
## CountryUkraine	1.032e+01
## CountryUnited Arab Emirates	1.505e+01
## CountryUnited Kingdom of Great Britain and Northern Ireland	2.144e+01
## CountryUnited Republic of Tanzania	2.276e+00
## CountryUnited States of America	1.762e+01
## CountryUruguay	1.572e+01
## CountryUzbekistan	7.007e+00
## CountryVanuatu	1.242e+01
## CountryVenezuela (Bolivarian Republic of)	1.380e+01
## CountryViet Nam	1.378e+01
## CountryYemen	4.465e+00
## CountryZambia	1.400e+00
## CountryZimbabwe	1.613e+00
## Year	2.288e-01
## HIV.AIDS	-4.315e-01
## Schooling	9.682e-02
## Diphtheria	-4.140e-02
## Adult.Mortality	7.489e-03
## under.five.deaths	-1.710e-01
## infant.deaths	2.256e-01
## Measles	-1.264e-05
## Alcohol	-3.213e-02
## Polio	-1.202e-02
## thinness.5.9.years	6.002e-02
## Total.expenditure	-1.412e-01
## percentage.expenditure	8.584e-05
## I(HIV.AIDS^2)	4.909e-03
## I(Schooling^2)	1.424e-03

## I(Diphtheria^2)	4.520e-04	
## I(Adult.Mortality^2)	-2.184e-05	
## I(under.five.deaths^2)	4.382e-05	
## I(infant.deaths^2)	-7.628e-05	
## I(Measles^2)	4.651e-11	
## I(Alcohol^2)	-2.155e-03	
## I(Polio^2)	1.476e-04	
## I(thinness.5.9.years^2)	-3.394e-04	
## I(Total.expenditure^2)	8.042e-03	
## I(percentage.expenditure^2)	-3.769e-09	
##	Std. Error	t value
e		
## (Intercept)	2.081e+01	-19.2
67		
## CountryAlbania	8.329e-01	18.2
57		
## CountryAlgeria	7.981e-01	15.8
59		
## CountryAngola	7.753e-01	-5.8
52		
## CountryAntigua and Barbuda	8.622e-01	17.
538		
## CountryArgentina	8.985e-01	16.
174		
## CountryArmenia	8.163e-01	16.3
73		
## CountryAustralia	1.121e+00	18.
914		
## CountryAustria	9.043e-01	23.8
56		
## CountryAzerbaijan	7.908e-01	13.
974		
## CountryBahamas	8.373e-01	17.2
73		
## CountryBahrain	8.678e-01	17.1
19		
## CountryBangladesh	7.528e-01	11.
371		
## CountryBarbados	8.756e-01	16.5
64		
## CountryBelarus	8.920e-01	11.1
87		
## CountryBelgium	9.417e-01	21.5
48		



## CountryBelize	8.386e-01	10.9
83		
## CountryBenin	7.746e-01	0.1
25		
## CountryBhutan	7.293e-01	7.5
48		
## CountryBolivia (Plurinational State of)	8.121e-01	9
.604		
## CountryBosnia and Herzegovina	8.264e-01	19
.930		
## CountryBotswana	8.891e-01	3.3
31		
## CountryBrazil	8.266e-01	13.0
80		
## CountryBrunei Darussalam	8.679e-01	17.
870		
## CountryBulgaria	8.494e-01	15.3
11		
## CountryBurkina Faso	8.119e-01	1.
520		
## CountryBurundi	7.932e-01	-1.7
49		
## CountryCabo Verde	8.324e-01	14.
764		
## CountryCambodia	7.513e-01	6.3
54		
## CountryCameroon	7.924e-01	0.3
55		
## CountryCanada	8.969e-01	23.8
05		
## CountryCentral African Republic	8.289e-01	-5
.804		
## CountryChad	7.901e-01	-3.4
54		
## CountryChile	8.609e-01	22.5
29		
## CountryChina	1.349e+00	7.0
56		
## CountryColombia	7.924e-01	16.6
74		
## CountryComoros	8.025e-01	2.5
80		
## CountryCongo	8.204e-01	2.9
08		

## CountryCook Islands 419	1.893e+00	5.
## CountryCosta Rica 032	8.193e-01	23.
## CountryCôte d'Ivoire 284	7.711e-01	-6.
## CountryCroatia 69	8.626e-01	18.9
## CountryCuba 04	8.751e-01	20.0
## CountryCyprus 04	8.506e-01	23.3
## CountryCzechia 29	8.567e-01	20.1
## CountryDemocratic People's Republic of Korea 0.965	8.222e-01	1
## CountryDemocratic Republic of the Congo .679	9.472e-01	-0
## CountryDenmark 65	9.564e-01	19.7
## CountryDjibouti 83	8.282e-01	4.3
## CountryDominica 48	1.894e+00	5.4
## CountryDominican Republic 066	8.211e-01	16.
## CountryEcuador 53	8.060e-01	18.2
## CountryEgypt 23	7.563e-01	13.1
## CountryEl Salvador 546	8.094e-01	14.
## CountryEquatorial Guinea 033	8.275e-01	-1.
## CountryEritrea 58	8.105e-01	2.6
## CountryEstonia 97	9.026e-01	16.1
## CountryEthiopia 26	8.851e-01	8.8
## CountryFiji 96	8.561e-01	9.3
## CountryFinland 61	9.559e-01	21.0

## CountryFrance	9.157e-01	23.7
33		
## CountryGabon	8.774e-01	7.2
34		
## CountryGambia	8.124e-01	1.2
19		
## CountryGeorgia	8.230e-01	16.6
92		
## CountryGermany	9.395e-01	22.0
02		
## CountryGhana	7.677e-01	4.1
69		
## CountryGreece	8.994e-01	23.2
77		
## CountryGrenada	8.879e-01	14.4
44		
## CountryGuatemala	7.694e-01	16.
134		
## CountryGuinea	7.674e-01	-0.3
13		
## CountryGuinea-Bissau	8.179e-01	-1.
635		
## CountryGuyana	8.309e-01	7.5
87		
## CountryHaiti	7.940e-01	4.3
38		
## CountryHonduras	8.047e-01	16.4
16		
## CountryHungary	8.850e-01	15.3
44		
## CountryIceland	1.000e+00	21.7
84		
## CountryIndia	3.219e+00	1.4
40		
## CountryIndonesia	8.320e-01	7.3
53		
## CountryIran (Islamic Republic of)	7.965e-01	15
.660		
## CountryIraq	7.524e-01	14.3
22		
## CountryIreland	9.777e-01	20.5
38		
## CountryIsrael	8.763e-01	23.8
11		

## CountryItaly	8.972e-01	24.4
46		
## CountryJamaica	8.211e-01	17.7
37		
## CountryJapan	8.791e-01	25.2
46		
## CountryJordan	8.257e-01	14.7
55		
## CountryKazakhstan	8.475e-01	7.
321		
## CountryKenya	7.895e-01	4.5
00		
## CountryKiribati	8.033e-01	6.9
46		
## CountryKuwait	8.542e-01	15.1
06		
## CountryKyrgyzstan	8.169e-01	10.
573		
## CountryLao People's Democratic Republic	7.774e-01	4
.597		
## CountryLatvia	8.880e-01	15.1
09		
## CountryLebanon	8.372e-01	17.3
79		
## CountryLesotho	9.258e-01	-0.9
00		
## CountryLiberia	8.016e-01	-0.4
47		
## CountryLibya	8.690e-01	13.0
12		
## CountryLithuania	9.210e-01	13.
911		
## CountryLuxembourg	8.843e-01	23.
456		
## CountryMadagascar	7.579e-01	6.
128		
## CountryMalawi	8.773e-01	-0.9
04		
## CountryMalaysia	8.289e-01	15.4
97		
## CountryMaldives	7.783e-01	18.7
31		
## CountryMali	7.922e-01	1.2
41		

## CountryMalta 14	8.484e-01	24.3
## CountryMarshall Islands 926	2.065e+00	5.
## CountryMauritania 792	7.882e-01	5.
## CountryMauritius 839	8.520e-01	13.
## CountryMexico 94	7.768e-01	18.8
## CountryMicronesia (Federated States of) .990	8.116e-01	10
## CountryMonaco 04	1.898e+00	5.3
## CountryMongolia 95	8.251e-01	6.6
## CountryMontenegro 806	8.284e-01	17.
## CountryMorocco 76	7.863e-01	14.3
## CountryMozambique 059	8.074e-01	1.
## CountryMyanmar 99	6.977e-01	6.9
## CountryNamibia 46	8.469e-01	6.9
## CountryNauru 07	1.884e+00	6.0
## CountryNepal 73	6.739e-01	9.3
## CountryNetherlands 607	9.457e-01	21.
## CountryNew Zealand 272	1.036e+00	20.
## CountryNicaragua 902	8.029e-01	16.
## CountryNiger 96	8.767e-01	5.9
## CountryNigeria 12	1.880e+00	5.5
## CountryNiue 97	1.891e+00	5.4
## CountryNorway 10	9.591e-01	22.2

## CountryOman 89	8.444e-01	16.5
## CountryPakistan 51	1.431e+00	1.3
## CountryPalau 99	1.903e+00	5.3
## CountryPanama 24	8.243e-01	20.3
## CountryPapua New Guinea 929	7.683e-01	4.
## CountryParaguay 00	8.112e-01	16.4
## CountryPeru 46	8.077e-01	16.9
## CountryPhilippines 814	7.468e-01	9.
## CountryPoland 68	8.842e-01	17.2
## CountryPortugal 63	9.087e-01	21.9
## CountryQatar 71	8.499e-01	19.1
## CountryRepublic of Korea 060	8.282e-01	25.
## CountryRepublic of Moldova 039	8.378e-01	12.
## CountryRomania 55	8.535e-01	16.0
## CountryRussian Federation 028	8.324e-01	9.
## CountryRwanda 89	8.120e-01	2.9
## CountrySaint Kitts and Nevis 571	1.908e+00	5.
## CountrySaint Lucia 289	8.489e-01	16.
## CountrySaint Vincent and the Grenadines .307	8.514e-01	15
## CountrySamoa 68	8.030e-01	18.1
## CountrySan Marino 84	1.907e+00	5.8
## CountrySao Tome and Principe 575	8.265e-01	6.

## CountrySaudi Arabia 940	8.360e-01	14.
## CountrySenegal 31	7.595e-01	6.1
## CountrySerbia 77	8.460e-01	16.2
## CountrySeychelles 656	8.534e-01	13.
## CountrySierra Leone 841	7.859e-01	-12.
## CountrySingapore 432	8.527e-01	24.
## CountrySlovakia 87	8.653e-01	16.8
## CountrySlovenia 84	9.221e-01	21.1
## CountrySolomon Islands 482	7.944e-01	10.
## CountrySomalia 77	7.832e-01	-3.4
## CountrySouth Africa 484	8.182e-01	7.
## CountrySouth Sudan 528	8.486e-01	-1.
## CountrySpain 88	9.112e-01	23.8
## CountrySri Lanka 70	7.786e-01	15.2
## CountrySudan 52	7.444e-01	6.5
## CountrySuriname 23	8.180e-01	13.3
## CountrySwaziland 57	9.577e-01	0.5
## CountrySweden 49	9.093e-01	24.0
## CountrySwitzerland 658	9.300e-01	23.
## CountrySyrian Arab Republic 930	7.989e-01	13.
## CountryTajikistan 347	7.851e-01	8.
## CountryThailand 70	8.305e-01	14.5

## CountryThe former Yugoslav republic of Macedonia 7.223	8.213e-01	1
## CountryTimor-Leste 985	7.971e-01	5.
## CountryTogo 86	7.985e-01	-0.5
## CountryTonga 12	8.255e-01	15.3
## CountryTrinidad and Tobago 431	8.386e-01	13.
## CountryTunisia 51	8.582e-01	16.0
## CountryTurkey 92	7.860e-01	16.8
## CountryTurkmenistan 248	8.122e-01	5.
## CountryTuvalu 47	2.041e+00	6.0
## CountryUganda 61	8.072e-01	5.3
## CountryUkraine 60	8.490e-01	12.1
## CountryUnited Arab Emirates 788	8.459e-01	17.
## CountryUnited Kingdom of Great Britain and Northern Ireland 25.934	8.266e-01	
## CountryUnited Republic of Tanzania .811	8.096e-01	2
## CountryUnited States of America .411	9.569e-01	18
## CountryUruguay 33	8.719e-01	18.0
## CountryUzbekistan 935	7.842e-01	8.
## CountryVanuatu 12	7.953e-01	15.6
## CountryVenezuela (Bolivarian Republic of) 7.114	8.064e-01	1
## CountryViet Nam 23	7.131e-01	19.3
## CountryYemen 82	6.888e-01	6.4
## CountryZambia 61	8.430e-01	1.6



## CountryZimbabwe	8.770e-01	1.8
39		
## Year	1.034e-02	22.12
6		
## HIV.AIDS	4.134e-02	-10.4
38		
## Schooling	8.237e-02	1.1
75		
## Diphtheria	1.151e-02	-3.5
96		
## Adult.Mortality	1.008e-03	7.4
26		
## under.five.deaths	1.492e-02	-11.
457		
## infant.deaths	2.151e-02	10.4
88		
## Measles	8.792e-06	-1.4
38		
## Alcohol	5.015e-02	-0.6
41		
## Polio	1.138e-02	-1.0
56		
## thinness.5.9.years	5.777e-02	1.
039		
## Total.expenditure	8.009e-02	-1.
763		
## percentage.expenditure	5.299e-05	1.
620		
## I(HIV.AIDS^2)	8.690e-04	5.6
49		
## I(Schooling^2)	4.683e-03	0.3
04		
## I(Diphtheria^2)	1.219e-04	3.7
07		
## I(Adult.Mortality^2)	2.248e-06	-9.
717		
## I(under.five.deaths^2)	4.784e-06	9.
161		
## I(infant.deaths^2)	9.106e-06	-8.
377		
## I(Measles^2)	5.703e-11	0.8
16		
## I(Alcohol^2)	3.932e-03	-0.5
48		

## I(Polio^2)	1.209e-04	1.2
21		
## I(thinness.5.9.years^2)	3.301e-03	-0.
103		
## I(Total.expenditure^2)	6.140e-03	1.
310		
## I(percentage.expenditure^2)	3.965e-09	-0
.951		
##	Pr(> t )	
## (Intercept)	< 2e-16 ***	
## CountryAlbania	< 2e-16 ***	
## CountryAlgeria	< 2e-16 ***	
## CountryAngola	5.43e-09 ***	
## CountryAntigua and Barbuda	< 2e-16 ***	
## CountryArgentina	< 2e-16 ***	
## CountryArmenia	< 2e-16 ***	
## CountryAustralia	< 2e-16 ***	
## CountryAustria	< 2e-16 ***	
## CountryAzerbaijan	< 2e-16 ***	
## CountryBahamas	< 2e-16 ***	
## CountryBahrain	< 2e-16 ***	
## CountryBangladesh	< 2e-16 ***	
## CountryBarbados	< 2e-16 ***	
## CountryBelarus	< 2e-16 ***	
## CountryBelgium	< 2e-16 ***	
## CountryBelize	< 2e-16 ***	
## CountryBenin	0.900208	
## CountryBhutan	6.01e-14 ***	
## CountryBolivia (Plurinational State of)	< 2e-16 ***	
## CountryBosnia and Herzegovina	< 2e-16 ***	
## CountryBotswana	0.000877 ***	
## CountryBrazil	< 2e-16 ***	
## CountryBrunei Darussalam	< 2e-16 ***	
## CountryBulgaria	< 2e-16 ***	
## CountryBurkina Faso	0.128578	
## CountryBurundi	0.080422 .	
## CountryCabo Verde	< 2e-16 ***	
## CountryCambodia	2.45e-10 ***	
## CountryCameroon	0.722968	
## CountryCanada	< 2e-16 ***	
## CountryCentral African Republic	7.23e-09 ***	
## CountryChad	0.000560 ***	
## CountryChile	< 2e-16 ***	
## CountryChina	2.16e-12 ***	

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## CountryColombia	< 2e-16 ***
## CountryComoros	0.009927 **
## CountryCongo	0.003666 **
## CountryCook Islands	6.52e-08 ***
## CountryCosta Rica	< 2e-16 ***
## CountryCôte d'Ivoire	3.84e-10 ***
## CountryCroatia	< 2e-16 ***
## CountryCuba	< 2e-16 ***
## CountryCyprus	< 2e-16 ***
## CountryCzechia	< 2e-16 ***
## CountryDemocratic People's Republic of Korea	< 2e-16 ***
## CountryDemocratic Republic of the Congo	0.497338
## CountryDenmark	< 2e-16 ***
## CountryDjibouti	1.21e-05 ***
## CountryDominica	5.54e-08 ***
## CountryDominican Republic	< 2e-16 ***
## CountryEcuador	< 2e-16 ***
## CountryEgypt	< 2e-16 ***
## CountryEl Salvador	< 2e-16 ***
## CountryEquatorial Guinea	0.301739
## CountryEritrea	0.007915 **
## CountryEstonia	< 2e-16 ***
## CountryEthiopia	< 2e-16 ***
## CountryFiji	< 2e-16 ***
## CountryFinland	< 2e-16 ***
## CountryFrance	< 2e-16 ***
## CountryGabon	6.05e-13 ***
## CountryGambia	0.223113
## CountryGeorgia	< 2e-16 ***
## CountryGermany	< 2e-16 ***
## CountryGhana	3.15e-05 ***
## CountryGreece	< 2e-16 ***
## CountryGrenada	< 2e-16 ***
## CountryGuatemala	< 2e-16 ***
## CountryGuinea	0.754077
## CountryGuinea-Bissau	0.102236
## CountryGuyana	4.48e-14 ***
## CountryHaiti	1.49e-05 ***
## CountryHonduras	< 2e-16 ***
## CountryHungary	< 2e-16 ***
## CountryIceland	< 2e-16 ***
## CountryIndia	0.150000
## CountryIndonesia	2.55e-13 ***
## CountryIran (Islamic Republic of)	< 2e-16 ***

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## CountryIraq	< 2e-16 ***
## CountryIreland	< 2e-16 ***
## CountryIsrael	< 2e-16 ***
## CountryItaly	< 2e-16 ***
## CountryJamaica	< 2e-16 ***
## CountryJapan	< 2e-16 ***
## CountryJordan	< 2e-16 ***
## CountryKazakhstan	3.24e-13 ***
## CountryKenya	7.08e-06 ***
## CountryKiribati	4.70e-12 ***
## CountryKuwait	< 2e-16 ***
## CountryKyrgyzstan	< 2e-16 ***
## CountryLao People's Democratic Republic	4.49e-06 ***
## CountryLatvia	< 2e-16 ***
## CountryLebanon	< 2e-16 ***
## CountryLesotho	0.367957
## CountryLiberia	0.655263
## CountryLibya	< 2e-16 ***
## CountryLithuania	< 2e-16 ***
## CountryLuxembourg	< 2e-16 ***
## CountryMadagascar	1.02e-09 ***
## CountryMalawi	0.366329
## CountryMalaysia	< 2e-16 ***
## CountryMaldives	< 2e-16 ***
## CountryMali	0.214856
## CountryMalta	< 2e-16 ***
## CountryMarshall Islands	3.51e-09 ***
## CountryMauritania	7.76e-09 ***
## CountryMauritius	< 2e-16 ***
## CountryMexico	< 2e-16 ***
## CountryMicronesia (Federated States of)	< 2e-16 ***
## CountryMonaco	1.23e-07 ***
## CountryMongolia	2.62e-11 ***
## CountryMontenegro	< 2e-16 ***
## CountryMorocco	< 2e-16 ***
## CountryMozambique	0.289655
## CountryMyanmar	3.24e-12 ***
## CountryNamibia	4.69e-12 ***
## CountryNauru	2.14e-09 ***
## CountryNepal	< 2e-16 ***
## CountryNetherlands	< 2e-16 ***
## CountryNew Zealand	< 2e-16 ***
## CountryNicaragua	< 2e-16 ***
## CountryNiger	2.29e-09 ***

## CountryNigeria	3.87e-08 ***
## CountryNiue	4.23e-08 ***
## CountryNorway	< 2e-16 ***
## CountryOman	< 2e-16 ***
## CountryPakistan	0.176751
## CountryPalau	7.27e-08 ***
## CountryPanama	< 2e-16 ***
## CountryPapua New Guinea	8.76e-07 ***
## CountryParaguay	< 2e-16 ***
## CountryPeru	< 2e-16 ***
## CountryPhilippines	< 2e-16 ***
## CountryPoland	< 2e-16 ***
## CountryPortugal	< 2e-16 ***
## CountryQatar	< 2e-16 ***
## CountryRepublic of Korea	< 2e-16 ***
## CountryRepublic of Moldova	< 2e-16 ***
## CountryRomania	< 2e-16 ***
## CountryRussian Federation	< 2e-16 ***
## CountryRwanda	0.002823 **
## CountrySaint Kitts and Nevis	2.78e-08 ***
## CountrySaint Lucia	< 2e-16 ***
## CountrySaint Vincent and the Grenadines	< 2e-16 ***
## CountrySamoa	< 2e-16 ***
## CountrySan Marino	4.51e-09 ***
## CountrySao Tome and Principe	5.80e-11 ***
## CountrySaudi Arabia	< 2e-16 ***
## CountrySenegal	9.98e-10 ***
## CountrySerbia	< 2e-16 ***
## CountrySeychelles	< 2e-16 ***
## CountrySierra Leone	< 2e-16 ***
## CountrySingapore	< 2e-16 ***
## CountrySlovakia	< 2e-16 ***
## CountrySlovenia	< 2e-16 ***
## CountrySolomon Islands	< 2e-16 ***
## CountrySomalia	0.000515 ***
## CountrySouth Africa	9.67e-14 ***
## CountrySouth Sudan	0.126553
## CountrySpain	< 2e-16 ***
## CountrySri Lanka	< 2e-16 ***
## CountrySudan	6.78e-11 ***
## CountrySuriname	< 2e-16 ***
## CountrySwaziland	0.577402
## CountrySweden	< 2e-16 ***
## CountrySwitzerland	< 2e-16 ***

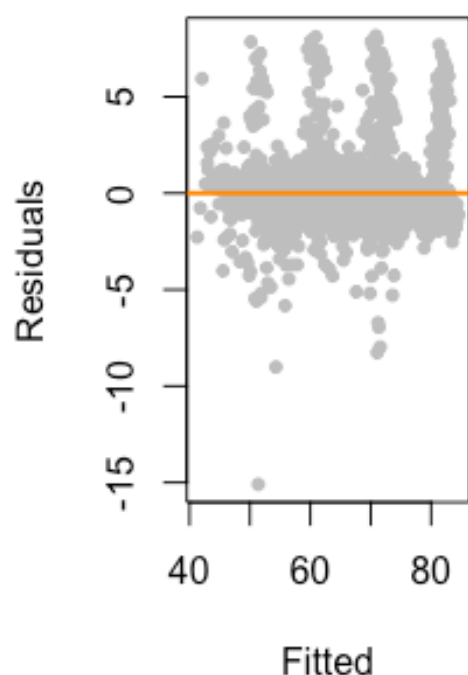
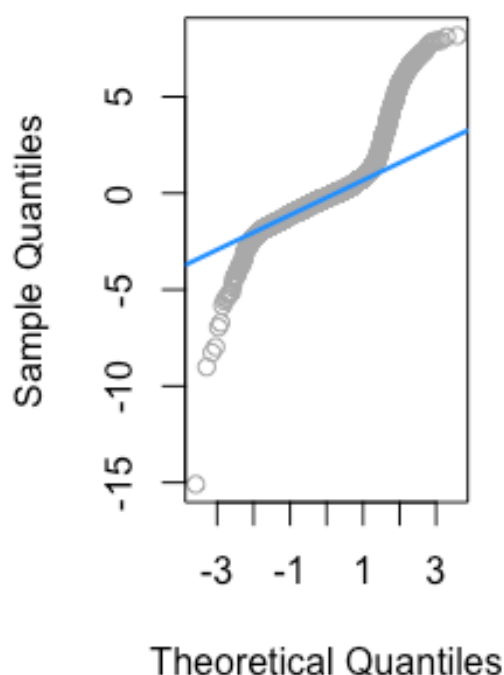
---

## CountrySyrian Arab Republic	< 2e-16 ***
## CountryTajikistan	< 2e-16 ***
## CountryThailand	< 2e-16 ***
## CountryThe former Yugoslav republic of Macedonia	< 2e-16 ***
## CountryTimor-Leste	2.44e-09 ***
## CountryTogo	0.558088
## CountryTonga	< 2e-16 ***
## CountryTrinidad and Tobago	< 2e-16 ***
## CountryTunisia	< 2e-16 ***
## CountryTurkey	< 2e-16 ***
## CountryTurkmenistan	1.66e-07 ***
## CountryTuvalu	1.68e-09 ***
## CountryUganda	8.97e-08 ***
## CountryUkraine	< 2e-16 ***
## CountryUnited Arab Emirates	< 2e-16 ***
## CountryUnited Kingdom of Great Britain and Northern Ireland	< 2e-16 ***
## CountryUnited Republic of Tanzania	0.004981 **
## CountryUnited States of America	< 2e-16 ***
## CountryUruguay	< 2e-16 ***
## CountryUzbekistan	< 2e-16 ***
## CountryVanuatu	< 2e-16 ***
## CountryVenezuela (Bolivarian Republic of)	< 2e-16 ***
## CountryViet Nam	< 2e-16 ***
## CountryYemen	1.07e-10 ***
## CountryZambia	0.096855 .
## CountryZimbabwe	0.066029 .
## Year	< 2e-16 ***
## HIV.AIDS	< 2e-16 ***
## Schooling	0.239939
## Diphtheria	0.000329 ***
## Adult.Mortality	1.49e-13 ***
## under.five.deaths	< 2e-16 ***
## infant.deaths	< 2e-16 ***
## Measles	0.150627
## Alcohol	0.521783
## Polio	0.291091
## thinness.5.9.years	0.298965
## Total.expenditure	0.077951 .
## percentage.expenditure	0.105370
## I(HIV.AIDS^2)	1.78e-08 ***
## I(Schooling^2)	0.761076
## I(Diphtheria^2)	0.000214 ***
## I(Adult.Mortality^2)	< 2e-16 ***
## I(under.five.deaths^2)	< 2e-16 ***

```
## I(infant.deaths^2) < 2e-16 ***
## I(Measles^2) 0.414854
## I(Alcohol^2) 0.583639
## I(Polio^2) 0.222147
## I(thinness.5.9.years^2) 0.918135
## I(Total.expenditure^2) 0.190385
## I(percentage.expenditure^2) 0.341914
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.768 on 2720 degrees of freedom
## Multiple R-squared: 0.968, Adjusted R-squared: 0.9654
## F-statistic: 378.9 on 217 and 2720 DF, p-value: < 2.2e-16

# Residual plot
par(mfrow=c(1,2))
plot(resid(lm_quadratic)~fitted(lm_quadratic), col = "grey", pch = 20,
      xlab = "Fitted", ylab = "Residuals", main = "Fitted versus Residuals")
abline(h = 0, col = "darkorange", lwd = 2)

# Normal qq plot
qqnorm(resid(lm_quadratic), main = "Normal Q-Q Plot", col = "darkgrey")
qqline(resid(lm_quadratic), col = "dodgerblue", lwd = 2)
```

**Fitted versus Residuals****Normal Q-Q Plot**

```
# cubic model
```

```
lm_cubic <- lm(Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
  Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +
  Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +
  percentage.expenditure + I(HIV.AIDS^2) + I(Schooling^2) + I(Diphtheria^
2)
  + I(Adult.Mortality^2) + I(under.five.deaths^2) + I(infant.deaths^2) +
I(Measles^2) + I(Alcohol^2) + I(Polio^2) + I(thinness.5.9.years^2) + I(Tota
l.expenditure^2) + I(percentage.expenditure^2)
  + I(HIV.AIDS^3) + I(Schooling^3) + I(Diphtheria^3)
  + I(Adult.Mortality^3) + I(under.five.deaths^3) + I(infant.deaths^3) +
I(Measles^3) + I(Alcohol^3) + I(Polio^3) + I(thinness.5.9.years^3) + I(Tota
l.expenditure^3) + I(percentage.expenditure^3), data = dataLife)
summary(lm_cubic)
```

```
##
```

```
## Call:
```

```
## lm(formula = Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
##   Diphtheria + Adult.Mortality + under.five.deaths + infant.deaths +
##   Measles + Alcohol + Polio + thinness.5.9.years + Total.expenditure +
##   percentage.expenditure + I(HIV.AIDS^2) + I(Schooling^2) +
```



```

##      I(Diphtheria^2) + I(Adult.Mortality^2) + I(under.five.deaths^2) +
##      I(infant.deaths^2) + I(Measles^2) + I(Alcohol^2) + I(Polio^2) +
##      I(thinness.5.9.years^2) + I(Total.expenditure^2) + I(percentage.expe
nditure^2) +
##      I(HIV.AIDS^3) + I(Schooling^3) + I(Diphtheria^3) + I(Adult.Mortality
^3) +
##      I(under.five.deaths^3) + I(infant.deaths^3) + I(Measles^3) +
##      I(Alcohol^3) + I(Polio^3) + I(thinness.5.9.years^3) + I(Total.expend
iture^3) +
##      I(percentage.expenditure^3), data = dataLife)
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -12.6332  -0.8243  -0.2088   0.3708   8.1634
##
## Coefficients:
##                                     Estimate
## (Intercept)                      -3.883e+02
## CountryAlbania                     1.478e+01
## CountryAlgeria                     1.207e+01
## CountryAngola                      -3.586e+00
## CountryAntigua and Barbuda          1.450e+01
## CountryArgentina                   1.365e+01
## CountryArmenia                     1.290e+01
## CountryAustralia                   1.951e+01
## CountryAustria                     2.064e+01
## CountryAzerbaijan                  1.037e+01
## CountryBahamas                     1.370e+01
## CountryBahrain                     1.456e+01
## CountryBangladesh                   9.110e+00
## CountryBarbados                    1.366e+01
## CountryBelarus                     9.550e+00
## CountryBelgium                     1.943e+01
## CountryBelize                      8.703e+00
## CountryBenin                       -2.753e-02
## CountryBhutan                      5.010e+00
## CountryBolivia (Plurinational State of) 7.350e+00
## CountryBosnia and Herzegovina       1.578e+01
## CountryBotswana                    2.691e+00
## CountryBrazil                      1.025e+01
## CountryBrunei Darussalam            1.505e+01
## CountryBulgaria                    1.219e+01
## CountryBurkina Faso                 1.862e+00
## CountryBurundi                     -1.594e+00

```

---

## CountryCabo Verde	1.193e+01
## CountryCambodia	4.271e+00
## CountryCameroon	1.072e+00
## CountryCanada	2.045e+01
## CountryCentral African Republic	-4.694e+00
## CountryChad	-1.608e+00
## CountryChile	1.872e+01
## CountryChina	9.867e+00
## CountryColombia	1.270e+01
## CountryComoros	1.086e+00
## CountryCongo	2.218e+00
## CountryCook Islands	9.901e+00
## CountryCosta Rica	1.830e+01
## CountryCôte d'Ivoire	-4.377e+00
## CountryCroatia	1.574e+01
## CountryCuba	1.688e+01
## CountryCyprus	1.922e+01
## CountryCzechia	1.672e+01
## CountryDemocratic People's Republic of Korea	8.538e+00
## CountryDemocratic Republic of the Congo	6.303e-01
## CountryDenmark	1.779e+01
## CountryDjibouti	2.831e+00
## CountryDominica	9.851e+00
## CountryDominican Republic	1.274e+01
## CountryEcuador	1.428e+01
## CountryEgypt	9.637e+00
## CountryEl Salvador	1.131e+01
## CountryEquatorial Guinea	-1.152e+00
## CountryEritrea	1.262e+00
## CountryEstonia	1.432e+01
## CountryEthiopia	9.538e+00
## CountryFiji	7.572e+00
## CountryFinland	1.924e+01
## CountryFrance	2.108e+01
## CountryGabon	6.192e+00
## CountryGambia	6.414e-01
## CountryGeorgia	1.303e+01
## CountryGermany	1.977e+01
## CountryGhana	3.496e+00
## CountryGreece	2.020e+01
## CountryGrenada	1.208e+01
## CountryGuatemala	1.184e+01
## CountryGuinea	-2.708e-01
## CountryGuinea-Bissau	-1.464e+00

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## CountryGuyana	5.643e+00
## CountryHaiti	3.307e+00
## CountryHonduras	1.291e+01
## CountryHungary	1.300e+01
## CountryIceland	2.069e+01
## CountryIndia	2.899e+00
## CountryIndonesia	5.922e+00
## CountryIran (Islamic Republic of)	1.204e+01
## CountryIraq	1.002e+01
## CountryIreland	1.914e+01
## CountryIsrael	2.038e+01
## CountryItaly	2.110e+01
## CountryJamaica	1.440e+01
## CountryJapan	2.152e+01
## CountryJordan	1.168e+01
## CountryKazakhstan	5.477e+00
## CountryKenya	4.331e+00
## CountryKiribati	4.789e+00
## CountryKuwait	1.256e+01
## CountryKyrgyzstan	8.149e+00
## CountryLao People's Democratic Republic	2.929e+00
## CountryLatvia	1.259e+01
## CountryLebanon	1.384e+01
## CountryLesotho	-1.524e+00
## CountryLiberia	-7.098e-01
## CountryLibya	1.077e+01
## CountryLithuania	1.206e+01
## CountryLuxembourg	2.023e+01
## CountryMadagascar	4.349e+00
## CountryMalawi	-5.608e-01
## CountryMalaysia	1.244e+01
## CountryMaldives	1.434e+01
## CountryMali	1.830e+00
## CountryMalta	1.995e+01
## CountryMarshall Islands	1.213e+01
## CountryMauritania	3.881e+00
## CountryMauritius	1.144e+01
## CountryMexico	1.436e+01
## CountryMicronesia (Federated States of)	8.288e+00
## CountryMonaco	9.697e+00
## CountryMongolia	4.959e+00
## CountryMontenegro	1.403e+01
## CountryMorocco	1.079e+01
## CountryMozambique	1.489e+00

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## CountryMyanmar	4.613e+00
## CountryNamibia	5.092e+00
## CountryNauru	1.058e+01
## CountryNepal	5.960e+00
## CountryNetherlands	1.949e+01
## CountryNew Zealand	1.961e+01
## CountryNicaragua	1.311e+01
## CountryNiger	6.546e+00
## CountryNigeria	8.309e+00
## CountryNiue	1.003e+01
## CountryNorway	2.038e+01
## CountryOman	1.355e+01
## CountryPakistan	2.749e+00
## CountryPalau	1.004e+01
## CountryPanama	1.618e+01
## CountryPapua New Guinea	2.980e+00
## CountryParaguay	1.263e+01
## CountryPeru	1.340e+01
## CountryPhilippines	7.080e+00
## CountryPoland	1.461e+01
## CountryPortugal	1.925e+01
## CountryQatar	1.588e+01
## CountryRepublic of Korea	2.007e+01
## CountryRepublic of Moldova	9.143e+00
## CountryRomania	1.299e+01
## CountryRussian Federation	6.671e+00
## CountryRwanda	2.423e+00
## CountrySaint Kitts and Nevis	9.969e+00
## CountrySaint Lucia	1.311e+01
## CountrySaint Vincent and the Grenadines	1.261e+01
## CountrySamoa	1.419e+01
## CountrySan Marino	1.046e+01
## CountrySao Tome and Principe	4.865e+00
## CountrySaudi Arabia	1.196e+01
## CountrySenegal	4.395e+00
## CountrySerbia	1.299e+01
## CountrySeychelles	1.112e+01
## CountrySierra Leone	-1.037e+01
## CountrySingapore	2.052e+01
## CountrySlovakia	1.395e+01
## CountrySlovenia	1.859e+01
## CountrySolomon Islands	7.525e+00
## CountrySomalia	-2.193e+00
## CountrySouth Africa	5.573e+00

## CountrySouth Sudan	-1.245e+00
## CountrySpain	2.096e+01
## CountrySri Lanka	1.178e+01
## CountrySudan	4.975e+00
## CountrySuriname	1.029e+01
## CountrySwaziland	2.492e-01
## CountrySweden	2.126e+01
## CountrySwitzerland	2.119e+01
## CountrySyrian Arab Republic	1.051e+01
## CountryTajikistan	5.906e+00
## CountryThailand	1.171e+01
## CountryThe former Yugoslav republic of Macedonia	1.362e+01
## CountryTimor-Leste	3.939e+00
## CountryTogo	-6.551e-01
## CountryTonga	1.209e+01
## CountryTrinidad and Tobago	1.075e+01
## CountryTunisia	1.328e+01
## CountryTurkey	1.285e+01
## CountryTurkmenistan	3.742e+00
## CountryTuvalu	1.213e+01
## CountryUganda	5.449e+00
## CountryUkraine	9.577e+00
## CountryUnited Arab Emirates	1.465e+01
## CountryUnited Kingdom of Great Britain and Northern Ireland	2.057e+01
## CountryUnited Republic of Tanzania	3.674e+00
## CountryUnited States of America	1.745e+01
## CountryUruguay	1.513e+01
## CountryUzbekistan	6.708e+00
## CountryVanuatu	1.177e+01
## CountryVenezuela (Bolivarian Republic of)	1.298e+01
## CountryViet Nam	1.367e+01
## CountryYemen	3.851e+00
## CountryZambia	1.872e+00
## CountryZimbabwe	1.728e+00
## Year	2.235e-01
## HIV.AIDS	-6.485e-01
## Schooling	1.841e-01
## Diphtheria	-1.046e-01
## Adult.Mortality	2.479e-03
## under.five.deaths	-2.346e-01
## infant.deaths	2.984e-01
## Measles	-2.643e-06
## Alcohol	-1.889e-01
## Polio	-1.039e-02

## thinness.5.9.years	8.473e-02	
## Total.expenditure	-3.177e-01	
## percentage.expenditure	1.968e-05	
## I(HIV.AIDS^2)	2.035e-02	
## I(Schooling^2)	-1.790e-02	
## I(Diphtheria^2)	1.981e-03	
## I(Adult.Mortality^2)	6.189e-06	
## I(under.five.deaths^2)	1.219e-04	
## I(infant.deaths^2)	-1.922e-04	
## I(Measles^2)	-2.707e-11	
## I(Alcohol^2)	3.458e-02	
## I(Polio^2)	5.273e-05	
## I(thinness.5.9.years^2)	-2.664e-03	
## I(Total.expenditure^2)	3.636e-02	
## I(percentage.expenditure^2)	7.208e-09	
## I(HIV.AIDS^3)	-2.382e-04	
## I(Schooling^3)	8.094e-04	
## I(Diphtheria^3)	-9.767e-06	
## I(Adult.Mortality^3)	-3.452e-08	
## I(under.five.deaths^3)	-2.028e-08	
## I(infant.deaths^3)	3.910e-08	
## I(Measles^3)	1.801e-17	
## I(Alcohol^3)	-1.886e-03	
## I(Polio^3)	8.859e-07	
## I(thinness.5.9.years^3)	2.083e-05	
## I(Total.expenditure^3)	-1.283e-03	
## I(percentage.expenditure^3)	-4.415e-13	
##	Std. Error	t value
e		
## (Intercept)	2.128e+01	-18.2
44		
## CountryAlbania	9.380e-01	15.7
51		
## CountryAlgeria	9.105e-01	13.2
59		
## CountryAngola	8.204e-01	-4.3
71		
## CountryAntigua and Barbuda	1.021e+00	14.
204		
## CountryArgentina	9.600e-01	14.
223		
## CountryArmenia	9.399e-01	13.7
22		
## CountryAustralia	1.264e+00	15.

437		
## CountryAustria	1.020e+00	20.2
32		
## CountryAzerbaijan	9.207e-01	11.
264		
## CountryBahamas	9.679e-01	14.1
59		
## CountryBahrain	1.040e+00	14.0
02		
## CountryBangladesh	8.145e-01	11.
184		
## CountryBarbados	1.041e+00	13.1
19		
## CountryBelarus	1.014e+00	9.4
19		
## CountryBelgium	1.024e+00	18.9
73		
## CountryBelize	9.950e-01	8.7
46		
## CountryBenin	8.881e-01	-0.0
31		
## CountryBhutan	8.278e-01	6.0
52		
## CountryBolivia (Plurinational State of)	8.986e-01	8
.180		
## CountryBosnia and Herzegovina	9.753e-01	16
.177		
## CountryBotswana	1.056e+00	2.5
48		
## CountryBrazil	8.776e-01	11.6
84		
## CountryBrunei Darussalam	1.036e+00	14.
518		
## CountryBulgaria	9.674e-01	12.5
97		
## CountryBurkina Faso	9.280e-01	2.
007		
## CountryBurundi	9.094e-01	-1.7
53		
## CountryCabo Verde	9.787e-01	12.
191		
## CountryCambodia	8.116e-01	5.2
62		
## CountryCameroon	9.189e-01	1.1

67			
## Country	Canada	9.741e-01	20.9
96			
## Country	Central African Republic	9.722e-01	-4
.828			
## Country	Chad	8.842e-01	-1.8
18			
## Country	Chile	9.475e-01	19.7
58			
## Country	China	1.460e+00	6.7
59			
## Country	Colombia	8.824e-01	14.3
97			
## Country	Comoros	9.566e-01	1.1
36			
## Country	Congo	9.755e-01	2.2
74			
## Country	Cook Islands	1.912e+00	5.
180			
## Country	Costa Rica	9.424e-01	19.
415			
## Country	Côte d'Ivoire	8.862e-01	-4.
940			
## Country	Croatia	9.680e-01	16.2
63			
## Country	Cuba	1.022e+00	16.5
08			
## Country	Cyprus	9.410e-01	20.4
26			
## Country	Czechia	9.650e-01	17.3
22			
## Country	Democratic People's Republic of Korea	9.718e-01	
8.786			
## Country	Democratic Republic of the Congo	1.083e+00	0
.582			
## Country	Denmark	1.044e+00	17.0
44			
## Country	Djibouti	1.025e+00	2.7
61			
## Country	Dominica	1.935e+00	5.0
92			
## Country	Dominican Republic	9.730e-01	13.
093			
## Country	Ecuador	8.977e-01	15.9



08		
## CountryEgypt	7.996e-01	12.0
53		
## CountryEl Salvador	9.210e-01	12.
281		
## CountryEquatorial Guinea	9.653e-01	-1.
194		
## CountryEritrea	9.406e-01	1.3
42		
## CountryEstonia	1.032e+00	13.8
78		
## CountryEthiopia	9.459e-01	10.0
84		
## CountryFiji	1.020e+00	7.4
24		
## CountryFinland	1.037e+00	18.5
58		
## CountryFrance	9.821e-01	21.4
68		
## CountryGabon	1.085e+00	5.7
07		
## CountryGambia	9.565e-01	0.6
71		
## CountryGeorgia	9.669e-01	13.4
75		
## CountryGermany	1.019e+00	19.3
96		
## CountryGhana	8.567e-01	4.0
81		
## CountryGreece	9.825e-01	20.5
57		
## CountryGrenada	1.049e+00	11.5
08		
## CountryGuatemala	8.419e-01	14.
068		
## CountryGuinea	8.580e-01	-0.3
16		
## CountryGuinea-Bissau	9.753e-01	-1.
501		
## CountryGuyana	1.001e+00	5.6
39		
## CountryHaiti	9.401e-01	3.5
18		
## CountryHonduras	9.230e-01	13.9

89			
## CountryHungary	9.928e-01	13.0	
90			
## CountryIceland	1.087e+00	19.0	
43			
## CountryIndia	4.616e+00	0.6	
28			
## CountryIndonesia	9.461e-01	6.2	
60			
## CountryIran (Islamic Republic of)	8.683e-01	13	
.862			
## CountryIraq	8.461e-01	11.8	
43			
## CountryIreland	1.055e+00	18.1	
41			
## CountryIsrael	9.731e-01	20.9	
46			
## CountryItaly	9.697e-01	21.7	
62			
## CountryJamaica	9.411e-01	15.3	
02			
## CountryJapan	9.737e-01	22.0	
97			
## CountryJordan	9.716e-01	12.0	
26			
## CountryKazakhstan	9.594e-01	5.	
709			
## CountryKenya	8.783e-01	4.9	
31			
## CountryKiribati	8.939e-01	5.3	
57			
## CountryKuwait	1.004e+00	12.5	
13			
## CountryKyrgyzstan	9.588e-01	8.	
499			
## CountryLao People's Democratic Republic	8.694e-01	3	
.369			
## CountryLatvia	1.018e+00	12.3	
68			
## CountryLebanon	1.018e+00	13.5	
96			
## CountryLesotho	1.110e+00	-1.3	
73			
## CountryLiberia	9.331e-01	-0.7	

61		
## CountryLibya	1.033e+00	10.4
32		
## CountryLithuania	1.058e+00	11.
400		
## CountryLuxembourg	9.696e-01	20.
866		
## CountryMadagascar	8.458e-01	5.
142		
## CountryMalawi	1.041e+00	-0.5
39		
## CountryMalaysia	9.540e-01	13.0
36		
## CountryMaldives	8.760e-01	16.3
76		
## CountryMali	8.914e-01	2.0
53		
## CountryMalta	9.398e-01	21.2
25		
## CountryMarshall Islands	2.258e+00	5.
372		
## CountryMauritania	9.133e-01	4.
250		
## CountryMauritius	1.009e+00	11.
335		
## CountryMexico	8.074e-01	17.7
87		
## CountryMicronesia (Federated States of)	9.105e-01	9
.103		
## CountryMonaco	1.945e+00	4.9
86		
## CountryMongolia	9.506e-01	5.2
17		
## CountryMontenegro	9.597e-01	14.
614		
## CountryMorocco	8.839e-01	12.2
09		
## CountryMozambique	9.213e-01	1.
616		
## CountryMyanmar	7.116e-01	6.4
83		
## CountryNamibia	9.711e-01	5.2
43		
## CountryNauru	1.907e+00	5.5

50			
## Country	Nepal	7.150e-01	8.3
36			
## Country	Netherlands	1.025e+00	19.
011			
## Country	New Zealand	1.131e+00	17.
338			
## Country	Nicaragua	9.125e-01	14.
364			
## Country	Niger	1.015e+00	6.4
52			
## Country	Nigeria	2.150e+00	3.8
65			
## Country	Niue	1.907e+00	5.2
57			
## Country	Norway	1.041e+00	19.5
70			
## Country	Oman	9.942e-01	13.6
30			
## Country	Pakistan	1.535e+00	1.7
92			
## Country	Palau	1.923e+00	5.2
21			
## Country	Panama	9.464e-01	17.0
96			
## Country	Papua New Guinea	8.510e-01	3.
502			
## Country	Paraguay	9.287e-01	13.6
02			
## Country	Peru	8.907e-01	15.0
42			
## Country	Philippines	7.718e-01	9.
174			
## Country	Poland	1.005e+00	14.5
43			
## Country	Portugal	9.848e-01	19.5
48			
## Country	Qatar	1.021e+00	15.5
57			
## Country	Republic of Korea	9.148e-01	21.
942			
## Country	Republic of Moldova	9.787e-01	9.
342			
## Country	Romania	9.997e-01	12.9

89			
## Country	Russian Federation	9.158e-01	7.
285			
## Country	Rwanda	9.517e-01	2.5
46			
## Country	Saint Kitts and Nevis	1.960e+00	5.
086			
## Country	Saint Lucia	1.010e+00	12.
977			
## Country	Saint Vincent and the Grenadines	1.009e+00	12
.502			
## Country	Samoa	8.972e-01	15.8
12			
## Country	San Marino	1.963e+00	5.3
27			
## Country	Sao Tome and Principe	9.851e-01	4.
939			
## Country	Saudi Arabia	9.589e-01	12.
475			
## Country	Senegal	8.492e-01	5.1
76			
## Country	Serbia	9.729e-01	13.3
50			
## Country	Seychelles	1.016e+00	10.
941			
## Country	Sierra Leone	8.711e-01	-11.
908			
## Country	Singapore	9.811e-01	20.
914			
## Country	Slovakia	9.671e-01	14.4
28			
## Country	Slovenia	1.028e+00	18.0
81			
## Country	Solomon Islands	9.001e-01	8.
360			
## Country	Somalia	8.949e-01	-2.4
51			
## Country	South Africa	9.013e-01	6.
184			
## Country	South Sudan	9.757e-01	-1.
276			
## Country	Spain	9.832e-01	21.3
18			
## Country	Sri Lanka	8.728e-01	13.4

94			
## Country	Sudan	8.162e-01	6.0
95			
## Country	Suriname	9.834e-01	10.4
66			
## Country	Swaziland	1.226e+00	0.2
03			
## Country	Sweden	1.004e+00	21.1
80			
## Country	Switzerland	1.010e+00	20.
971			
## Country	Syrian Arab Republic	9.471e-01	11.
099			
## Country	Tajikistan	9.153e-01	6.
452			
## Country	Thailand	9.236e-01	12.6
75			
## Country	The former Yugoslav republic of Macedonia	9.526e-01	1
4.302			
## Country	Timor-Leste	8.892e-01	4.
430			
## Country	Togo	9.437e-01	-0.6
94			
## Country	Tonga	9.256e-01	13.0
60			
## Country	Trinidad and Tobago	1.009e+00	10.
654			
## Country	Tunisia	1.011e+00	13.1
38			
## Country	Turkey	8.930e-01	14.3
91			
## Country	Turkmenistan	9.455e-01	3.
958			
## Country	Tuvalu	2.168e+00	5.5
95			
## Country	Uganda	9.203e-01	5.9
21			
## Country	Ukraine	9.739e-01	9.8
34			
## Country	United Arab Emirates	1.018e+00	14.
396			
## Country	United Kingdom of Great Britain and Northern Ireland	9.018e-01	
22.806			
## Country	United Republic of Tanzania	9.144e-01	4

.018		
## CountryUnited States of America	1.105e+00	15
.794		
## CountryUruguay	9.804e-01	15.4
31		
## CountryUzbekistan	8.727e-01	7.
686		
## CountryVanuatu	9.080e-01	12.9
65		
## CountryVenezuela (Bolivarian Republic of)	8.975e-01	1
4.467		
## CountryViet Nam	7.604e-01	17.9
78		
## CountryYemen	7.218e-01	5.3
35		
## CountryZambia	1.018e+00	1.8
39		
## CountryZimbabwe	1.033e+00	1.6
72		
## Year	1.054e-02	21.21
4		
## HIV.AIDS	7.884e-02	-8.2
25		
## Schooling	1.819e-01	1.0
13		
## Diphtheria	3.487e-02	-3.0
01		
## Adult.Mortality	1.966e-03	1.2
61		
## under.five.deaths	2.246e-02	-10.
445		
## infant.deaths	3.384e-02	8.8
18		
## Measles	1.338e-05	-0.1
98		
## Alcohol	8.331e-02	-2.2
68		
## Polio	3.629e-02	-0.2
86		
## thinness.5.9.years	2.031e-01	0.
417		
## Total.expenditure	1.915e-01	-1.
659		
## percentage.expenditure	9.641e-05	0.

204		
## I(HIV.AIDS^2)	4.123e-03	4.9
37		
## I(Schooling^2)	2.258e-02	-0.7
93		
## I(Diphtheria^2)	7.934e-04	2.4
96		
## I(Adult.Mortality^2)	9.290e-06	0.
666		
## I(under.five.deaths^2)	1.975e-05	6.
174		
## I(infant.deaths^2)	4.298e-05	-4.
471		
## I(Measles^2)	2.286e-10	-0.1
18		
## I(Alcohol^2)	1.529e-02	2.2
62		
## I(Polio^2)	8.228e-04	0.0
64		
## I(thinness.5.9.years^2)	2.521e-02	-0.
106		
## I(Total.expenditure^2)	2.839e-02	1.
281		
## I(percentage.expenditure^2)	1.666e-08	0.
433		
## I(HIV.AIDS^3)	5.947e-05	-4.0
06		
## I(Schooling^3)	7.630e-04	1.0
61		
## I(Diphtheria^3)	4.951e-06	-1.9
73		
## I(Adult.Mortality^3)	1.091e-08	-3.
164		
## I(under.five.deaths^3)	4.900e-09	-4.
139		
## I(infant.deaths^3)	1.472e-08	2.
656		
## I(Measles^3)	9.313e-16	0.0
19		
## I(Alcohol^3)	7.354e-04	-2.5
64		
## I(Polio^3)	5.107e-06	0.1
73		
## I(thinness.5.9.years^3)	7.966e-04	0.



```

026
## I(Total.expenditure^3) 1.236e-03 -1.
039
## I(percentage.expenditure^3) 6.955e-13 -0.635
##
## Pr(>|t|)
## (Intercept) < 2e-16 ***
## CountryAlbania < 2e-16 ***
## CountryAlgeria < 2e-16 ***
## CountryAngola 1.28e-05 ***
## CountryAntigua and Barbuda < 2e-16 ***
## CountryArgentina < 2e-16 ***
## CountryArmenia < 2e-16 ***
## CountryAustralia < 2e-16 ***
## CountryAustria < 2e-16 ***
## CountryAzerbaijan < 2e-16 ***
## CountryBahamas < 2e-16 ***
## CountryBahrain < 2e-16 ***
## CountryBangladesh < 2e-16 ***
## CountryBarbados < 2e-16 ***
## CountryBelarus < 2e-16 ***
## CountryBelgium < 2e-16 ***
## CountryBelize < 2e-16 ***
## CountryBenin 0.975274
## CountryBhutan 1.63e-09 ***
## CountryBolivia (Plurinational State of) 4.31e-16 ***
## CountryBosnia and Herzegovina < 2e-16 ***
## CountryBotswana 0.010904 *
## CountryBrazil < 2e-16 ***
## CountryBrunei Darussalam < 2e-16 ***
## CountryBulgaria < 2e-16 ***
## CountryBurkina Faso 0.044877 *
## CountryBurundi 0.079797 .
## CountryCabo Verde < 2e-16 ***
## CountryCambodia 1.53e-07 ***
## CountryCameroon 0.243263
## CountryCanada < 2e-16 ***
## CountryCentral African Republic 1.45e-06 ***
## CountryChad 0.069131 .
## CountryChile < 2e-16 ***
## CountryChina 1.70e-11 ***
## CountryColombia < 2e-16 ***
## CountryComoros 0.256147
## CountryCongo 0.023069 *

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## CountryCook Islands	2.38e-07 ***
## CountryCosta Rica	< 2e-16 ***
## CountryCôte d'Ivoire	8.30e-07 ***
## CountryCroatia	< 2e-16 ***
## CountryCuba	< 2e-16 ***
## CountryCyprus	< 2e-16 ***
## CountryCzechia	< 2e-16 ***
## CountryDemocratic People's Republic of Korea	< 2e-16 ***
## CountryDemocratic Republic of the Congo	0.560745
## CountryDenmark	< 2e-16 ***
## CountryDjibouti	0.005808 **
## CountryDominica	3.78e-07 ***
## CountryDominican Republic	< 2e-16 ***
## CountryEcuador	< 2e-16 ***
## CountryEgypt	< 2e-16 ***
## CountryEl Salvador	< 2e-16 ***
## CountryEquatorial Guinea	0.232714
## CountryEritrea	0.179817
## CountryEstonia	< 2e-16 ***
## CountryEthiopia	< 2e-16 ***
## CountryFiji	1.51e-13 ***
## CountryFinland	< 2e-16 ***
## CountryFrance	< 2e-16 ***
## CountryGabon	1.27e-08 ***
## CountryGambia	0.502510
## CountryGeorgia	< 2e-16 ***
## CountryGermany	< 2e-16 ***
## CountryGhana	4.61e-05 ***
## CountryGreece	< 2e-16 ***
## CountryGrenada	< 2e-16 ***
## CountryGuatemala	< 2e-16 ***
## CountryGuinea	0.752299
## CountryGuinea-Bissau	0.133523
## CountryGuyana	1.88e-08 ***
## CountryHaiti	0.000442 ***
## CountryHonduras	< 2e-16 ***
## CountryHungary	< 2e-16 ***
## CountryIceland	< 2e-16 ***
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## CountryIraq	< 2e-16 ***
## CountryIreland	< 2e-16 ***
## CountryIsrael	< 2e-16 ***

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## CountryJamaica	< 2e-16 ***
## CountryJapan	< 2e-16 ***
## CountryJordan	< 2e-16 ***
## CountryKazakhstan	1.26e-08 ***
## CountryKenya	8.69e-07 ***
## CountryKiribati	9.15e-08 ***
## CountryKuwait	< 2e-16 ***
## CountryKyrgyzstan	< 2e-16 ***
## CountryLao People's Democratic Republic	0.000764 ***
## CountryLatvia	< 2e-16 ***
## CountryLebanon	< 2e-16 ***
## CountryLesotho	0.170017
## CountryLiberia	0.446954
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## CountryLithuania	< 2e-16 ***
## CountryLuxembourg	< 2e-16 ***
## CountryMadagascar	2.92e-07 ***
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## CountryMaldives	< 2e-16 ***
## CountryMali	0.040179 *
## CountryMalta	< 2e-16 ***
## CountryMarshall Islands	8.46e-08 ***
## CountryMauritania	2.21e-05 ***
## CountryMauritius	< 2e-16 ***
## CountryMexico	< 2e-16 ***
## CountryMicronesia (Federated States of)	< 2e-16 ***
## CountryMonaco	6.57e-07 ***
## CountryMongolia	1.96e-07 ***
## CountryMontenegro	< 2e-16 ***
## CountryMorocco	< 2e-16 ***
## CountryMozambique	0.106159
## CountryMyanmar	1.06e-10 ***
## CountryNamibia	1.70e-07 ***
## CountryNauru	3.13e-08 ***
## CountryNepal	< 2e-16 ***
## CountryNetherlands	< 2e-16 ***
## CountryNew Zealand	< 2e-16 ***
## CountryNicaragua	< 2e-16 ***
## CountryNiger	1.30e-10 ***
## CountryNigeria	0.000114 ***
## CountryNiue	1.58e-07 ***
## CountryNorway	< 2e-16 ***

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## CountryOman	< 2e-16 ***
## CountryPakistan	0.073304 .
## CountryPalau	1.91e-07 ***
## CountryPanama	< 2e-16 ***
## CountryPapua New Guinea	0.000470 ***
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## CountryPeru	< 2e-16 ***
## CountryPhilippines	< 2e-16 ***
## CountryPoland	< 2e-16 ***
## CountryPortugal	< 2e-16 ***
## CountryQatar	< 2e-16 ***
## CountryRepublic of Korea	< 2e-16 ***
## CountryRepublic of Moldova	< 2e-16 ***
## CountryRomania	< 2e-16 ***
## CountryRussian Federation	4.21e-13 ***
## CountryRwanda	0.010966 *
## CountrySaint Kitts and Nevis	3.91e-07 ***
## CountrySaint Lucia	< 2e-16 ***
## CountrySaint Vincent and the Grenadines	< 2e-16 ***
## CountrySamoa	< 2e-16 ***
## CountrySan Marino	1.08e-07 ***
## CountrySao Tome and Principe	8.33e-07 ***
## CountrySaudi Arabia	< 2e-16 ***
## CountrySenegal	2.44e-07 ***
## CountrySerbia	< 2e-16 ***
## CountrySeychelles	< 2e-16 ***
## CountrySierra Leone	< 2e-16 ***
## CountrySingapore	< 2e-16 ***
## CountrySlovakia	< 2e-16 ***
## CountrySlovenia	< 2e-16 ***
## CountrySolomon Islands	< 2e-16 ***
## CountrySomalia	0.014318 *
## CountrySouth Africa	7.21e-10 ***
## CountrySouth Sudan	0.202188
## CountrySpain	< 2e-16 ***
## CountrySri Lanka	< 2e-16 ***
## CountrySudan	1.25e-09 ***
## CountrySuriname	< 2e-16 ***
## CountrySwaziland	0.838933
## CountrySweden	< 2e-16 ***
## CountrySwitzerland	< 2e-16 ***
## CountrySyrian Arab Republic	< 2e-16 ***
## CountryTajikistan	1.30e-10 ***
## CountryThailand	< 2e-16 ***

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## CountryThe former Yugoslav republic of Macedonia	< 2e-16 ***
## CountryTimor-Leste	9.80e-06 ***
## CountryTogo	0.487635
## CountryTonga	< 2e-16 ***
## CountryTrinidad and Tobago	< 2e-16 ***
## CountryTunisia	< 2e-16 ***
## CountryTurkey	< 2e-16 ***
## CountryTurkmenistan	7.76e-05 ***
## CountryTuvalu	2.42e-08 ***
## CountryUganda	3.60e-09 ***
## CountryUkraine	< 2e-16 ***
## CountryUnited Arab Emirates	< 2e-16 ***
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## CountryUnited Republic of Tanzania	6.03e-05 ***
## CountryUnited States of America	< 2e-16 ***
## CountryUruguay	< 2e-16 ***
## CountryUzbekistan	2.10e-14 ***
## CountryVanuatu	< 2e-16 ***
## CountryVenezuela (Bolivarian Republic of)	< 2e-16 ***
## CountryViet Nam	< 2e-16 ***
## CountryYemen	1.03e-07 ***
## CountryZambia	0.066043 .
## CountryZimbabwe	0.094600 .
## Year	< 2e-16 ***
## HIV.AIDS	2.99e-16 ***
## Schooling	0.311371
## Diphtheria	0.002720 **
## Adult.Mortality	0.207309
## under.five.deaths	< 2e-16 ***
## infant.deaths	< 2e-16 ***
## Measles	0.843404
## Alcohol	0.023425 *
## Polio	0.774674
## thinness.5.9.years	0.676572
## Total.expenditure	0.097263 .
## percentage.expenditure	0.838295
## I(HIV.AIDS^2)	8.43e-07 ***
## I(Schooling^2)	0.428076
## I(Diphtheria^2)	0.012604 *
## I(Adult.Mortality^2)	0.505351
## I(under.five.deaths^2)	7.67e-10 ***
## I(infant.deaths^2)	8.11e-06 ***
## I(Measles^2)	0.905742
## I(Alcohol^2)	0.023804 *

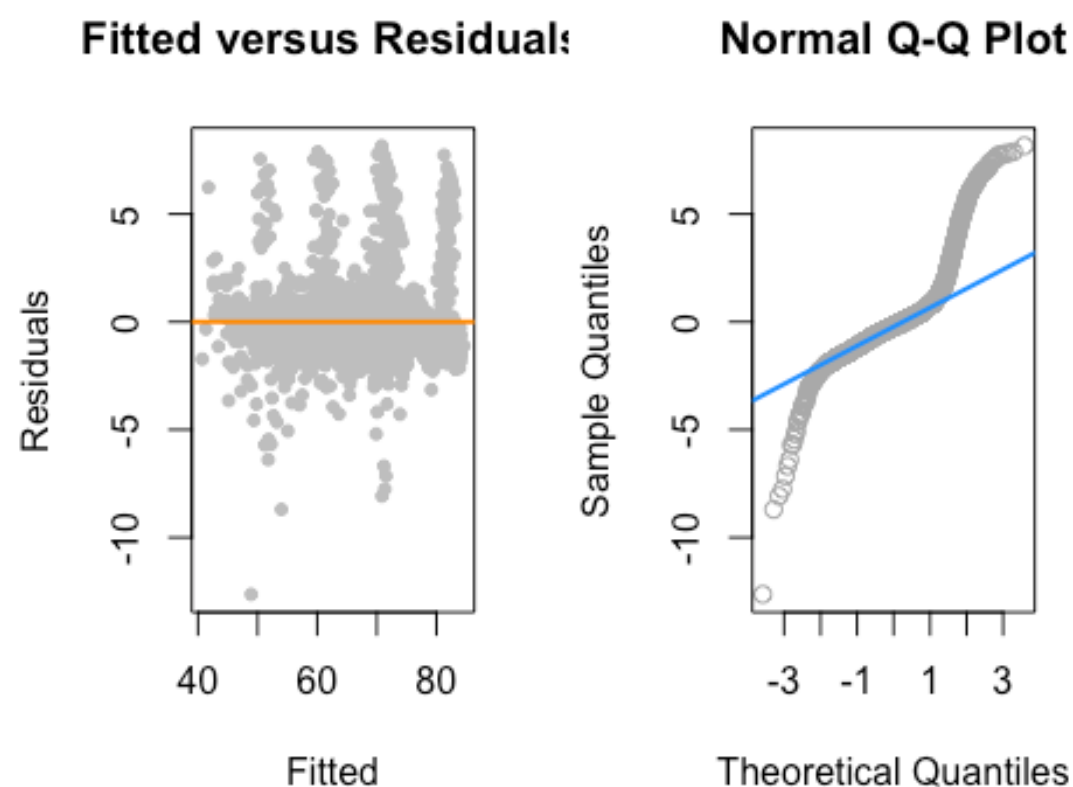
```

## I(Polio^2)                                0.948910
## I(thinness.5.9.years^2)                   0.915851
## I(Total.expenditure^2)                     0.200458
## I(percentage.expenditure^2)                0.665243
## I(HIV.AIDS^3)                             6.34e-05 ***
## I(Schooling^3)                            0.288904
## I(Diphtheria^3)                           0.048617 *
## I(Adult.Mortality^3)                      0.001573 **
## I(under.five.deaths^3)                    3.59e-05 ***
## I(infant.deaths^3)                        0.007963 **
## I(Measles^3)                              0.984573
## I(Alcohol^3)                              0.010397 *
## I(Polio^3)                                0.862288
## I(thinness.5.9.years^3)                   0.979144
## I(Total.expenditure^3)                     0.299113
## I(percentage.expenditure^3)                0.525666
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.744 on 2708 degrees of freedom
## Multiple R-squared:  0.969, Adjusted R-squared:  0.9664
## F-statistic: 369.5 on 229 and 2708 DF,  p-value: < 2.2e-16

# Residual plot
par(mfrow=c(1,2))
plot(resid(lm_cubic)~fitted(lm_cubic), col = "grey", pch = 20,
      xlab = "Fitted", ylab = "Residuals", main = "Fitted versus Residuals")
abline(h = 0, col = "darkorange", lwd = 2)

# Normal qq plot
qqnorm(resid(lm_cubic), main = "Normal Q-Q Plot", col = "darkgrey")
qqline(resid(lm_cubic), col = "dodgerblue", lwd = 2)

```



## multicollinearity

*# finding predictors with VIF larger than 20*

```
library(faraway)
```

```
vifs=vif(my_fit)
```

```
corr = which(vifs>20)
```

```
vifs[corr]
```

```
##      CountryIndia under.five.deaths    infant.deaths
##      23.38002      1275.47498      1410.81118
```

*# drop variables with high VIF*

```
drop = c("under.five.deaths", "infant.deaths")
```

```
dataLife = dataLife[,!(names(dataLife) %in% drop)]
```

*# fit the model without the predictors with high VIF*

```
final_null = lm(Life.expectancy~1, data=dataLife)
```

```
final_fit = step(final_null, direction="both",
```

```

scope=Life.expectancy~Year+Adult.Mortality+Alcohol
+percentage.expenditure+Measles+BMI
+Polio+Total.expenditure+Diphtheria+HIV.AIDS
+thinness..1.19.years+thinness.5.9.years+Income.composit
ion.of.resources
+Schooling+Country+Status, trace=FALSE)
options(max.print=4000)
summary(final_fit)

##
## Call:
## lm(formula = Life.expectancy ~ Country + Year + HIV.AIDS + Schooling +
##     Diphtheria + Adult.Mortality + Measles + Alcohol + Polio +
##     Total.expenditure + percentage.expenditure, data = dataLife)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -23.6167  -0.8866  -0.2421   0.4584   9.8300
##
## Coefficients:
##                                     Estimate
## (Intercept)                       -4.693e+02
## CountryAlbania                     1.557e+01
## CountryAlgeria                     1.387e+01
## CountryAngola                      -8.071e+00
## CountryAntigua and Barbuda         1.621e+01
## CountryArgentina                   1.525e+01
## CountryArmenia                     1.401e+01
## CountryAustralia                   2.137e+01
## CountryAustria                     2.173e+01
## CountryAzerbaijan                  1.139e+01
## CountryBahamas                     1.520e+01
## CountryBahrain                     1.562e+01
## CountryBangladesh                  1.019e+01
## CountryBarbados                    1.477e+01
## CountryBelarus                     1.078e+01
## CountryBelgium                     2.068e+01
## CountryBelize                      1.001e+01
## CountryBenin                      -4.643e-01
## CountryBhutan                      7.096e+00
## CountryBolivia (Plurinational State of) 8.158e+00
## CountryBosnia and Herzegovina      1.670e+01
## CountryBotswana                    2.690e+00
## CountryBrazil                      1.387e+01
## CountryBrunei Darussalam           1.626e+01

```



---

## CountryBulgaria	1.359e+01
## CountryBurkina Faso	-1.650e+00
## CountryBurundi	-1.737e+00
## CountryCabo Verde	1.326e+01
## CountryCambodia	5.811e+00
## CountryCameroon	-2.308e+00
## CountryCanada	2.171e+01
## CountryCentral African Republic	-6.303e+00
## CountryChad	-5.985e+00
## CountryChile	1.972e+01
## CountryChina	1.574e+01
## CountryColombia	1.399e+01
## CountryComoros	2.805e+00
## CountryCongo	2.177e+00
## CountryCook Islands	1.087e+01
## CountryCosta Rica	1.921e+01
## CountryCôte d'Ivoire	-6.746e+00
## CountryCroatia	1.678e+01
## CountryCuba	1.802e+01
## CountryCyprus	2.017e+01
## CountryCzechia	1.768e+01
## CountryDemocratic People's Republic of Korea	9.794e+00
## CountryDemocratic Republic of the Congo	-1.944e+00
## CountryDenmark	1.923e+01
## CountryDjibouti	3.854e+00
## CountryDominica	1.091e+01
## CountryDominican Republic	1.349e+01
## CountryEcuador	1.529e+01
## CountryEgypt	1.195e+01
## CountryEl Salvador	1.241e+01
## CountryEquatorial Guinea	-8.418e-01
## CountryEritrea	2.893e+00
## CountryEstonia	1.524e+01
## CountryEthiopia	2.033e+00
## CountryFiji	8.757e+00
## CountryFinland	2.063e+01
## CountryFrance	2.243e+01
## CountryGabon	6.112e+00
## CountryGambia	1.533e+00
## CountryGeorgia	1.425e+01
## CountryGermany	2.119e+01
## CountryGhana	2.700e+00
## CountryGreece	2.140e+01
## CountryGrenada	1.368e+01

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## CountryGuatemala	1.282e+01
## CountryGuinea	-1.480e+00
## CountryGuinea-Bissau	-1.662e+00
## CountryGuyana	7.116e+00
## CountryHaiti	2.524e+00
## CountryHonduras	1.402e+01
## CountryHungary	1.436e+01
## CountryIceland	2.209e+01
## CountryIndia	7.181e+00
## CountryIndonesia	8.501e+00
## CountryIran (Islamic Republic of)	1.410e+01
## CountryIraq	1.144e+01
## CountryIreland	2.021e+01
## CountryIsrael	2.115e+01
## CountryItaly	2.227e+01
## CountryJamaica	1.524e+01
## CountryJapan	2.265e+01
## CountryJordan	1.324e+01
## CountryKazakhstan	7.288e+00
## CountryKenya	1.810e+00
## CountryKiribati	5.802e+00
## CountryKuwait	1.365e+01
## CountryKyrgyzstan	9.614e+00
## CountryLao People's Democratic Republic	3.819e+00
## CountryLatvia	1.408e+01
## CountryLebanon	1.457e+01
## CountryLesotho	-1.826e+00
## CountryLiberia	-1.001e-01
## CountryLibya	1.236e+01
## CountryLithuania	1.322e+01
## CountryLuxembourg	2.112e+01
## CountryMadagascar	4.361e+00
## CountryMalawi	-3.098e+00
## CountryMalaysia	1.396e+01
## CountryMaldives	1.592e+01
## CountryMali	-2.754e+00
## CountryMalta	2.074e+01
## CountryMarshall Islands	1.343e+01
## CountryMauritania	4.612e+00
## CountryMauritius	1.299e+01
## CountryMexico	1.626e+01
## CountryMicronesia (Federated States of)	9.297e+00
## CountryMonaco	1.089e+01
## CountryMongolia	6.423e+00

---

## CountryMontenegro	1.525e+01
## CountryMorocco	1.274e+01
## CountryMozambique	-1.224e+00
## CountryMyanmar	5.447e+00
## CountryNamibia	6.152e+00
## CountryNauru	1.144e+01
## CountryNepal	7.472e+00
## CountryNetherlands	2.096e+01
## CountryNew Zealand	2.125e+01
## CountryNicaragua	1.432e+01
## CountryNiger	-1.776e-01
## CountryNigeria	-4.300e+00
## CountryNiue	1.100e+01
## CountryNorway	2.155e+01
## CountryOman	1.493e+01
## CountryPakistan	5.959e+00
## CountryPalau	1.099e+01
## CountryPanama	1.724e+01
## CountryPapua New Guinea	3.554e+00
## CountryParaguay	1.391e+01
## CountryPeru	1.421e+01
## CountryPhilippines	8.623e+00
## CountryPoland	1.599e+01
## CountryPortugal	2.027e+01
## CountryQatar	1.705e+01
## CountryRepublic of Korea	2.124e+01
## CountryRepublic of Moldova	1.115e+01
## CountryRomania	1.463e+01
## CountryRussian Federation	8.681e+00
## CountryRwanda	2.139e+00
## CountrySaint Kitts and Nevis	1.131e+01
## CountrySaint Lucia	1.467e+01
## CountrySaint Vincent and the Grenadines	1.402e+01
## CountrySamoa	1.440e+01
## CountrySan Marino	1.089e+01
## CountrySao Tome and Principe	6.412e+00
## CountrySaudi Arabia	1.339e+01
## CountrySenegal	4.126e+00
## CountrySerbia	1.456e+01
## CountrySeychelles	1.286e+01
## CountrySierra Leone	-1.150e+01
## CountrySingapore	2.132e+01
## CountrySlovakia	1.531e+01
## CountrySlovenia	1.994e+01

## CountrySolomon Islands	8.821e+00
## CountrySomalia	-4.954e+00
## CountrySouth Africa	5.190e+00
## CountrySouth Sudan	-2.212e+00
## CountrySpain	2.218e+01
## CountrySri Lanka	1.363e+01
## CountrySudan	3.662e+00
## CountrySuriname	1.119e+01
## CountrySwaziland	3.680e+00
## CountrySweden	2.247e+01
## CountrySwitzerland	2.223e+01
## CountrySyrian Arab Republic	1.181e+01
## CountryTajikistan	7.444e+00
## CountryThailand	1.378e+01
## CountryThe former Yugoslav republic of Macedonia	1.445e+01
## CountryTimor-Leste	5.567e+00
## CountryTogo	-8.718e-01
## CountryTonga	1.284e+01
## CountryTrinidad and Tobago	1.217e+01
## CountryTunisia	1.424e+01
## CountryTurkey	1.441e+01
## CountryTurkmenistan	5.484e+00
## CountryTuvalu	1.422e+01
## CountryUganda	1.538e-01
## CountryUkraine	1.092e+01
## CountryUnited Arab Emirates	1.575e+01
## CountryUnited Kingdom of Great Britain and Northern Ireland	2.175e+01
## CountryUnited Republic of Tanzania	-5.662e-01
## CountryUnited States of America	1.912e+01
## CountryUruguay	1.638e+01
## CountryUzbekistan	8.629e+00
## CountryVanuatu	1.232e+01
## CountryVenezuela (Bolivarian Republic of)	1.433e+01
## CountryViet Nam	1.547e+01
## CountryYemen	5.197e+00
## CountryZambia	-7.526e-01
## CountryZimbabwe	1.898e-02
## Year	2.623e-01
## HIV.AIDS	-3.340e-01
## Schooling	1.506e-01
## Diphtheria	6.644e-03
## Adult.Mortality	-1.870e-03
## Measles	-1.417e-05
## Alcohol	-5.609e-02

## Polio	4.580e-03	
## Total.expenditure	-3.807e-02	
## percentage.expenditure	3.839e-05	
##	Std. Error	t value
e		
## (Intercept)	1.985e+01	-23.6
35		
## CountryAlbania	7.125e-01	21.8
46		
## CountryAlgeria	7.066e-01	19.6
29		
## CountryAngola	6.917e-01	-11.6
69		
## CountryAntigua and Barbuda	7.129e-01	22.
744		
## CountryArgentina	7.618e-01	20.
021		
## CountryArmenia	7.017e-01	19.9
69		
## CountryAustralia	8.356e-01	25.
578		
## CountryAustria	7.836e-01	27.7
28		
## CountryAzerbaijan	6.905e-01	16.
497		
## CountryBahamas	7.324e-01	20.7
58		
## CountryBahrain	7.274e-01	21.4
81		
## CountryBangladesh	6.916e-01	14.
740		
## CountryBarbados	7.426e-01	19.8
87		
## CountryBelarus	7.717e-01	13.9
66		
## CountryBelgium	7.871e-01	26.2
76		
## CountryBelize	7.147e-01	14.0
02		
## CountryBenin	6.786e-01	-0.6
84		
## CountryBhutan	6.862e-01	10.3
41		
## CountryBolivia (Plurinational State of)	7.136e-01	11

.433		
## CountryBosnia and Herzegovina	7.014e-01	23
.805		
## CountryBotswana	7.418e-01	3.6
26		
## CountryBrazil	7.302e-01	18.9
94		
## CountryBrunei Darussalam	7.303e-01	22.
263		
## CountryBulgaria	7.456e-01	18.2
24		
## CountryBurkina Faso	6.930e-01	-2.
381		
## CountryBurundi	6.864e-01	-2.5
30		
## CountryCabo Verde	7.023e-01	18.
887		
## CountryCambodia	6.804e-01	8.5
41		
## CountryCameroon	6.898e-01	-3.3
45		
## CountryCanada	7.620e-01	28.4
88		
## CountryCentral African Republic	6.953e-01	-9
.065		
## CountryChad	6.869e-01	-8.7
13		
## CountryChile	7.375e-01	26.7
44		
## CountryChina	7.554e-01	20.8
41		
## CountryColombia	7.015e-01	19.9
48		
## CountryComoros	6.798e-01	4.1
26		
## CountryCongo	6.887e-01	3.1
61		
## CountryCook Islands	1.967e+00	5.
526		
## CountryCosta Rica	7.040e-01	27.
282		
## CountryCôte d'Ivoire	6.977e-01	-9.
669		
## CountryCroatia	7.597e-01	22.0

93		
## CountryCuba	7.314e-01	24.6
35		
## CountryCyprus	7.456e-01	27.0
57		
## CountryCzechia	7.557e-01	23.3
90		
## CountryDemocratic People's Republic of Korea	7.020e-01	1
3.951		
## CountryDemocratic Republic of the Congo	7.252e-01	-2
.680		
## CountryDenmark	7.934e-01	24.2
38		
## CountryDjibouti	6.894e-01	5.5
90		
## CountryDominica	1.966e+00	5.5
50		
## CountryDominican Republic	7.120e-01	18.
952		
## CountryEcuador	7.066e-01	21.6
31		
## CountryEgypt	6.983e-01	17.1
10		
## CountryEl Salvador	6.994e-01	17.
736		
## CountryEquatorial Guinea	7.058e-01	-1.
193		
## CountryEritrea	6.972e-01	4.1
49		
## CountryEstonia	7.593e-01	20.0
66		
## CountryEthiopia	6.795e-01	2.9
92		
## CountryFiji	7.233e-01	12.1
07		
## CountryFinland	7.843e-01	26.2
98		
## CountryFrance	7.862e-01	28.5
26		
## CountryGabon	7.234e-01	8.4
49		
## CountryGambia	6.851e-01	2.2
38		
## CountryGeorgia	7.075e-01	20.1

38			
## CountryGermany	7.943e-01	26.6	
81			
## CountryGhana	6.844e-01	3.9	
45			
## CountryGreece	7.591e-01	28.1	
95			
## CountryGrenada	7.496e-01	18.2	
50			
## CountryGuatemala	6.836e-01	18.	
751			
## CountryGuinea	6.797e-01	-2.1	
77			
## CountryGuinea-Bissau	6.841e-01	-2.	
430			
## CountryGuyana	7.046e-01	10.1	
00			
## CountryHaiti	6.877e-01	3.6	
70			
## CountryHonduras	6.924e-01	20.2	
49			
## CountryHungary	7.633e-01	18.8	
20			
## CountryIceland	7.938e-01	27.8	
26			
## CountryIndia	7.102e-01	10.1	
11			
## CountryIndonesia	6.980e-01	12.	
179			
## CountryIran (Islamic Republic of)	7.054e-01	19	
.989			
## CountryIraq	6.815e-01	16.7	
81			
## CountryIreland	8.087e-01	24.9	
86			
## CountryIsrael	7.393e-01	28.6	
15			
## CountryItaly	7.602e-01	29.2	
97			
## CountryJamaica	7.036e-01	21.6	
66			
## CountryJapan	7.490e-01	30.2	
35			
## CountryJordan	7.082e-01	18.6	



91			
## CountryKazakhstan	7.312e-01	9.	
967			
## CountryKenya	6.924e-01	2.6	
14			
## CountryKiribati	6.908e-01	8.3	
98			
## CountryKuwait	7.270e-01	18.7	
79			
## CountryKyrgyzstan	7.011e-01	13.	
713			
## CountryLao People's Democratic Republic	6.866e-01	5	
.563			
## CountryLatvia	7.534e-01	18.6	
92			
## CountryLebanon	7.095e-01	20.5	
36			
## CountryLesotho	7.610e-01	-2.3	
99			
## CountryLiberia	6.805e-01	-0.1	
47			
## CountryLibya	7.306e-01	16.9	
19			
## CountryLithuania	7.820e-01	16.	
900			
## CountryLuxembourg	7.801e-01	27.	
072			
## CountryMadagascar	6.786e-01	6.	
426			
## CountryMalawi	7.248e-01	-4.2	
75			
## CountryMalaysia	7.090e-01	19.6	
94			
## CountryMaldives	7.004e-01	22.7	
34			
## CountryMali	6.786e-01	-4.0	
58			
## CountryMalta	7.321e-01	28.3	
33			
## CountryMarshall Islands	1.995e+00	6.	
728			
## CountryMauritania	6.819e-01	6.	
764			
## CountryMauritius	7.159e-01	18.	

142		
## CountryMexico	7.093e-01	22.9
23		
## CountryMicronesia (Federated States of)	6.855e-01	13
.561		
## CountryMonaco	1.967e+00	5.5
37		
## CountryMongolia	7.051e-01	9.1
09		
## CountryMontenegro	6.907e-01	22.
081		
## CountryMorocco	6.927e-01	18.3
89		
## CountryMozambique	6.968e-01	-1.
756		
## CountryMyanmar	6.893e-01	7.9
03		
## CountryNamibia	7.179e-01	8.5
70		
## CountryNauru	1.962e+00	5.8
34		
## CountryNepal	6.822e-01	10.9
53		
## CountryNetherlands	7.811e-01	26.
829		
## CountryNew Zealand	8.053e-01	26.
384		
## CountryNicaragua	6.929e-01	20.
664		
## CountryNiger	6.927e-01	-0.2
56		
## CountryNigeria	7.393e-01	-5.8
16		
## CountryNiue	1.965e+00	5.5
99		
## CountryNorway	7.782e-01	27.6
87		
## CountryOman	7.129e-01	20.9
39		
## CountryPakistan	6.874e-01	8.6
68		
## CountryPalau	1.971e+00	5.5
75		
## CountryPanama	7.103e-01	24.2

68		
## Country	Papua New Guinea	6.756e-01 5.
260		
## Country	Paraguay	7.035e-01 19.7
79		
## Country	Peru	7.123e-01 19.9
48		
## Country	Philippines	6.993e-01 12.
331		
## Country	Poland	7.585e-01 21.0
75		
## Country	Portugal	7.806e-01 25.9
68		
## Country	Qatar	7.201e-01 23.6
72		
## Country	Republic of Korea	7.270e-01 29.
212		
## Country	Republic of Moldova	7.238e-01 15.
403		
## Country	Romania	7.385e-01 19.8
12		
## Country	Russian Federation	7.475e-01 11.
614		
## Country	Rwanda	6.944e-01 3.0
80		
## Country	Saint Kitts and Nevis	1.977e+00 5.
719		
## Country	Saint Lucia	7.390e-01 19.
854		
## Country	Saint Vincent and the Grenadines	7.215e-01 19
.425		
## Country	Samoa	6.978e-01 20.6
30		
## Country	San Marino	1.971e+00 5.5
24		
## Country	Sao Tome and Principe	6.922e-01 9.
264		
## Country	Saudi Arabia	7.188e-01 18.
626		
## Country	Senegal	6.816e-01 6.0
53		
## Country	Serbia	7.324e-01 19.8
78		
## Country	Seychelles	7.224e-01 17.

802		
## Country	Sierra Leone	6.784e-01 -16.
953		
## Country	Singapore	7.285e-01 29.
272		
## Country	Slovakia	7.508e-01 20.3
86		
## Country	Slovenia	7.764e-01 25.6
79		
## Country	Solomon Islands	6.812e-01 12.
950		
## Country	Somalia	6.919e-01 -7.1
60		
## Country	South Africa	7.538e-01 6.
885		
## Country	South Sudan	7.333e-01 -3.
016		
## Country	Spain	7.729e-01 28.6
92		
## Country	Sri Lanka	7.153e-01 19.0
50		
## Country	Sudan	6.812e-01 5.3
76		
## Country	Suriname	6.978e-01 16.0
43		
## Country	Swaziland	8.376e-01 4.3
93		
## Country	Sweden	7.595e-01 29.5
91		
## Country	Switzerland	8.019e-01 27.
724		
## Country	Syrian Arab Republic	6.890e-01 17.
146		
## Country	Tajikistan	6.875e-01 10.
828		
## Country	Thailand	7.194e-01 19.1
47		
## Country	The former Yugoslav republic of Macedonia	7.039e-01 2
0.529		
## Country	Timor-Leste	6.946e-01 8.
014		
## Country	Togo	6.841e-01 -1.2
74		
## Country	Tonga	7.143e-01 17.9

72		
## Country	Trinidad and Tobago	7.062e-01 17.
235		
## Country	Tunisia	7.240e-01 19.6
66		
## Country	Turkey	7.015e-01 20.5
42		
## Country	Turkmenistan	6.969e-01 7.
869		
## Country	Tuvalu	1.997e+00 7.1
20		
## Country	Uganda	7.068e-01 0.2
18		
## Country	Ukraine	7.294e-01 14.9
70		
## Country	United Arab Emirates	7.182e-01 21.
930		
## Country	United Kingdom of Great Britain and Northern Ireland	7.420e-01
29.307		
## Country	United Republic of Tanzania	7.055e-01 -0
.803		
## Country	United States of America	7.363e-01 25
.965		
## Country	Uruguay	7.369e-01 22.2
32		
## Country	Uzbekistan	6.971e-01 12.
378		
## Country	Vanuatu	6.870e-01 17.9
32		
## Country	Venezuela (Bolivarian Republic of)	7.156e-01 2
0.023		
## Country	Viet Nam	6.978e-01 22.1
72		
## Country	Yemen	6.774e-01 7.6
71		
## Country	Zambia	7.052e-01 -1.0
67		
## Country	Zimbabwe	7.623e-01 0.0
25		
## Year		9.983e-03 26.27
2		
## HIV.AIDS		1.494e-02 -22.3
49		
## Schooling		3.678e-02 4.0

---

```

96
## Diphtheria                2.301e-03    2.8
88
## Adult.Mortality           4.538e-04   -4.1
21
## Measles                   4.329e-06   -3.2
74
## Alcohol                   2.325e-02   -2.4
13
## Polio                     2.264e-03    2.02
3
## Total.expenditure         2.233e-02   -1.
705
## percentage.expenditure    2.661e-05    1.
443
##
## Pr(>|t|)
## (Intercept)               < 2e-16 ***
## CountryAlbania            < 2e-16 ***
## CountryAlgeria            < 2e-16 ***
## CountryAngola              < 2e-16 ***
## CountryAntigua and Barbuda < 2e-16 ***
## CountryArgentina          < 2e-16 ***
## CountryArmenia            < 2e-16 ***
## CountryAustralia          < 2e-16 ***
## CountryAustria            < 2e-16 ***
## CountryAzerbaijan         < 2e-16 ***
## CountryBahamas            < 2e-16 ***
## CountryBahrain            < 2e-16 ***
## CountryBangladesh         < 2e-16 ***
## CountryBarbados           < 2e-16 ***
## CountryBelarus            < 2e-16 ***
## CountryBelgium            < 2e-16 ***
## CountryBelize             < 2e-16 ***
## CountryBenin              0.493881
## CountryBhutan             < 2e-16 ***
## CountryBolivia (Plurinational State of) < 2e-16 ***
## CountryBosnia and Herzegovina < 2e-16 ***
## CountryBotswana           0.000293 ***
## CountryBrazil             < 2e-16 ***
## CountryBrunei Darussalam  < 2e-16 ***
## CountryBulgaria           < 2e-16 ***
## CountryBurkina Faso       0.017333 *
## CountryBurundi            0.011463 *
## CountryCabo Verde         < 2e-16 ***

```

---

## CountryCambodia	< 2e-16 ***
## CountryCameroon	0.000834 ***
## CountryCanada	< 2e-16 ***
## CountryCentral African Republic	< 2e-16 ***
## CountryChad	< 2e-16 ***
## CountryChile	< 2e-16 ***
## CountryChina	< 2e-16 ***
## CountryColombia	< 2e-16 ***
## CountryComoros	3.80e-05 ***
## CountryCongo	0.001587 **
## CountryCook Islands	3.58e-08 ***
## CountryCosta Rica	< 2e-16 ***
## CountryCôte d'Ivoire	< 2e-16 ***
## CountryCroatia	< 2e-16 ***
## CountryCuba	< 2e-16 ***
## CountryCyprus	< 2e-16 ***
## CountryCzechia	< 2e-16 ***
## CountryDemocratic People's Republic of Korea	< 2e-16 ***
## CountryDemocratic Republic of the Congo	0.007408 **
## CountryDenmark	< 2e-16 ***
## CountryDjibouti	2.49e-08 ***
## CountryDominica	3.14e-08 ***
## CountryDominican Republic	< 2e-16 ***
## CountryEcuador	< 2e-16 ***
## CountryEgypt	< 2e-16 ***
## CountryEl Salvador	< 2e-16 ***
## CountryEquatorial Guinea	0.233104
## CountryEritrea	3.44e-05 ***
## CountryEstonia	< 2e-16 ***
## CountryEthiopia	0.002795 **
## CountryFiji	< 2e-16 ***
## CountryFinland	< 2e-16 ***
## CountryFrance	< 2e-16 ***
## CountryGabon	< 2e-16 ***
## CountryGambia	0.025297 *
## CountryGeorgia	< 2e-16 ***
## CountryGermany	< 2e-16 ***
## CountryGhana	8.17e-05 ***
## CountryGreece	< 2e-16 ***
## CountryGrenada	< 2e-16 ***
## CountryGuatemala	< 2e-16 ***
## CountryGuinea	0.029587 *
## CountryGuinea-Bissau	0.015168 *
## CountryGuyana	< 2e-16 ***

---

## CountryHaiti	0.000247 ***
## CountryHonduras	< 2e-16 ***
## CountryHungary	< 2e-16 ***
## CountryIceland	< 2e-16 ***
## CountryIndia	< 2e-16 ***
## CountryIndonesia	< 2e-16 ***
## CountryIran (Islamic Republic of)	< 2e-16 ***
## CountryIraq	< 2e-16 ***
## CountryIreland	< 2e-16 ***
## CountryIsrael	< 2e-16 ***
## CountryItaly	< 2e-16 ***
## CountryJamaica	< 2e-16 ***
## CountryJapan	< 2e-16 ***
## CountryJordan	< 2e-16 ***
## CountryKazakhstan	< 2e-16 ***
## CountryKenya	0.009003 **
## CountryKiribati	< 2e-16 ***
## CountryKuwait	< 2e-16 ***
## CountryKyrgyzstan	< 2e-16 ***
## CountryLao People's Democratic Republic	2.91e-08 ***
## CountryLatvia	< 2e-16 ***
## CountryLebanon	< 2e-16 ***
## CountryLesotho	0.016517 *
## CountryLiberia	0.883002
## CountryLibya	< 2e-16 ***
## CountryLithuania	< 2e-16 ***
## CountryLuxembourg	< 2e-16 ***
## CountryMadagascar	1.54e-10 ***
## CountryMalawi	1.98e-05 ***
## CountryMalaysia	< 2e-16 ***
## CountryMaldives	< 2e-16 ***
## CountryMali	5.08e-05 ***
## CountryMalta	< 2e-16 ***
## CountryMarshall Islands	2.08e-11 ***
## CountryMauritania	1.64e-11 ***
## CountryMauritius	< 2e-16 ***
## CountryMexico	< 2e-16 ***
## CountryMicronesia (Federated States of)	< 2e-16 ***
## CountryMonaco	3.38e-08 ***
## CountryMongolia	< 2e-16 ***
## CountryMontenegro	< 2e-16 ***
## CountryMorocco	< 2e-16 ***
## CountryMozambique	0.079150 .
## CountryMyanmar	3.92e-15 ***



---

## CountryNamibia	< 2e-16 ***
## CountryNauru	6.06e-09 ***
## CountryNepal	< 2e-16 ***
## CountryNetherlands	< 2e-16 ***
## CountryNew Zealand	< 2e-16 ***
## CountryNicaragua	< 2e-16 ***
## CountryNiger	0.797698
## CountryNigeria	6.71e-09 ***
## CountryNiue	2.37e-08 ***
## CountryNorway	< 2e-16 ***
## CountryOman	< 2e-16 ***
## CountryPakistan	< 2e-16 ***
## CountryPalau	2.72e-08 ***
## CountryPanama	< 2e-16 ***
## CountryPapua New Guinea	1.55e-07 ***
## CountryParaguay	< 2e-16 ***
## CountryPeru	< 2e-16 ***
## CountryPhilippines	< 2e-16 ***
## CountryPoland	< 2e-16 ***
## CountryPortugal	< 2e-16 ***
## CountryQatar	< 2e-16 ***
## CountryRepublic of Korea	< 2e-16 ***
## CountryRepublic of Moldova	< 2e-16 ***
## CountryRomania	< 2e-16 ***
## CountryRussian Federation	< 2e-16 ***
## CountryRwanda	0.002088 **
## CountrySaint Kitts and Nevis	1.19e-08 ***
## CountrySaint Lucia	< 2e-16 ***
## CountrySaint Vincent and the Grenadines	< 2e-16 ***
## CountrySamoa	< 2e-16 ***
## CountrySan Marino	3.62e-08 ***
## CountrySao Tome and Principe	< 2e-16 ***
## CountrySaudi Arabia	< 2e-16 ***
## CountrySenegal	1.61e-09 ***
## CountrySerbia	< 2e-16 ***
## CountrySeychelles	< 2e-16 ***
## CountrySierra Leone	< 2e-16 ***
## CountrySingapore	< 2e-16 ***
## CountrySlovakia	< 2e-16 ***
## CountrySlovenia	< 2e-16 ***
## CountrySolomon Islands	< 2e-16 ***
## CountrySomalia	1.03e-12 ***
## CountrySouth Africa	7.14e-12 ***
## CountrySouth Sudan	0.002584 **

---

## CountrySpain	< 2e-16 ***
## CountrySri Lanka	< 2e-16 ***
## CountrySudan	8.27e-08 ***
## CountrySuriname	< 2e-16 ***
## CountrySwaziland	1.16e-05 ***
## CountrySweden	< 2e-16 ***
## CountrySwitzerland	< 2e-16 ***
## CountrySyrian Arab Republic	< 2e-16 ***
## CountryTajikistan	< 2e-16 ***
## CountryThailand	< 2e-16 ***
## CountryThe former Yugoslav republic of Macedonia	< 2e-16 ***
## CountryTimor-Leste	1.63e-15 ***
## CountryTogo	0.202688
## CountryTonga	< 2e-16 ***
## CountryTrinidad and Tobago	< 2e-16 ***
## CountryTunisia	< 2e-16 ***
## CountryTurkey	< 2e-16 ***
## CountryTurkmenistan	5.09e-15 ***
## CountryTuvalu	1.38e-12 ***
## CountryUganda	0.827733
## CountryUkraine	< 2e-16 ***
## CountryUnited Arab Emirates	< 2e-16 ***
## CountryUnited Kingdom of Great Britain and Northern Ireland	< 2e-16 ***
## CountryUnited Republic of Tanzania	0.422281
## CountryUnited States of America	< 2e-16 ***
## CountryUruguay	< 2e-16 ***
## CountryUzbekistan	< 2e-16 ***
## CountryVanuatu	< 2e-16 ***
## CountryVenezuela (Bolivarian Republic of)	< 2e-16 ***
## CountryViet Nam	< 2e-16 ***
## CountryYemen	2.35e-14 ***
## CountryZambia	0.285981
## CountryZimbabwe	0.980134
## Year	< 2e-16 ***
## HIV.AIDS	< 2e-16 ***
## Schooling	4.33e-05 ***
## Diphtheria	0.003910 **
## Adult.Mortality	3.89e-05 ***
## Measles	0.001073 **
## Alcohol	0.015890 *
## Polio	0.043141 *
## Total.expenditure	0.088285 .
## percentage.expenditure	0.149169
## ---	

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.898 on 2735 degrees of freedom
## Multiple R-squared:  0.9629, Adjusted R-squared:  0.9602
## F-statistic: 351.4 on 202 and 2735 DF,  p-value: < 2.2e-16

# assess performance

set.seed(251203021)
n = nrow(dataLife)
idx_tr = sample(n,round(0.70*n),replace=FALSE)

dataLife_tr = dataLife[idx_tr,]
dataLife_ts = dataLife[-idx_tr,]

dataLife_tr = rbind(dataLife_tr, dataLife_ts[which(dataLife_ts$Country=='Cook Islands' | dataLife_ts$Country=='San Marino' | dataLife_ts$Country=='Marshall Islands' | dataLife_ts$Country=='Tuvalu') ,])

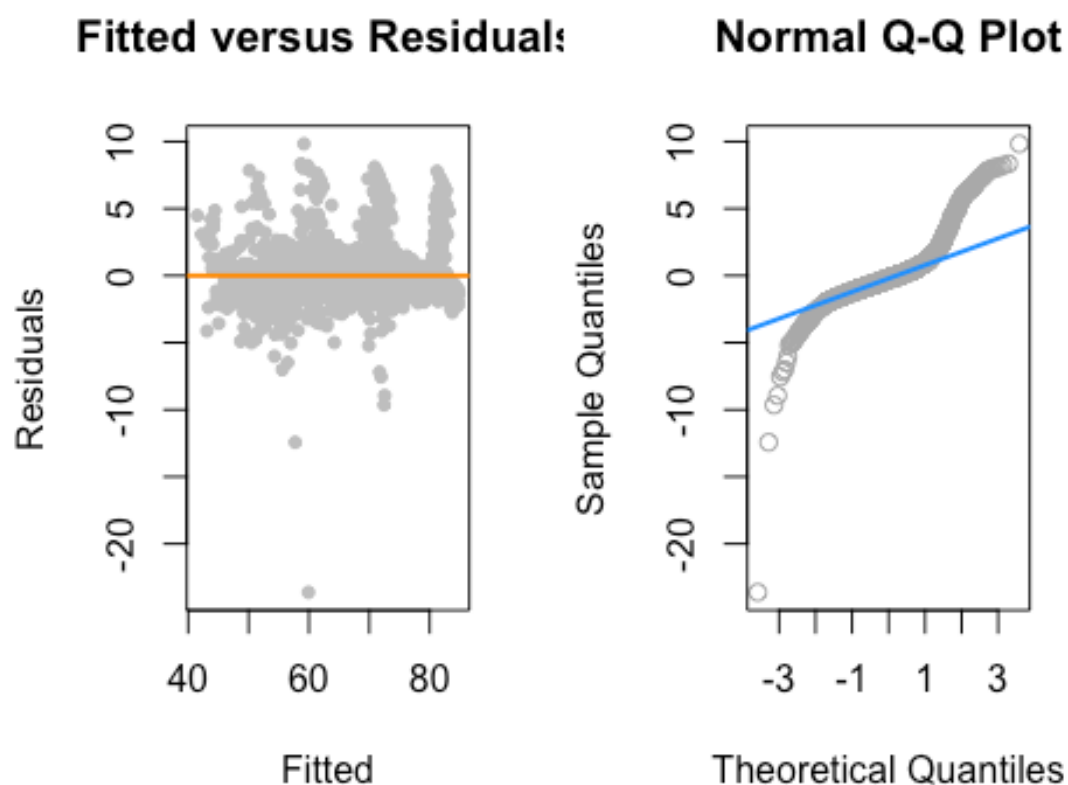
ypr = predict(final_fit,newdata=dataLife_ts)
mse = mean((ypr - dataLife_ts[,4])^2)
mse

## [1] 3.946655

# check model assumption

# Residual plot
par(mfrow=c(1,2))
plot(resid(final_fit)~fitted(final_fit), col = "grey", pch = 20,
      xlab = "Fitted", ylab = "Residuals", main = "Fitted versus Residuals")
abline(h = 0, col = "darkorange", lwd = 2)

# Normal qq plot
qqnorm(resid(final_fit), main = "Normal Q-Q Plot", col = "darkgrey")
qqline(resid(final_fit), col = "dodgerblue", lwd = 2)
```



## interactions

*# considering interactions between countries and other predictors*

```
my_fit_interaction = lm(Life.expectancy ~ Country*Year + HIV.AIDS*Country +
  Schooling*Country + Diphtheria*Country + Adult.Mortality*Country + Measles
*Country + Alcohol*Country+Polio*Country+thinness.5.9.years*Country + Total
.expenditure*Country + percentage.expenditure*Country, data=dataLife)
```

```
summary(my_fit_interaction)
```

```
##
```

```
## Call:
```

```
## lm(formula = Life.expectancy ~ Country * Year + HIV.AIDS * Country +
##   Schooling * Country + Diphtheria * Country + Adult.Mortality *
##   Country + Measles * Country + Alcohol * Country + Polio *
##   Country + thinness.5.9.years * Country + Total.expenditure *
##   Country + percentage.expenditure * Country, data = dataLife)
```

```
##
```

```
## Residuals:
```

```

##      Min      1Q  Median      3Q      Max
## -4.2342 -0.1439  0.0000  0.1303  5.5768
##
## Coefficients: (291 not defined because of singularities)
##
##      Estimate
## (Intercept)
##      -5.100e+02
## CountryAlbania
##      -2.113e+03
## CountryAlgeria
##      -8.495e+00
## CountryAngola
##      -5.135e+03
## CountryAntigua and Barbuda
##      2.536e+02
## CountryArgentina
##      9.807e+01
## CountryArmenia
##      1.847e+02
## CountryAustralia
##      4.705e+02
## CountryAustria
##      -1.510e+02
## CountryAzerbaijan
##      -2.549e+03
## CountryBahamas
##      5.233e+02
## CountryBahrain
##      2.518e+02
## CountryBangladesh
##      1.547e+03
## CountryBarbados
##      2.424e+02
## CountryBelarus
##      9.333e+02
## CountryBelgium
##      -7.551e+02
## CountryBelize
##      2.703e+02
## CountryBenin
##      2.811e+02
## CountryBhutan
##      -4.967e+02

```

---

## CountryBolivia (Plurinational State of)

-4.386e+03

## CountryBosnia and Herzegovina

1.034e+03

## CountryBotswana

-1.230e+03

## CountryBrazil

2.371e+03

## CountryBrunei Darussalam

-1.504e+03

## CountryBulgaria

1.464e+02

## CountryBurkina Faso

-4.738e+02

## CountryBurundi

-4.286e+02

## CountryCabo Verde

-1.238e+03

## CountryCambodia

3.781e+01

## CountryCameroon

6.649e+02

## CountryCanada

6.757e+02

## CountryCentral African Republic

-1.716e+02

## CountryChad

-2.286e+03

## CountryChile

2.820e+02

## CountryChina

-1.041e+03

## CountryColombia

-1.931e+02

## CountryComoros

-1.048e+05

## CountryCongo

-3.837e+03

## CountryCook Islands

1.378e+01

## CountryCosta Rica

4.814e+02

## CountryCôte d'Ivoire

-4.440e+03

---

```
## CountryCroatia
    -3.637e+02
## CountryCuba
    3.736e+02
## CountryCyprus
    -3.052e+00
## CountryCzechia
    -4.690e+01
## CountryDemocratic People's Republic of Korea
    -1.105e+03
## CountryDemocratic Republic of the Congo
    -5.637e+02
## CountryDenmark
    5.879e+02
## CountryDjibouti
    7.574e+03
## CountryDominica
    1.332e+01
## CountryDominican Republic
    -6.628e+03
## CountryEcuador
    4.621e+01
## CountryEgypt
    1.873e+03
## CountryEl Salvador
    -7.764e+01
## CountryEquatorial Guinea
    -1.595e+02
## CountryEritrea
    -5.809e+03
## CountryEstonia
    -2.909e+03
## CountryEthiopia
    6.220e+02
## CountryFiji
    3.173e+02
## CountryFinland
    -6.764e+02
## CountryFrance
    5.224e+02
## CountryGabon
    -7.149e+03
## CountryGambia
    7.679e+01
```

---

```
## CountryGeorgia
    3.635e+02
## CountryGermany
   -5.318e+02
## CountryGhana
   -2.251e+02
## CountryGreece
   -1.378e+03
## CountryGrenada
   -1.220e+03
## CountryGuatemala
    1.912e+03
## CountryGuinea
   -8.217e+02
## CountryGuinea-Bissau
   -1.278e+03
## CountryGuyana
    2.847e+02
## CountryHaiti
    1.187e+04
## CountryHonduras
    1.107e+02
## CountryHungary
   -1.779e+02
## CountryIceland
    2.914e+03
## CountryIndia
   -2.934e+02
## CountryIndonesia
    3.797e+02
## CountryIran (Islamic Republic of)
   -2.342e+02
## CountryIraq
   -3.474e+03
## CountryIreland
    1.984e+03
## CountryIsrael
   -5.106e+02
## CountryItaly
    1.185e+03
## CountryJamaica
    1.384e+02
## CountryJapan
    3.836e+02
```



---

```
## CountryJordan
    2.335e+02
## CountryKazakhstan
   -7.781e+02
## CountryKenya
    1.804e+03
## CountryKiribati
    2.415e+02
## CountryKuwait
    4.199e+02
## CountryKyrgyzstan
   -2.814e+03
## CountryLao People's Democratic Republic
    5.295e+03
## CountryLatvia
    6.041e+03
## CountryLebanon
    2.302e+02
## CountryLesotho
    7.252e+02
## CountryLiberia
    3.526e+03
## CountryLibya
    2.281e+03
## CountryLithuania
   -1.700e+03
## CountryLuxembourg
    3.339e+02
## CountryMadagascar
    9.558e+03
## CountryMalawi
    2.095e+03
## CountryMalaysia
    3.272e+02
## CountryMaldives
   -2.431e+03
## CountryMali
   -9.500e+02
## CountryMalta
   -1.493e+02
## CountryMarshall Islands
    1.491e+01
## CountryMauritania
    2.072e+03
```

---

```
## CountryMauritius
    -3.502e+02
## CountryMexico
    6.223e+02
## CountryMicronesia (Federated States of)
    3.252e+02
## CountryMonaco
    1.346e+01
## CountryMongolia
    -4.872e+01
## CountryMontenegro
    2.530e+02
## CountryMorocco
    2.166e+03
## CountryMozambique
    -4.940e+03
## CountryMyanmar
    -4.103e+02
## CountryNamibia
    1.205e+03
## CountryNauru
    1.394e+01
## CountryNepal
    -2.991e+03
## CountryNetherlands
    -6.744e+01
## CountryNew Zealand
    3.685e+02
## CountryNicaragua
    6.023e+02
## CountryNiger
    4.804e+03
## CountryNigeria
    2.004e+03
## CountryNiue
    1.334e+01
## CountryNorway
    7.422e+02
## CountryOman
    6.647e+01
## CountryPakistan
    2.223e+02
## CountryPalau
    4.063e+01
```

---

```
## CountryPanama
    4.319e+02
## CountryPapua New Guinea
    4.321e+02
## CountryParaguay
   -2.019e+03
## CountryPeru
   -3.313e+02
## CountryPhilippines
    3.873e+02
## CountryPoland
    2.479e+02
## CountryPortugal
   -7.811e+02
## CountryQatar
    4.043e+02
## CountryRepublic of Korea
   -1.611e+02
## CountryRepublic of Moldova
    4.425e+03
## CountryRomania
    2.744e+03
## CountryRussian Federation
    8.153e+01
## CountryRwanda
   -1.016e+04
## CountrySaint Kitts and Nevis
    7.499e+01
## CountrySaint Lucia
   -6.920e+01
## CountrySaint Vincent and the Grenadines
    1.443e+03
## CountrySamoa
   -8.985e+02
## CountrySan Marino
    1.275e+01
## CountrySao Tome and Principe
    1.494e+03
## CountrySaudi Arabia
    3.810e+02
## CountrySenegal
   -2.830e+03
## CountrySerbia
    5.827e+02
```

---

```
## CountrySeychelles
    2.235e+02
## CountrySierra Leone
    5.118e+03
## CountrySingapore
    1.697e+03
## CountrySlovakia
    -1.034e+01
## CountrySlovenia
    -1.431e+03
## CountrySolomon Islands
    2.413e+02
## CountrySomalia
    -8.350e+02
## CountrySouth Africa
    3.722e+03
## CountrySouth Sudan
    -3.167e+02
## CountrySpain
    -1.557e+03
## CountrySri Lanka
    1.627e+03
## CountrySudan
    2.330e+03
## CountrySuriname
    3.728e+03
## CountrySwaziland
    -1.096e+04
## CountrySweden
    -6.882e+02
## CountrySwitzerland
    -1.478e+03
## CountrySyrian Arab Republic
    2.916e+03
## CountryTajikistan
    1.768e+01
## CountryThailand
    -1.242e+03
## CountryThe former Yugoslav republic of Macedonia
    1.104e+02
## CountryTimor-Leste
    -2.286e+03
## CountryTogo
    1.555e+03
```

---

```

## CountryTonga
    3.430e+02
## CountryTrinidad and Tobago
    2.434e+03
## CountryTunisia
    4.424e+02
## CountryTurkey
   -1.488e+03
## CountryTurkmenistan
   -2.757e+02
## CountryTuvalu
    1.337e+01
## CountryUganda
    1.068e+04
## CountryUkraine
    2.697e+02
## CountryUnited Arab Emirates
    4.239e+02
## CountryUnited Kingdom of Great Britain and Northern Ireland
    7.463e+02
## CountryUnited Republic of Tanzania
    4.488e+03
## CountryUnited States of America
    2.906e+02
## CountryUruguay
    3.824e+02
## CountryUzbekistan
    3.265e+02
## CountryVanuatu
   -2.177e+03
## CountryVenezuela (Bolivarian Republic of)
    4.711e+02
## CountryViet Nam
    1.034e+02
## CountryYemen
   -2.302e+03
## CountryZambia
    4.186e+03
## CountryZimbabwe
   -7.117e+03
## Year
    2.819e-01
## HIV.AIDS
    8.038e-01

```

---

```

## Schooling
    1.150e-01
## Diphtheria
    7.817e-02
## Adult.Mortality
   -3.851e-03
## Measles
    1.021e-04
## Alcohol
   -7.258e+00
## Polio
   -8.233e-02
## thinness.5.9.years
    7.382e-02
## Total.expenditure
    1.212e-01
## percentage.expenditure
   -1.670e-03
## CountryAlbania:Year
    1.051e+00
## CountryAlgeria:Year
    1.400e-02
## CountryAngola:Year
    2.555e+00
## CountryAntigua and Barbuda:Year
   -1.158e-01
## CountryArgentina:Year
   -3.526e-02
## CountryArmenia:Year
   -8.031e-02
## CountryAustralia:Year
   -2.296e-01
## CountryAustria:Year
    2.655e-02
## CountryAzerbaijan:Year
    1.329e+00
## CountryBahamas:Year
   -2.596e-01
## CountryBahrain:Year
   -1.097e-01
## CountryBangladesh:Year
   -7.891e-01
## CountryBarbados:Year
   -1.121e-01

```

---

```
## CountryBelarus:Year
    -4.593e-01
## CountryBelgium:Year
    3.017e-01
## CountryBelize:Year
    -1.310e-01
## CountryBenin:Year
    -1.301e-01
## CountryBhutan:Year
    2.364e-01
## CountryBolivia (Plurinational State of):Year
    2.315e+00
## CountryBosnia and Herzegovina:Year
    -4.963e-01
## CountryBotswana:Year
    4.422e-01
## CountryBrazil:Year
    -1.118e+00
## CountryBrunei Darussalam:Year
    7.424e-01
## CountryBulgaria:Year
    -5.706e-02
## CountryBurkina Faso:Year
    2.310e-01
## CountryBurundi:Year
    2.105e-01
## CountryCabo Verde:Year
    5.810e-01
## CountryCambodia:Year
    -2.041e-02
## CountryCameroon:Year
    -3.255e-01
## CountryCanada:Year
    -5.763e-01
## CountryCentral African Republic:Year
    2.128e-01
## CountryChad:Year
    1.149e+00
## CountryChile:Year
    -1.490e-01
## CountryChina:Year
    5.195e-01
## CountryColombia:Year
    1.050e-01
```

```
## CountryComoros:Year
    5.039e+01
## CountryCongo:Year
    1.824e+00
## CountryCook Islands:Year
    NA
## CountryCosta Rica:Year
   -2.271e-01
## CountryCôte d'Ivoire:Year
    2.160e+00
## CountryCroatia:Year
    1.935e-01
## CountryCuba:Year
   -1.614e-01
## CountryCyprus:Year
   -3.499e-03
## CountryCzechia:Year
    2.683e-02
## CountryDemocratic People's Republic of Korea:Year
    5.787e-01
## CountryDemocratic Republic of the Congo:Year
    2.800e-01
## CountryDenmark:Year
   -2.902e-01
## CountryDjibouti:Year
   -3.790e+00
## CountryDominica:Year
    NA
## CountryDominican Republic:Year
    3.398e+00
## CountryEcuador:Year
   -4.272e-03
## CountryEgypt:Year
   -9.505e-01
## CountryEl Salvador:Year
    2.188e-02
## CountryEquatorial Guinea:Year
    7.922e-02
## CountryEritrea:Year
    2.845e+00
## CountryEstonia:Year
    1.407e+00
## CountryEthiopia:Year
   -3.005e-01
```



---

```
## CountryFiji:Year
    -1.541e-01
## CountryFinland:Year
    4.375e-01
## CountryFrance:Year
    -3.123e-01
## CountryGabon:Year
    3.504e+00
## CountryGambia:Year
    -1.308e-02
## CountryGeorgia:Year
    -1.820e-01
## CountryGermany:Year
    3.946e-01
## CountryGhana:Year
    1.042e-01
## CountryGreece:Year
    7.279e-01
## CountryGrenada:Year
    7.273e-01
## CountryGuatemala:Year
    -1.044e+00
## CountryGuinea:Year
    4.090e-01
## CountryGuinea-Bissau:Year
    6.436e-01
## CountryGuyana:Year
    -1.451e-01
## CountryHaiti:Year
    -5.836e+00
## CountryHonduras:Year
    -4.742e-02
## CountryHungary:Year
    1.013e-01
## CountryIceland:Year
    -1.503e+00
## CountryIndia:Year
    1.482e-01
## CountryIndonesia:Year
    -1.867e-01
## CountryIran (Islamic Republic of):Year
    1.209e-01
## CountryIraq:Year
    1.253e+00
```

---

```
## CountryIreland:Year
    -1.073e+00
## CountryIsrael:Year
    3.112e-01
## CountryItaly:Year
    -6.388e-01
## CountryJamaica:Year
    -6.208e-02
## CountryJapan:Year
    -1.901e-01
## CountryJordan:Year
    -1.081e-01
## CountryKazakhstan:Year
    3.994e-01
## CountryKenya:Year
    -8.469e-01
## CountryKiribati:Year
    -1.161e-01
## CountryKuwait:Year
    -1.998e-01
## CountryKyrgyzstan:Year
    1.364e+00
## CountryLao People's Democratic Republic:Year
    -2.694e+00
## CountryLatvia:Year
    -2.926e+00
## CountryLebanon:Year
    -9.823e-02
## CountryLesotho:Year
    -3.509e-01
## CountryLiberia:Year
    -1.687e+00
## CountryLibya:Year
    -1.050e+00
## CountryLithuania:Year
    8.345e-01
## CountryLuxembourg:Year
    -1.800e-01
## CountryMadagascar:Year
    -4.510e+00
## CountryMalawi:Year
    -1.017e+00
## CountryMalaysia:Year
    -1.547e-01
```

---

```
## CountryMaldives:Year
    1.208e+00
## CountryMali:Year
    4.756e-01
## CountryMalta:Year
    8.759e-02
## CountryMarshall Islands:Year
    NA
## CountryMauritania:Year
   -1.049e+00
## CountryMauritius:Year
    1.946e-01
## CountryMexico:Year
   -3.119e-01
## CountryMicronesia (Federated States of):Year
   -1.634e-01
## CountryMonaco:Year
    NA
## CountryMongolia:Year
    3.603e-02
## CountryMontenegro:Year
   -1.161e-01
## CountryMorocco:Year
   -1.084e+00
## CountryMozambique:Year
    2.460e+00
## CountryMyanmar:Year
    7.920e-02
## CountryNamibia:Year
   -5.829e-01
## CountryNauru:Year
    NA
## CountryNepal:Year
    1.439e+00
## CountryNetherlands:Year
    5.426e-02
## CountryNew Zealand:Year
   -2.132e-01
## CountryNicaragua:Year
   -3.167e-01
## CountryNiger:Year
   -2.443e+00
## CountryNigeria:Year
   -1.023e+00
```

---

```
## CountryNiue:Year
      NA
## CountryNorway:Year
    -4.134e-01
## CountryOman:Year
    -1.583e-02
## CountryPakistan:Year
    -1.068e-01
## CountryPalau:Year
      NA
## CountryPanama:Year
    -1.955e-01
## CountryPapua New Guinea:Year
    -2.919e-01
## CountryParaguay:Year
     1.018e+00
## CountryPeru:Year
     1.674e-01
## CountryPhilippines:Year
    -1.852e-01
## CountryPoland:Year
    -1.189e-01
## CountryPortugal:Year
     3.276e-01
## CountryQatar:Year
    -1.955e-01
## CountryRepublic of Korea:Year
     1.131e-01
## CountryRepublic of Moldova:Year
    -2.143e+00
## CountryRomania:Year
    -1.318e+00
## CountryRussian Federation:Year
     4.240e-03
## CountryRwanda:Year
     4.894e+00
## CountrySaint Kitts and Nevis:Year
      NA
## CountrySaint Lucia:Year
     3.544e-02
## CountrySaint Vincent and the Grenadines:Year
    -5.359e-01
## CountrySamoa:Year
     4.307e-01
```

---

```

## CountrySan Marino:Year
      NA
## CountrySao Tome and Principe:Year
      -7.230e-01
## CountrySaudi Arabia:Year
      -1.862e-01
## CountrySenegal:Year
      1.436e+00
## CountrySerbia:Year
      -2.822e-01
## CountrySeychelles:Year
      -1.011e-01
## CountrySierra Leone:Year
      -2.611e+00
## CountrySingapore:Year
      -8.056e-01
## CountrySlovakia:Year
      1.708e-02
## CountrySlovenia:Year
      7.808e-01
## CountrySolomon Islands:Year
      -1.138e-01
## CountrySomalia:Year
      3.931e-01
## CountrySouth Africa:Year
      -1.702e+00
## CountrySouth Sudan:Year
      1.706e-01
## CountrySpain:Year
      8.294e-01
## CountrySri Lanka:Year
      -1.006e+00
## CountrySudan:Year
      -1.217e+00
## CountrySuriname:Year
      -1.915e+00
## CountrySwaziland:Year
      5.407e+00
## CountrySweden:Year
      6.386e-01
## CountrySwitzerland:Year
      6.060e-01
## CountrySyrian Arab Republic:Year
      -1.468e+00

```

---

```

## CountryTajikistan:Year
    1.142e-02
## CountryThailand:Year
    6.231e-01
## CountryThe former Yugoslav republic of Macedonia:Year
    -4.634e-02
## CountryTimor-Leste:Year
    1.091e+00
## CountryTogo:Year
    -7.581e-01
## CountryTonga:Year
    -1.621e-01
## CountryTrinidad and Tobago:Year
    -1.066e+00
## CountryTunisia:Year
    -2.160e-01
## CountryTurkey:Year
    7.658e-01
## CountryTurkmenistan:Year
    1.506e-01
## CountryTuvalu:Year
    NA
## CountryUganda:Year
    -5.155e+00
## CountryUkraine:Year
    -1.203e-01
## CountryUnited Arab Emirates:Year
    -2.105e-01
## CountryUnited Kingdom of Great Britain and Northern Ireland:Year
    -4.387e-01
## CountryUnited Republic of Tanzania:Year
    -2.183e+00
## CountryUnited States of America:Year
    -1.356e-01
## CountryUruguay:Year
    -1.796e-01
## CountryUzbekistan:Year
    -1.460e-01
## CountryVanuatu:Year
    1.012e+00
## CountryVenezuela (Bolivarian Republic of):Year
    -2.227e-01
## CountryViet Nam:Year
    -4.537e-02

```

---

```

## CountryYemen:Year
    9.310e-01
## CountryZambia:Year
   -1.543e+00
## CountryZimbabwe:Year
    3.510e+00
## CountryAlbania:HIV.AIDS
      NA
## CountryAlgeria:HIV.AIDS
      NA
## CountryAngola:HIV.AIDS
    1.704e+01
## CountryAntigua and Barbuda:HIV.AIDS
   -6.751e-01
## CountryArgentina:HIV.AIDS
      NA
## CountryArmenia:HIV.AIDS
      NA
## CountryAustralia:HIV.AIDS
      NA
## CountryAustria:HIV.AIDS
      NA
## CountryAzerbaijan:HIV.AIDS
      NA
## CountryBahamas:HIV.AIDS
   -6.350e-01
## CountryBahrain:HIV.AIDS
      NA
## CountryBangladesh:HIV.AIDS
      NA
## CountryBarbados:HIV.AIDS
   -7.035e-01
## CountryBelarus:HIV.AIDS
      NA
## CountryBelgium:HIV.AIDS
      NA
## CountryBelize:HIV.AIDS
   -8.621e-01
## CountryBenin:HIV.AIDS
   -1.966e-01
## CountryBhutan:HIV.AIDS
    2.275e+00
## CountryBolivia (Plurinational State of):HIV.AIDS
    4.001e+01

```

```

## CountryBosnia and Herzegovina:HIV.AIDS
    NA
## CountryBotswana:HIV.AIDS
    -1.132e+00
## CountryBrazil:HIV.AIDS
    NA
## CountryBrunei Darussalam:HIV.AIDS
    NA
## CountryBulgaria:HIV.AIDS
    NA
## CountryBurkina Faso:HIV.AIDS
    6.907e-01
## CountryBurundi:HIV.AIDS
    -1.307e+00
## CountryCabo Verde:HIV.AIDS
    -1.498e+01
## CountryCambodia:HIV.AIDS
    -9.017e-01
## CountryCameroon:HIV.AIDS
    -1.435e+00
## CountryCanada:HIV.AIDS
    NA
## CountryCentral African Republic:HIV.AIDS
    -7.825e+00
## CountryChad:HIV.AIDS
    -3.003e-01
## CountryChile:HIV.AIDS
    NA
## CountryChina:HIV.AIDS
    NA
## CountryColombia:HIV.AIDS
    NA
## CountryComoros:HIV.AIDS
    -4.230e+00
## CountryCongo:HIV.AIDS
    -5.413e+00
## CountryCook Islands:HIV.AIDS
    NA
## CountryCosta Rica:HIV.AIDS
    NA
## CountryCôte d'Ivoire:HIV.AIDS
    -2.678e+00
## CountryCroatia:HIV.AIDS
    NA

```



---

```

## CountryCuba:HIV.AIDS
      NA
## CountryCyprus:HIV.AIDS
      NA
## CountryCzechia:HIV.AIDS
      NA
## CountryDemocratic People's Republic of Korea:HIV.AIDS
      NA
## CountryDemocratic Republic of the Congo:HIV.AIDS
      -7.008e-01
## CountryDenmark:HIV.AIDS
      NA
## CountryDjibouti:HIV.AIDS
      6.513e-01
## CountryDominica:HIV.AIDS
      NA
## CountryDominican Republic:HIV.AIDS
      7.917e+00
## CountryEcuador:HIV.AIDS
      -3.742e+00
## CountryEgypt:HIV.AIDS
      NA
## CountryEl Salvador:HIV.AIDS
      -1.068e+01
## CountryEquatorial Guinea:HIV.AIDS
      -8.856e-01
## CountryEritrea:HIV.AIDS
      2.090e+01
## CountryEstonia:HIV.AIDS
      NA
## CountryEthiopia:HIV.AIDS
      -3.939e+00
## CountryFiji:HIV.AIDS
      NA
## CountryFinland:HIV.AIDS
      NA
## CountryFrance:HIV.AIDS
      NA
## CountryGabon:HIV.AIDS
      -7.373e-01
## CountryGambia:HIV.AIDS
      1.965e-01
## CountryGeorgia:HIV.AIDS
      NA

```

---

```

## CountryGermany:HIV.AIDS
    NA
## CountryGhana:HIV.AIDS
    1.283e+01
## CountryGreece:HIV.AIDS
    NA
## CountryGrenada:HIV.AIDS
    NA
## CountryGuatemala:HIV.AIDS
    -2.608e+01
## CountryGuinea:HIV.AIDS
    1.711e-01
## CountryGuinea-Bissau:HIV.AIDS
    -2.672e-01
## CountryGuyana:HIV.AIDS
    -1.003e+00
## CountryHaiti:HIV.AIDS
    -1.911e+01
## CountryHonduras:HIV.AIDS
    -1.711e+00
## CountryHungary:HIV.AIDS
    NA
## CountryIceland:HIV.AIDS
    NA
## CountryIndia:HIV.AIDS
    -2.287e+00
## CountryIndonesia:HIV.AIDS
    1.748e+00
## CountryIran (Islamic Republic of):HIV.AIDS
    NA
## CountryIraq:HIV.AIDS
    NA
## CountryIreland:HIV.AIDS
    NA
## CountryIsrael:HIV.AIDS
    NA
## CountryItaly:HIV.AIDS
    NA
## CountryJamaica:HIV.AIDS
    -1.019e+00
## CountryJapan:HIV.AIDS
    NA
## CountryJordan:HIV.AIDS
    NA

```

---

```

## CountryKazakhstan:HIV.AIDS
      NA
## CountryKenya:HIV.AIDS
      -4.637e-01
## CountryKiribati:HIV.AIDS
      NA
## CountryKuwait:HIV.AIDS
      NA
## CountryKyrgyzstan:HIV.AIDS
      -2.762e+01
## CountryLao People's Democratic Republic:HIV.AIDS
      4.511e+01
## CountryLatvia:HIV.AIDS
      NA
## CountryLebanon:HIV.AIDS
      NA
## CountryLesotho:HIV.AIDS
      -1.136e+00
## CountryLiberia:HIV.AIDS
      -4.109e+00
## CountryLibya:HIV.AIDS
      NA
## CountryLithuania:HIV.AIDS
      NA
## CountryLuxembourg:HIV.AIDS
      NA
## CountryMadagascar:HIV.AIDS
      -6.011e+00
## CountryMalawi:HIV.AIDS
      -1.438e+00
## CountryMalaysia:HIV.AIDS
      NA
## CountryMaldives:HIV.AIDS
      NA
## CountryMali:HIV.AIDS
      -1.219e+00
## CountryMalta:HIV.AIDS
      NA
## CountryMarshall Islands:HIV.AIDS
      NA
## CountryMauritania:HIV.AIDS
      -3.795e+00
## CountryMauritius:HIV.AIDS
      -9.078e-01

```

---

```
## CountryMexico:HIV.AIDS
      NA
## CountryMicronesia (Federated States of):HIV.AIDS
      NA
## CountryMonaco:HIV.AIDS
      NA
## CountryMongolia:HIV.AIDS
      NA
## CountryMontenegro:HIV.AIDS
      NA
## CountryMorocco:HIV.AIDS
      NA
## CountryMozambique:HIV.AIDS
      2.723e-01
## CountryMyanmar:HIV.AIDS
      -7.895e+00
## CountryNamibia:HIV.AIDS
      -1.423e+00
## CountryNauru:HIV.AIDS
      NA
## CountryNepal:HIV.AIDS
      5.153e+00
## CountryNetherlands:HIV.AIDS
      NA
## CountryNew Zealand:HIV.AIDS
      NA
## CountryNicaragua:HIV.AIDS
      -1.388e+01
## CountryNiger:HIV.AIDS
      5.611e+00
## CountryNigeria:HIV.AIDS
      -1.901e+00
## CountryNiue:HIV.AIDS
      NA
## CountryNorway:HIV.AIDS
      NA
## CountryOman:HIV.AIDS
      NA
## CountryPakistan:HIV.AIDS
      NA
## CountryPalau:HIV.AIDS
      NA
## CountryPanama:HIV.AIDS
      -2.399e-01
```

---

```
## CountryPapua New Guinea:HIV.AIDS
      8.329e+00
## CountryParaguay:HIV.AIDS
      2.591e+01
## CountryPeru:HIV.AIDS
      -8.161e-01
## CountryPhilippines:HIV.AIDS
      NA
## CountryPoland:HIV.AIDS
      NA
## CountryPortugal:HIV.AIDS
      NA
## CountryQatar:HIV.AIDS
      NA
## CountryRepublic of Korea:HIV.AIDS
      NA
## CountryRepublic of Moldova:HIV.AIDS
      NA
## CountryRomania:HIV.AIDS
      NA
## CountryRussian Federation:HIV.AIDS
      -8.379e+00
## CountryRwanda:HIV.AIDS
      -7.503e-01
## CountrySaint Kitts and Nevis:HIV.AIDS
      NA
## CountrySaint Lucia:HIV.AIDS
      -9.942e-01
## CountrySaint Vincent and the Grenadines:HIV.AIDS
      2.383e+00
## CountrySamoa:HIV.AIDS
      NA
## CountrySan Marino:HIV.AIDS
      NA
## CountrySao Tome and Principe:HIV.AIDS
      -5.357e-01
## CountrySaudi Arabia:HIV.AIDS
      NA
## CountrySenegal:HIV.AIDS
      1.494e+00
## CountrySerbia:HIV.AIDS
      NA
## CountrySeychelles:HIV.AIDS
      NA
```

---

```

## CountrySierra Leone:HIV.AIDS
    -2.046e+00
## CountrySingapore:HIV.AIDS
    NA
## CountrySlovakia:HIV.AIDS
    NA
## CountrySlovenia:HIV.AIDS
    NA
## CountrySolomon Islands:HIV.AIDS
    NA
## CountrySomalia:HIV.AIDS
    -2.779e+01
## CountrySouth Africa:HIV.AIDS
    -1.856e+00
## CountrySouth Sudan:HIV.AIDS
    -1.960e+00
## CountrySpain:HIV.AIDS
    NA
## CountrySri Lanka:HIV.AIDS
    NA
## CountrySudan:HIV.AIDS
    -8.125e+00
## CountrySuriname:HIV.AIDS
    -4.299e+00
## CountrySwaziland:HIV.AIDS
    -8.692e-01
## CountrySweden:HIV.AIDS
    NA
## CountrySwitzerland:HIV.AIDS
    NA
## CountrySyrian Arab Republic:HIV.AIDS
    NA
## CountryTajikistan:HIV.AIDS
    2.770e+00
## CountryThailand:HIV.AIDS
    4.990e+00
## CountryThe former Yugoslav republic of Macedonia:HIV.AIDS
    NA
## CountryTimor-Leste:HIV.AIDS
    NA
## CountryTogo:HIV.AIDS
    -1.359e+00
## CountryTonga:HIV.AIDS
    NA

```

---

```

## CountryTrinidad and Tobago:HIV.AIDS
    1.105e-01
## CountryTunisia:HIV.AIDS
    NA
## CountryTurkey:HIV.AIDS
    NA
## CountryTurkmenistan:HIV.AIDS
    NA
## CountryTuvalu:HIV.AIDS
    NA
## CountryUganda:HIV.AIDS
    -5.764e+00
## CountryUkraine:HIV.AIDS
    -1.114e+00
## CountryUnited Arab Emirates:HIV.AIDS
    NA
## CountryUnited Kingdom of Great Britain and Northern Ireland:HIV.AIDS
    NA
## CountryUnited Republic of Tanzania:HIV.AIDS
    -1.872e+00
## CountryUnited States of America:HIV.AIDS
    NA
## CountryUruguay:HIV.AIDS
    NA
## CountryUzbekistan:HIV.AIDS
    -2.822e+00
## CountryVanuatu:HIV.AIDS
    NA
## CountryVenezuela (Bolivarian Republic of):HIV.AIDS
    NA
## CountryViet Nam:HIV.AIDS
    -2.070e-01
## CountryYemen:HIV.AIDS
    NA
## CountryZambia:HIV.AIDS
    -1.764e-01
## CountryZimbabwe:HIV.AIDS
    NA
## CountryAlbania:Schooling
    -2.267e-02
## CountryAlgeria:Schooling
    -5.791e-02
## CountryAngola:Schooling
    -3.396e+00

```

---

```
## CountryAntigua and Barbuda:Schooling
    -1.095e-01
## CountryArgentina:Schooling
    -8.271e-01
## CountryArmenia:Schooling
    8.061e-02
## CountryAustralia:Schooling
    1.095e+00
## CountryAustria:Schooling
    -5.919e-01
## CountryAzerbaijan:Schooling
    -1.523e+00
## CountryBahamas:Schooling
    2.228e+00
## CountryBahrain:Schooling
    -2.800e-01
## CountryBangladesh:Schooling
    3.707e+00
## CountryBarbados:Schooling
    -1.540e-01
## CountryBelarus:Schooling
    1.298e+00
## CountryBelgium:Schooling
    9.544e-01
## CountryBelize:Schooling
    1.887e-01
## CountryBenin:Schooling
    -2.279e-01
## CountryBhutan:Schooling
    3.084e-01
## CountryBolivia (Plurinational State of):Schooling
    -7.627e+00
## CountryBosnia and Herzegovina:Schooling
    -5.775e-02
## CountryBotswana:Schooling
    6.366e-01
## CountryBrazil:Schooling
    -1.203e+00
## CountryBrunei Darussalam:Schooling
    -1.073e+00
## CountryBulgaria:Schooling
    -7.215e-01
## CountryBurkina Faso:Schooling
    1.138e+00
```



---

```

## CountryBurundi:Schooling
    -1.004e-01
## CountryCabo Verde:Schooling
    9.491e-01
## CountryCambodia:Schooling
    1.649e+00
## CountryCameroon:Schooling
    7.451e-02
## CountryCanada:Schooling
    2.938e+01
## CountryCentral African Republic:Schooling
    -3.282e+01
## CountryChad:Schooling
    -4.276e+00
## CountryChile:Schooling
    2.377e+00
## CountryChina:Schooling
    -2.998e-01
## CountryColombia:Schooling
    -6.428e-01
## CountryComoros:Schooling
    2.294e+00
## CountryCongo:Schooling
    2.943e+00
## CountryCook Islands:Schooling
    NA
## CountryCosta Rica:Schooling
    -1.736e-01
## CountryCôte d'Ivoire:Schooling
    NA
## CountryCroatia:Schooling
    -9.782e-01
## CountryCuba:Schooling
    -2.653e-01
## CountryCyprus:Schooling
    3.637e-01
## CountryCzechia:Schooling
    NA
## CountryDemocratic People's Republic of Korea:Schooling
    NA
## CountryDemocratic Republic of the Congo:Schooling
    NA
## CountryDenmark:Schooling
    1.177e+00

```

---

```
## CountryDjibouti:Schooling
    1.314e+01
## CountryDominica:Schooling
    NA
## CountryDominican Republic:Schooling
   -1.721e+01
## CountryEcuador:Schooling
   -1.020e+00
## CountryEgypt:Schooling
    4.955e+00
## CountryEl Salvador:Schooling
    2.410e+00
## CountryEquatorial Guinea:Schooling
   -9.000e-02
## CountryEritrea:Schooling
    1.178e+01
## CountryEstonia:Schooling
   -6.998e+00
## CountryEthiopia:Schooling
   -5.441e-01
## CountryFiji:Schooling
    2.197e-01
## CountryFinland:Schooling
    1.112e-01
## CountryFrance:Schooling
    1.197e+01
## CountryGabon:Schooling
   -2.249e+00
## CountryGambia:Schooling
   -2.893e+00
## CountryGeorgia:Schooling
    4.335e-01
## CountryGermany:Schooling
    2.018e+00
## CountryGhana:Schooling
    4.811e+00
## CountryGreece:Schooling
    3.278e+00
## CountryGrenada:Schooling
   -1.115e+01
## CountryGuatemala:Schooling
    1.238e+01
## CountryGuinea:Schooling
   -4.782e-02
```

---

```
## CountryGuinea-Bissau:Schooling
    -8.558e-01
## CountryGuyana:Schooling
    -5.240e-02
## CountryHaiti:Schooling
    -5.197e+00
## CountryHonduras:Schooling
    -4.245e-01
## CountryHungary:Schooling
    -1.662e-02
## CountryIceland:Schooling
    7.630e+00
## CountryIndia:Schooling
    -1.713e-01
## CountryIndonesia:Schooling
    5.150e-02
## CountryIran (Islamic Republic of):Schooling
    -1.589e+00
## CountryIraq:Schooling
    8.705e+00
## CountryIreland:Schooling
    1.020e+01
## CountryIsrael:Schooling
    -2.106e+00
## CountryItaly:Schooling
    1.998e+00
## CountryJamaica:Schooling
    -4.376e-02
## CountryJapan:Schooling
    1.163e+00
## CountryJordan:Schooling
    -2.136e-01
## CountryKazakhstan:Schooling
    -1.196e+00
## CountryKenya:Schooling
    -1.108e+00
## CountryKiribati:Schooling
    -8.046e-02
## CountryKuwait:Schooling
    -1.969e-01
## CountryKyrgyzstan:Schooling
    1.073e+00
## CountryLao People's Democratic Republic:Schooling
    9.897e+00
```

---

```

## CountryLatvia:Schooling
    7.380e-02
## CountryLebanon:Schooling
    5.917e-03
## CountryLesotho:Schooling
   -2.046e+00
## CountryLiberia:Schooling
   -7.632e+00
## CountryLibya:Schooling
   -4.076e+00
## CountryLithuania:Schooling
    1.924e+00
## CountryLuxembourg:Schooling
    1.231e+01
## CountryMadagascar:Schooling
   -7.379e+00
## CountryMalawi:Schooling
    1.757e-01
## CountryMalaysia:Schooling
    1.738e-02
## CountryMaldives:Schooling
    1.955e+00
## CountryMali:Schooling
   -1.140e+00
## CountryMalta:Schooling
    7.633e-01
## CountryMarshall Islands:Schooling
        NA
## CountryMauritania:Schooling
    4.213e+00
## CountryMauritius:Schooling
   -1.425e+00
## CountryMexico:Schooling
    1.714e+00
## CountryMicronesia (Federated States of):Schooling
    3.032e-01
## CountryMonaco:Schooling
        NA
## CountryMongolia:Schooling
    1.114e-01
## CountryMontenegro:Schooling
   -1.360e-01
## CountryMorocco:Schooling
    2.426e+00

```

---

```
## CountryMozambique:Schooling
    -4.058e+00
## CountryMyanmar:Schooling
    6.216e+00
## CountryNamibia:Schooling
    -1.333e+00
## CountryNauru:Schooling
    NA
## CountryNepal:Schooling
    2.602e-01
## CountryNetherlands:Schooling
    -7.241e-01
## CountryNew Zealand:Schooling
    4.179e+00
## CountryNicaragua:Schooling
    2.716e+00
## CountryNiger:Schooling
    2.055e+01
## CountryNigeria:Schooling
    4.112e+00
## CountryNiue:Schooling
    NA
## CountryNorway:Schooling
    2.431e+00
## CountryOman:Schooling
    -1.029e-01
## CountryPakistan:Schooling
    2.304e-01
## CountryPalau:Schooling
    NA
## CountryPanama:Schooling
    -1.083e+00
## CountryPapua New Guinea:Schooling
    4.198e+00
## CountryParaguay:Schooling
    -5.266e+00
## CountryPeru:Schooling
    1.991e+00
## CountryPhilippines:Schooling
    9.724e-01
## CountryPoland:Schooling
    1.269e-01
## CountryPortugal:Schooling
    2.792e+00
```

```
## CountryQatar:Schooling
-1.039e-01
## CountryRepublic of Korea:Schooling
NA
## CountryRepublic of Moldova:Schooling
NA
## CountryRomania:Schooling
6.776e-02
## CountryRussian Federation:Schooling
5.021e-01
## CountryRwanda:Schooling
6.306e+00
## CountrySaint Kitts and Nevis:Schooling
NA
## CountrySaint Lucia:Schooling
-2.374e-01
## CountrySaint Vincent and the Grenadines:Schooling
-2.137e+01
## CountrySamoa:Schooling
2.467e+00
## CountrySan Marino:Schooling
NA
## CountrySao Tome and Principe:Schooling
2.456e-01
## CountrySaudi Arabia:Schooling
2.087e-02
## CountrySenegal:Schooling
-4.176e+00
## CountrySerbia:Schooling
7.701e-01
## CountrySeychelles:Schooling
-4.777e-01
## CountrySierra Leone:Schooling
1.251e+01
## CountrySingapore:Schooling
3.278e+00
## CountrySlovakia:Schooling
-4.435e-01
## CountrySlovenia:Schooling
-9.804e-01
## CountrySolomon Islands:Schooling
1.518e-02
## CountrySomalia:Schooling
NA
```

---

```

## CountrySouth Africa:Schooling
    -2.112e+01
## CountrySouth Sudan:Schooling
    -1.571e-01
## CountrySpain:Schooling
    -4.875e+00
## CountrySri Lanka:Schooling
    9.635e+00
## CountrySudan:Schooling
    1.924e+01
## CountrySuriname:Schooling
    1.167e+01
## CountrySwaziland:Schooling
    1.714e+00
## CountrySweden:Schooling
    5.171e+00
## CountrySwitzerland:Schooling
    -7.939e+00
## CountrySyrian Arab Republic:Schooling
    6.571e+00
## CountryTajikistan:Schooling
    -1.721e+00
## CountryThailand:Schooling
    -1.071e-02
## CountryThe former Yugoslav republic of Macedonia:Schooling
    1.032e-01
## CountryTimor-Leste:Schooling
    -1.244e-01
## CountryTogo:Schooling
    -2.376e-01
## CountryTonga:Schooling
    -1.877e-01
## CountryTrinidad and Tobago:Schooling
    -1.275e+01
## CountryTunisia:Schooling
    4.492e-01
## CountryTurkey:Schooling
    -2.502e+00
## CountryTurkmenistan:Schooling
    -2.446e-01
## CountryTuvalu:Schooling
    NA
## CountryUganda:Schooling
    -1.304e+00

```

---

```

## CountryUkraine:Schooling
    -4.605e-01
## CountryUnited Arab Emirates:Schooling
    6.380e-01
## CountryUnited Kingdom of Great Britain and Northern Ireland:Schooling
    NA
## CountryUnited Republic of Tanzania:Schooling
    NA
## CountryUnited States of America:Schooling
    NA
## CountryUruguay:Schooling
    7.974e-02
## CountryUzbekistan:Schooling
    -4.830e-01
## CountryVanuatu:Schooling
    5.121e+00
## CountryVenezuela (Bolivarian Republic of):Schooling
    -7.015e-02
## CountryViet Nam:Schooling
    -1.478e-01
## CountryYemen:Schooling
    4.990e-01
## CountryZambia:Schooling
    -3.294e+01
## CountryZimbabwe:Schooling
    4.058e+00
## CountryAlbania:Diphtheria
    -3.665e-01
## CountryAlgeria:Diphtheria
    1.247e-01
## CountryAngola:Diphtheria
    -6.315e-02
## CountryAntigua and Barbuda:Diphtheria
    -7.515e-02
## CountryArgentina:Diphtheria
    -5.596e-02
## CountryArmenia:Diphtheria
    -7.766e-02
## CountryAustralia:Diphtheria
    1.593e+00
## CountryAustria:Diphtheria
    -1.416e+00
## CountryAzerbaijan:Diphtheria
    -6.464e-01

```



---

```

## CountryBahamas:Diphtheria
      3.932e-03
## CountryBahrain:Diphtheria
     -8.423e-02
## CountryBangladesh:Diphtheria
      4.726e-03
## CountryBarbados:Diphtheria
     -7.457e-02
## CountryBelarus:Diphtheria
     -7.352e-02
## CountryBelgium:Diphtheria
      7.118e-01
## CountryBelize:Diphtheria
     -8.133e-02
## CountryBenin:Diphtheria
     -8.015e-02
## CountryBhutan:Diphtheria
      2.621e-02
## CountryBolivia (Plurinational State of):Diphtheria
     -6.410e-01
## CountryBosnia and Herzegovina:Diphtheria
     -8.295e-02
##
      Std. Error
## (Intercept)
      1.957e+03
## CountryAlbania
      3.338e+03
## CountryAlgeria
      4.625e+03
## CountryAngola
      3.844e+03
## CountryAntigua and Barbuda
      2.389e+03
## CountryArgentina
      2.111e+03
## CountryArmenia
      2.012e+03
## CountryAustralia
      2.146e+03
## CountryAustria
      2.020e+03
## CountryAzerbaijan
      2.446e+03

```

---

## CountryBahamas	2.074e+03
## CountryBahrain	2.176e+03
## CountryBangladesh	2.235e+03
## CountryBarbados	2.586e+03
## CountryBelarus	2.785e+03
## CountryBelgium	2.178e+03
## CountryBelize	2.034e+03
## CountryBenin	8.539e+03
## CountryBhutan	9.851e+03
## CountryBolivia (Plurinational State of)	2.679e+03
## CountryBosnia and Herzegovina	3.081e+03
## CountryBotswana	2.422e+03
## CountryBrazil	2.706e+03
## CountryBrunei Darussalam	3.318e+03
## CountryBulgaria	2.593e+03
## CountryBurkina Faso	3.929e+03
## CountryBurundi	7.991e+03
## CountryCabo Verde	6.653e+03
## CountryCambodia	3.011e+03
## CountryCameroon	5.101e+03
## CountryCanada	1.974e+03
## CountryCentral African Republic	3.304e+03

---

## CountryChad	2.297e+03
## CountryChile	2.498e+03
## CountryChina	4.714e+03
## CountryColombia	2.561e+03
## CountryComoros	8.132e+04
## CountryCongo	5.165e+03
## CountryCook Islands	8.905e+00
## CountryCosta Rica	5.726e+03
## CountryCôte d'Ivoire	4.956e+03
## CountryCroatia	2.460e+03
## CountryCuba	1.984e+03
## CountryCyprus	2.031e+03
## CountryCzechia	2.249e+03
## CountryDemocratic People's Republic of Korea	3.466e+03
## CountryDemocratic Republic of the Congo	2.451e+03
## CountryDenmark	2.078e+03
## CountryDjibouti	3.451e+03
## CountryDominica	9.615e+00
## CountryDominican Republic	4.586e+03
## CountryEcuador	2.346e+03
## CountryEgypt	3.232e+03
## CountryEl Salvador	2.149e+03

---

## CountryEquatorial Guinea	2.069e+03
## CountryEritrea	3.549e+03
## CountryEstonia	2.542e+03
## CountryEthiopia	3.348e+03
## CountryFiji	2.472e+03
## CountryFinland	2.034e+03
## CountryFrance	2.007e+03
## CountryGabon	7.292e+03
## CountryGambia	2.369e+03
## CountryGeorgia	2.269e+03
## CountryGermany	4.033e+03
## CountryGhana	5.641e+03
## CountryGreece	2.140e+03
## CountryGrenada	2.131e+03
## CountryGuatemala	2.318e+03
## CountryGuinea	2.396e+03
## CountryGuinea-Bissau	5.613e+03
## CountryGuyana	2.225e+03
## CountryHaiti	2.951e+03
## CountryHonduras	2.339e+03
## CountryHungary	2.372e+03
## CountryIceland	2.017e+03

---

```
## CountryIndia
    5.275e+03
## CountryIndonesia
    3.984e+03
## CountryIran (Islamic Republic of)
    2.212e+03
## CountryIraq
    2.032e+03
## CountryIreland
    2.645e+03
## CountryIsrael
    1.999e+03
## CountryItaly
    2.260e+03
## CountryJamaica
    2.010e+03
## CountryJapan
    2.275e+03
## CountryJordan
    2.028e+03
## CountryKazakhstan
    2.217e+03
## CountryKenya
    5.022e+03
## CountryKiribati
    2.090e+03
## CountryKuwait
    2.240e+03
## CountryKyrgyzstan
    2.110e+03
## CountryLao People's Democratic Republic
    3.690e+03
## CountryLatvia
    2.476e+03
## CountryLebanon
    2.012e+03
## CountryLesotho
    2.068e+03
## CountryLiberia
    4.177e+03
## CountryLibya
    2.084e+03
## CountryLithuania
    2.509e+03
```

---

## CountryLuxembourg	2.009e+03
## CountryMadagascar	3.865e+03
## CountryMalawi	1.158e+04
## CountryMalaysia	4.681e+03
## CountryMaldives	2.365e+03
## CountryMali	2.237e+03
## CountryMalta	1.992e+03
## CountryMarshall Islands	3.426e+01
## CountryMauritania	2.069e+03
## CountryMauritius	4.732e+03
## CountryMexico	2.427e+03
## CountryMicronesia (Federated States of)	2.224e+03
## CountryMonaco	8.369e+00
## CountryMongolia	2.264e+03
## CountryMontenegro	2.488e+03
## CountryMorocco	2.681e+03
## CountryMozambique	4.711e+03
## CountryMyanmar	2.646e+03
## CountryNamibia	2.564e+03
## CountryNauru	3.666e+00
## CountryNepal	9.838e+03
## CountryNetherlands	2.062e+03

---

## CountryNew Zealand	2.063e+03
## CountryNicaragua	2.139e+03
## CountryNiger	2.298e+03
## CountryNigeria	2.559e+03
## CountryNiue	8.854e+00
## CountryNorway	1.972e+03
## CountryOman	2.141e+03
## CountryPakistan	2.679e+03
## CountryPalau	3.022e+02
## CountryPanama	2.294e+03
## CountryPapua New Guinea	3.111e+03
## CountryParaguay	2.218e+03
## CountryPeru	2.338e+03
## CountryPhilippines	2.092e+03
## CountryPoland	2.696e+03
## CountryPortugal	2.176e+03
## CountryQatar	2.191e+03
## CountryRepublic of Korea	2.036e+03
## CountryRepublic of Moldova	4.296e+03
## CountryRomania	4.337e+03
## CountryRussian Federation	3.211e+03
## CountryRwanda	6.990e+03

---

```
## CountrySaint Kitts and Nevis
    6.996e+02
## CountrySaint Lucia
    2.176e+03
## CountrySaint Vincent and the Grenadines
    2.283e+03
## CountrySamoa
    2.203e+03
## CountrySan Marino
    1.783e+01
## CountrySao Tome and Principe
    5.325e+03
## CountrySaudi Arabia
    2.206e+03
## CountrySenegal
    4.114e+03
## CountrySerbia
    2.842e+03
## CountrySeychelles
    2.495e+03
## CountrySierra Leone
    6.339e+03
## CountrySingapore
    2.266e+03
## CountrySlovakia
    2.320e+03
## CountrySlovenia
    3.348e+03
## CountrySolomon Islands
    2.009e+03
## CountrySomalia
    2.745e+03
## CountrySouth Africa
    2.145e+03
## CountrySouth Sudan
    1.863e+03
## CountrySpain
    2.012e+03
## CountrySri Lanka
    4.451e+03
## CountrySudan
    2.230e+03
## CountrySuriname
    2.491e+03
```



---

## CountrySwaziland	1.131e+04
## CountrySweden	2.388e+03
## CountrySwitzerland	2.085e+03
## CountrySyrian Arab Republic	2.174e+03
## CountryTajikistan	2.282e+03
## CountryThailand	6.755e+03
## CountryThe former Yugoslav republic of Macedonia	2.320e+03
## CountryTimor-Leste	5.134e+03
## CountryTogo	1.131e+04
## CountryTonga	1.968e+03
## CountryTrinidad and Tobago	3.486e+03
## CountryTunisia	2.712e+03
## CountryTurkey	2.393e+03
## CountryTurkmenistan	2.037e+03
## CountryTuvalu	3.026e+01
## CountryUganda	1.167e+04
## CountryUkraine	2.994e+03
## CountryUnited Arab Emirates	4.511e+03
## CountryUnited Kingdom of Great Britain and Northern Ireland	2.106e+03
## CountryUnited Republic of Tanzania	5.361e+03
## CountryUnited States of America	2.052e+03
## CountryUruguay	2.130e+03

---

```

## CountryUzbekistan
    2.309e+03
## CountryVanuatu
    2.210e+03
## CountryVenezuela (Bolivarian Republic of)
    2.160e+03
## CountryViet Nam
    6.238e+03
## CountryYemen
    2.384e+03
## CountryZambia
    6.303e+03
## CountryZimbabwe
    2.785e+03
## Year
    9.855e-01
## HIV.AIDS
    4.064e-01
## Schooling
    3.201e+00
## Diphtheria
    4.854e-02
## Adult.Mortality
    9.239e-03
## Measles
    4.678e-04
## Alcohol
    8.281e+01
## Polio
    3.614e-02
## thinness.5.9.years
    2.176e-01
## Total.expenditure
    7.617e-01
## percentage.expenditure
    2.488e-02
## CountryAlbania:Year
    1.668e+00
## CountryAlgeria:Year
    2.296e+00
## CountryAngola:Year
    1.927e+00
## CountryAntigua and Barbuda:Year
    1.192e+00

```

---

```
## CountryArgentina:Year
    1.064e+00
## CountryArmenia:Year
    1.013e+00
## CountryAustralia:Year
    1.074e+00
## CountryAustria:Year
    1.019e+00
## CountryAzerbaijan:Year
    1.236e+00
## CountryBahamas:Year
    1.048e+00
## CountryBahrain:Year
    1.134e+00
## CountryBangladesh:Year
    1.129e+00
## CountryBarbados:Year
    1.285e+00
## CountryBelarus:Year
    1.390e+00
## CountryBelgium:Year
    1.123e+00
## CountryBelize:Year
    1.020e+00
## CountryBenin:Year
    4.225e+00
## CountryBhutan:Year
    4.780e+00
## CountryBolivia (Plurinational State of):Year
    1.385e+00
## CountryBosnia and Herzegovina:Year
    1.523e+00
## CountryBotswana:Year
    1.221e+00
## CountryBrazil:Year
    1.338e+00
## CountryBrunei Darussalam:Year
    1.617e+00
## CountryBulgaria:Year
    1.295e+00
## CountryBurkina Faso:Year
    1.968e+00
## CountryBurundi:Year
    3.855e+00
```

---

```

## CountryCabo Verde:Year
    3.263e+00
## CountryCambodia:Year
    1.500e+00
## CountryCameroon:Year
    2.501e+00
## CountryCanada:Year
    1.009e+00
## CountryCentral African Republic:Year
    1.633e+00
## CountryChad:Year
    1.157e+00
## CountryChile:Year
    1.271e+00
## CountryChina:Year
    2.332e+00
## CountryColombia:Year
    1.272e+00
## CountryComoros:Year
    3.910e+01
## CountryCongo:Year
    2.526e+00
## CountryCook Islands:Year
    NA
## CountryCosta Rica:Year
    2.921e+00
## CountryCôte d'Ivoire:Year
    2.429e+00
## CountryCroatia:Year
    1.223e+00
## CountryCuba:Year
    9.982e-01
## CountryCyprus:Year
    1.025e+00
## CountryCzechia:Year
    1.112e+00
## CountryDemocratic People's Republic of Korea:Year
    1.674e+00
## CountryDemocratic Republic of the Congo:Year
    1.210e+00
## CountryDenmark:Year
    1.046e+00
## CountryDjibouti:Year
    1.713e+00

```

---

```
## CountryDominica:Year
      NA
## CountryDominican Republic:Year
      2.329e+00
## CountryEcuador:Year
      1.182e+00
## CountryEgypt:Year
      1.613e+00
## CountryEl Salvador:Year
      1.085e+00
## CountryEquatorial Guinea:Year
      1.042e+00
## CountryEritrea:Year
      1.760e+00
## CountryEstonia:Year
      1.252e+00
## CountryEthiopia:Year
      1.673e+00
## CountryFiji:Year
      1.268e+00
## CountryFinland:Year
      1.024e+00
## CountryFrance:Year
      1.013e+00
## CountryGabon:Year
      3.651e+00
## CountryGambia:Year
      1.187e+00
## CountryGeorgia:Year
      1.143e+00
## CountryGermany:Year
      1.810e+00
## CountryGhana:Year
      2.761e+00
## CountryGreece:Year
      1.082e+00
## CountryGrenada:Year
      1.081e+00
## CountryGuatemala:Year
      1.162e+00
## CountryGuinea:Year
      1.204e+00
## CountryGuinea-Bissau:Year
      2.837e+00
```

---

```
## CountryGuyana:Year
    1.100e+00
## CountryHaiti:Year
    1.493e+00
## CountryHonduras:Year
    1.162e+00
## CountryHungary:Year
    1.183e+00
## CountryIceland:Year
    1.018e+00
## CountryIndia:Year
    2.416e+00
## CountryIndonesia:Year
    2.023e+00
## CountryIran (Islamic Republic of):Year
    1.129e+00
## CountryIraq:Year
    1.018e+00
## CountryIreland:Year
    1.355e+00
## CountryIsrael:Year
    1.012e+00
## CountryItaly:Year
    1.135e+00
## CountryJamaica:Year
    1.013e+00
## CountryJapan:Year
    1.174e+00
## CountryJordan:Year
    1.022e+00
## CountryKazakhstan:Year
    1.118e+00
## CountryKenya:Year
    2.408e+00
## CountryKiribati:Year
    1.050e+00
## CountryKuwait:Year
    1.124e+00
## CountryKyrgyzstan:Year
    1.054e+00
## CountryLao People's Democratic Republic:Year
    1.871e+00
## CountryLatvia:Year
    1.227e+00
```

```
## CountryLebanon:Year
    1.015e+00
## CountryLesotho:Year
    1.044e+00
## CountryLiberia:Year
    2.056e+00
## CountryLibya:Year
    1.040e+00
## CountryLithuania:Year
    1.243e+00
## CountryLuxembourg:Year
    1.022e+00
## CountryMadagascar:Year
    1.887e+00
## CountryMalawi:Year
    5.628e+00
## CountryMalaysia:Year
    2.290e+00
## CountryMaldives:Year
    1.161e+00
## CountryMali:Year
    1.125e+00
## CountryMalta:Year
    1.005e+00
## CountryMarshall Islands:Year
    NA
## CountryMauritania:Year
    1.042e+00
## CountryMauritius:Year
    2.326e+00
## CountryMexico:Year
    1.226e+00
## CountryMicronesia (Federated States of):Year
    1.151e+00
## CountryMonaco:Year
    NA
## CountryMongolia:Year
    1.135e+00
## CountryMontenegro:Year
    1.240e+00
## CountryMorocco:Year
    1.340e+00
## CountryMozambique:Year
    2.330e+00
```

```
## CountryMyanmar:Year
    1.325e+00
## CountryNamibia:Year
    1.296e+00
## CountryNauru:Year
    NA
## CountryNepal:Year
    4.699e+00
## CountryNetherlands:Year
    1.033e+00
## CountryNew Zealand:Year
    1.039e+00
## CountryNicaragua:Year
    1.073e+00
## CountryNiger:Year
    1.159e+00
## CountryNigeria:Year
    1.287e+00
## CountryNiue:Year
    NA
## CountryNorway:Year
    9.974e-01
## CountryOman:Year
    1.088e+00
## CountryPakistan:Year
    1.352e+00
## CountryPalau:Year
    NA
## CountryPanama:Year
    1.139e+00
## CountryPapua New Guinea:Year
    1.571e+00
## CountryParaguay:Year
    1.107e+00
## CountryPeru:Year
    1.167e+00
## CountryPhilippines:Year
    1.096e+00
## CountryPoland:Year
    1.304e+00
## CountryPortugal:Year
    1.082e+00
## CountryQatar:Year
    1.112e+00
```



---

```
## CountryRepublic of Korea:Year
    1.006e+00
## CountryRepublic of Moldova:Year
    2.093e+00
## CountryRomania:Year
    2.141e+00
## CountryRussian Federation:Year
    1.560e+00
## CountryRwanda:Year
    3.408e+00
## CountrySaint Kitts and Nevis:Year
    NA
## CountrySaint Lucia:Year
    1.090e+00
## CountrySaint Vincent and the Grenadines:Year
    1.125e+00
## CountrySamoa:Year
    1.114e+00
## CountrySan Marino:Year
    NA
## CountrySao Tome and Principe:Year
    2.609e+00
## CountrySaudi Arabia:Year
    1.102e+00
## CountrySenegal:Year
    2.076e+00
## CountrySerbia:Year
    1.400e+00
## CountrySeychelles:Year
    1.237e+00
## CountrySierra Leone:Year
    3.219e+00
## CountrySingapore:Year
    1.142e+00
## CountrySlovakia:Year
    1.156e+00
## CountrySlovenia:Year
    1.645e+00
## CountrySolomon Islands:Year
    1.014e+00
## CountrySomalia:Year
    1.338e+00
## CountrySouth Africa:Year
    1.065e+00
```

---

```
## CountrySouth Sudan:Year
    1.031e+00
## CountrySpain:Year
    1.016e+00
## CountrySri Lanka:Year
    2.253e+00
## CountrySudan:Year
    1.129e+00
## CountrySuriname:Year
    1.274e+00
## CountrySwaziland:Year
    5.601e+00
## CountrySweden:Year
    1.159e+00
## CountrySwitzerland:Year
    1.052e+00
## CountrySyrian Arab Republic:Year
    1.076e+00
## CountryTajikistan:Year
    1.130e+00
## CountryThailand:Year
    3.215e+00
## CountryThe former Yugoslav republic of Macedonia:Year
    1.159e+00
## CountryTimor-Leste:Year
    2.435e+00
## CountryTogo:Year
    5.551e+00
## CountryTonga:Year
    9.911e-01
## CountryTrinidad and Tobago:Year
    1.674e+00
## CountryTunisia:Year
    1.417e+00
## CountryTurkey:Year
    1.203e+00
## CountryTurkmenistan:Year
    1.022e+00
## CountryTuvalu:Year
    NA
## CountryUganda:Year
    5.647e+00
## CountryUkraine:Year
    1.494e+00
```

---

```

## CountryUnited Arab Emirates:Year
    2.396e+00
## CountryUnited Kingdom of Great Britain and Northern Ireland:Year
    1.055e+00
## CountryUnited Republic of Tanzania:Year
    2.610e+00
## CountryUnited States of America:Year
    1.012e+00
## CountryUruguay:Year
    1.069e+00
## CountryUzbekistan:Year
    1.145e+00
## CountryVanuatu:Year
    1.110e+00
## CountryVenezuela (Bolivarian Republic of):Year
    1.085e+00
## CountryViet Nam:Year
    3.109e+00
## CountryYemen:Year
    1.153e+00
## CountryZambia:Year
    2.900e+00
## CountryZimbabwe:Year
    1.389e+00
## CountryAlbania:HIV.AIDS
    NA
## CountryAlgeria:HIV.AIDS
    NA
## CountryAngola:HIV.AIDS
    7.637e+00
## CountryAntigua and Barbuda:HIV.AIDS
    2.276e+01
## CountryArgentina:HIV.AIDS
    NA
## CountryArmenia:HIV.AIDS
    NA
## CountryAustralia:HIV.AIDS
    NA
## CountryAustria:HIV.AIDS
    NA
## CountryAzerbaijan:HIV.AIDS
    NA
## CountryBahamas:HIV.AIDS
    1.491e+01

```

---

```

## CountryBahrain:HIV.AIDS
    NA
## CountryBangladesh:HIV.AIDS
    NA
## CountryBarbados:HIV.AIDS
    3.058e+00
## CountryBelarus:HIV.AIDS
    NA
## CountryBelgium:HIV.AIDS
    NA
## CountryBelize:HIV.AIDS
    1.608e+00
## CountryBenin:HIV.AIDS
    8.739e+00
## CountryBhutan:HIV.AIDS
    1.570e+01
## CountryBolivia (Plurinational State of):HIV.AIDS
    2.714e+01
## CountryBosnia and Herzegovina:HIV.AIDS
    NA
## CountryBotswana:HIV.AIDS
    4.774e-01
## CountryBrazil:HIV.AIDS
    NA
## CountryBrunei Darussalam:HIV.AIDS
    NA
## CountryBulgaria:HIV.AIDS
    NA
## CountryBurkina Faso:HIV.AIDS
    3.530e+00
## CountryBurundi:HIV.AIDS
    8.954e+00
## CountryCabo Verde:HIV.AIDS
    8.514e+00
## CountryCambodia:HIV.AIDS
    7.107e+00
## CountryCameroon:HIV.AIDS
    1.903e+00
## CountryCanada:HIV.AIDS
    NA
## CountryCentral African Republic:HIV.AIDS
    3.594e+00
## CountryChad:HIV.AIDS
    1.508e+00

```

---

```

## CountryChile:HIV.AIDS
    NA
## CountryChina:HIV.AIDS
    NA
## CountryColombia:HIV.AIDS
    NA
## CountryComoros:HIV.AIDS
    3.037e+00
## CountryCongo:HIV.AIDS
    2.897e+00
## CountryCook Islands:HIV.AIDS
    NA
## CountryCosta Rica:HIV.AIDS
    NA
## CountryCôte d'Ivoire:HIV.AIDS
    1.593e+00
## CountryCroatia:HIV.AIDS
    NA
## CountryCuba:HIV.AIDS
    NA
## CountryCyprus:HIV.AIDS
    NA
## CountryCzechia:HIV.AIDS
    NA
## CountryDemocratic People's Republic of Korea:HIV.AIDS
    NA
## CountryDemocratic Republic of the Congo:HIV.AIDS
    7.533e+00
## CountryDenmark:HIV.AIDS
    NA
## CountryDjibouti:HIV.AIDS
    3.214e+00
## CountryDominica:HIV.AIDS
    NA
## CountryDominican Republic:HIV.AIDS
    5.637e+00
## CountryEcuador:HIV.AIDS
    2.003e+01
## CountryEgypt:HIV.AIDS
    NA
## CountryEl Salvador:HIV.AIDS
    1.087e+01
## CountryEquatorial Guinea:HIV.AIDS
    8.566e-01

```

---

```
## CountryEritrea:HIV.AIDS
    1.073e+01
## CountryEstonia:HIV.AIDS
    NA
## CountryEthiopia:HIV.AIDS
    4.698e+00
## CountryFiji:HIV.AIDS
    NA
## CountryFinland:HIV.AIDS
    NA
## CountryFrance:HIV.AIDS
    NA
## CountryGabon:HIV.AIDS
    7.845e-01
## CountryGambia:HIV.AIDS
    1.501e+00
## CountryGeorgia:HIV.AIDS
    NA
## CountryGermany:HIV.AIDS
    NA
## CountryGhana:HIV.AIDS
    3.529e+00
## CountryGreece:HIV.AIDS
    NA
## CountryGrenada:HIV.AIDS
    NA
## CountryGuatemala:HIV.AIDS
    2.233e+01
## CountryGuinea:HIV.AIDS
    1.610e+00
## CountryGuinea-Bissau:HIV.AIDS
    3.219e+00
## CountryGuyana:HIV.AIDS
    1.320e+00
## CountryHaiti:HIV.AIDS
    3.167e+00
## CountryHonduras:HIV.AIDS
    5.875e+00
## CountryHungary:HIV.AIDS
    NA
## CountryIceland:HIV.AIDS
    NA
## CountryIndia:HIV.AIDS
    4.850e+01
```

---

```
## CountryIndonesia:HIV.AIDS
    1.620e+01
## CountryIran (Islamic Republic of):HIV.AIDS
    NA
## CountryIraq:HIV.AIDS
    NA
## CountryIreland:HIV.AIDS
    NA
## CountryIsrael:HIV.AIDS
    NA
## CountryItaly:HIV.AIDS
    NA
## CountryJamaica:HIV.AIDS
    2.450e+00
## CountryJapan:HIV.AIDS
    NA
## CountryJordan:HIV.AIDS
    NA
## CountryKazakhstan:HIV.AIDS
    NA
## CountryKenya:HIV.AIDS
    1.289e+00
## CountryKiribati:HIV.AIDS
    NA
## CountryKuwait:HIV.AIDS
    NA
## CountryKyrgyzstan:HIV.AIDS
    1.415e+01
## CountryLao People's Democratic Republic:HIV.AIDS
    2.219e+01
## CountryLatvia:HIV.AIDS
    NA
## CountryLebanon:HIV.AIDS
    NA
## CountryLesotho:HIV.AIDS
    4.287e-01
## CountryLiberia:HIV.AIDS
    2.932e+00
## CountryLibya:HIV.AIDS
    NA
## CountryLithuania:HIV.AIDS
    NA
## CountryLuxembourg:HIV.AIDS
    NA
```

---

```
## CountryMadagascar:HIV.AIDS
      8.353e+00
## CountryMalawi:HIV.AIDS
      8.579e-01
## CountryMalaysia:HIV.AIDS
      NA
## CountryMaldives:HIV.AIDS
      NA
## CountryMali:HIV.AIDS
      5.868e+00
## CountryMalta:HIV.AIDS
      NA
## CountryMarshall Islands:HIV.AIDS
      NA
## CountryMauritania:HIV.AIDS
      8.944e+00
## CountryMauritius:HIV.AIDS
      2.110e+01
## CountryMexico:HIV.AIDS
      NA
## CountryMicronesia (Federated States of):HIV.AIDS
      NA
## CountryMonaco:HIV.AIDS
      NA
## CountryMongolia:HIV.AIDS
      NA
## CountryMontenegro:HIV.AIDS
      NA
## CountryMorocco:HIV.AIDS
      NA
## CountryMozambique:HIV.AIDS
      9.315e-01
## CountryMyanmar:HIV.AIDS
      6.777e+00
## CountryNamibia:HIV.AIDS
      5.098e-01
## CountryNauru:HIV.AIDS
      NA
## CountryNepal:HIV.AIDS
      1.995e+01
## CountryNetherlands:HIV.AIDS
      NA
## CountryNew Zealand:HIV.AIDS
      NA
```



---

```

## CountryNicaragua:HIV.AIDS
    1.432e+01
## CountryNiger:HIV.AIDS
    7.180e+00
## CountryNigeria:HIV.AIDS
    2.644e+00
## CountryNiue:HIV.AIDS
    NA
## CountryNorway:HIV.AIDS
    NA
## CountryOman:HIV.AIDS
    NA
## CountryPakistan:HIV.AIDS
    NA
## CountryPalau:HIV.AIDS
    NA
## CountryPanama:HIV.AIDS
    1.431e+01
## CountryPapua New Guinea:HIV.AIDS
    5.331e+00
## CountryParaguay:HIV.AIDS
    1.194e+01
## CountryPeru:HIV.AIDS
    2.070e+01
## CountryPhilippines:HIV.AIDS
    NA
## CountryPoland:HIV.AIDS
    NA
## CountryPortugal:HIV.AIDS
    NA
## CountryQatar:HIV.AIDS
    NA
## CountryRepublic of Korea:HIV.AIDS
    NA
## CountryRepublic of Moldova:HIV.AIDS
    NA
## CountryRomania:HIV.AIDS
    NA
## CountryRussian Federation:HIV.AIDS
    1.245e+01
## CountryRwanda:HIV.AIDS
    1.459e+00
## CountrySaint Kitts and Nevis:HIV.AIDS
    NA

```

---

```

## CountrySaint Lucia:HIV.AIDS
    9.381e+00
## CountrySaint Vincent and the Grenadines:HIV.AIDS
    5.792e+00
## CountrySamoa:HIV.AIDS
    NA
## CountrySan Marino:HIV.AIDS
    NA
## CountrySao Tome and Principe:HIV.AIDS
    4.155e+00
## CountrySaudi Arabia:HIV.AIDS
    NA
## CountrySenegal:HIV.AIDS
    9.657e+00
## CountrySerbia:HIV.AIDS
    NA
## CountrySeychelles:HIV.AIDS
    NA
## CountrySierra Leone:HIV.AIDS
    3.507e+00
## CountrySingapore:HIV.AIDS
    NA
## CountrySlovakia:HIV.AIDS
    NA
## CountrySlovenia:HIV.AIDS
    NA
## CountrySolomon Islands:HIV.AIDS
    NA
## CountrySomalia:HIV.AIDS
    1.498e+01
## CountrySouth Africa:HIV.AIDS
    4.469e-01
## CountrySouth Sudan:HIV.AIDS
    2.219e+00
## CountrySpain:HIV.AIDS
    NA
## CountrySri Lanka:HIV.AIDS
    NA
## CountrySudan:HIV.AIDS
    1.250e+01
## CountrySuriname:HIV.AIDS
    1.636e+00
## CountrySwaziland:HIV.AIDS
    4.480e-01

```

---

```

## CountrySweden:HIV.AIDS
      NA
## CountrySwitzerland:HIV.AIDS
      NA
## CountrySyrian Arab Republic:HIV.AIDS
      NA
## CountryTajikistan:HIV.AIDS
      5.511e+01
## CountryThailand:HIV.AIDS
      2.367e+01
## CountryThe former Yugoslav republic of Macedonia:HIV.AIDS
      NA
## CountryTimor-Leste:HIV.AIDS
      NA
## CountryTogo:HIV.AIDS
      1.674e+00
## CountryTonga:HIV.AIDS
      NA
## CountryTrinidad and Tobago:HIV.AIDS
      1.251e+00
## CountryTunisia:HIV.AIDS
      NA
## CountryTurkey:HIV.AIDS
      NA
## CountryTurkmenistan:HIV.AIDS
      NA
## CountryTuvalu:HIV.AIDS
      NA
## CountryUganda:HIV.AIDS
      2.904e+00
## CountryUkraine:HIV.AIDS
      5.041e+00
## CountryUnited Arab Emirates:HIV.AIDS
      NA
## CountryUnited Kingdom of Great Britain and Northern Ireland:HIV.AIDS
      NA
## CountryUnited Republic of Tanzania:HIV.AIDS
      8.487e-01
## CountryUnited States of America:HIV.AIDS
      NA
## CountryUruguay:HIV.AIDS
      NA
## CountryUzbekistan:HIV.AIDS
      1.659e+01

```

```

## CountryVanuatu:HIV.AIDS
      NA
## CountryVenezuela (Bolivarian Republic of):HIV.AIDS
      NA
## CountryViet Nam:HIV.AIDS
      1.303e+01
## CountryYemen:HIV.AIDS
      NA
## CountryZambia:HIV.AIDS
      6.690e-01
## CountryZimbabwe:HIV.AIDS
      NA
## CountryAlbania:Schooling
      3.660e+00
## CountryAlgeria:Schooling
      4.840e+00
## CountryAngola:Schooling
      4.421e+00
## CountryAntigua and Barbuda:Schooling
      3.205e+00
## CountryArgentina:Schooling
      4.030e+00
## CountryArmenia:Schooling
      3.563e+00
## CountryAustralia:Schooling
      3.337e+00
## CountryAustria:Schooling
      3.446e+00
## CountryAzerbaijan:Schooling
      4.301e+00
## CountryBahamas:Schooling
      9.351e+00
## CountryBahrain:Schooling
      5.754e+00
## CountryBangladesh:Schooling
      3.862e+00
## CountryBarbados:Schooling
      4.047e+00
## CountryBelarus:Schooling
      4.751e+00
## CountryBelgium:Schooling
      3.303e+00
## CountryBelize:Schooling
      3.895e+00

```

---

```
## CountryBenin:Schooling
      8.822e+00
## CountryBhutan:Schooling
      5.775e+00
## CountryBolivia (Plurinational State of):Schooling
      6.380e+00
## CountryBosnia and Herzegovina:Schooling
      3.206e+00
## CountryBotswana:Schooling
      1.025e+01
## CountryBrazil:Schooling
      3.590e+00
## CountryBrunei Darussalam:Schooling
      4.205e+00
## CountryBulgaria:Schooling
      5.666e+00
## CountryBurkina Faso:Schooling
      4.722e+00
## CountryBurundi:Schooling
      5.214e+00
## CountryCabo Verde:Schooling
      4.156e+00
## CountryCambodia:Schooling
      3.642e+00
## CountryCameroon:Schooling
      4.239e+00
## CountryCanada:Schooling
      1.477e+01
## CountryCentral African Republic:Schooling
      1.264e+01
## CountryChad:Schooling
      4.297e+00
## CountryChile:Schooling
      5.397e+00
## CountryChina:Schooling
      3.986e+00
## CountryColombia:Schooling
      3.733e+00
## CountryComoros:Schooling
      4.757e+00
## CountryCongo:Schooling
      3.467e+00
## CountryCook Islands:Schooling
      NA
```

---

```

## CountryCosta Rica:Schooling
    1.381e+01
## CountryCôte d'Ivoire:Schooling
    NA
## CountryCroatia:Schooling
    5.746e+00
## CountryCuba:Schooling
    3.242e+00
## CountryCyprus:Schooling
    3.636e+00
## CountryCzechia:Schooling
    NA
## CountryDemocratic People's Republic of Korea:Schooling
    NA
## CountryDemocratic Republic of the Congo:Schooling
    NA
## CountryDenmark:Schooling
    3.346e+00
## CountryDjibouti:Schooling
    5.665e+00
## CountryDominica:Schooling
    NA
## CountryDominican Republic:Schooling
    1.922e+01
## CountryEcuador:Schooling
    4.695e+00
## CountryEgypt:Schooling
    5.301e+00
## CountryEl Salvador:Schooling
    4.798e+00
## CountryEquatorial Guinea:Schooling
    3.217e+00
## CountryEritrea:Schooling
    6.645e+00
## CountryEstonia:Schooling
    4.318e+00
## CountryEthiopia:Schooling
    3.978e+00
## CountryFiji:Schooling
    5.704e+00
## CountryFinland:Schooling
    3.514e+00
## CountryFrance:Schooling
    3.985e+00

```

---

```
## CountryGabon:Schooling
    2.121e+01
## CountryGambia:Schooling
    4.623e+00
## CountryGeorgia:Schooling
    4.574e+00
## CountryGermany:Schooling
    1.995e+01
## CountryGhana:Schooling
    3.617e+00
## CountryGreece:Schooling
    3.741e+00
## CountryGrenada:Schooling
    6.104e+00
## CountryGuatemala:Schooling
    4.227e+00
## CountryGuinea:Schooling
    3.509e+00
## CountryGuinea-Bissau:Schooling
    5.574e+00
## CountryGuyana:Schooling
    3.957e+00
## CountryHaiti:Schooling
    1.117e+01
## CountryHonduras:Schooling
    5.728e+00
## CountryHungary:Schooling
    3.746e+00
## CountryIceland:Schooling
    3.601e+00
## CountryIndia:Schooling
    4.398e+00
## CountryIndonesia:Schooling
    6.138e+00
## CountryIran (Islamic Republic of):Schooling
    3.417e+00
## CountryIraq:Schooling
    4.861e+00
## CountryIreland:Schooling
    6.071e+00
## CountryIsrael:Schooling
    4.025e+00
## CountryItaly:Schooling
    5.134e+00
```

---

```
## CountryJamaica:Schooling
    3.656e+00
## CountryJapan:Schooling
    1.217e+01
## CountryJordan:Schooling
    4.532e+00
## CountryKazakhstan:Schooling
    4.021e+00
## CountryKenya:Schooling
    4.322e+00
## CountryKiribati:Schooling
    3.308e+00
## CountryKuwait:Schooling
    4.852e+00
## CountryKyrgyzstan:Schooling
    3.746e+00
## CountryLao People's Democratic Republic:Schooling
    6.775e+00
## CountryLatvia:Schooling
    3.857e+00
## CountryLebanon:Schooling
    3.546e+00
## CountryLesotho:Schooling
    4.282e+00
## CountryLiberia:Schooling
    3.858e+00
## CountryLibya:Schooling
    3.579e+00
## CountryLithuania:Schooling
    3.345e+00
## CountryLuxembourg:Schooling
    5.484e+00
## CountryMadagascar:Schooling
    5.995e+00
## CountryMalawi:Schooling
    5.163e+00
## CountryMalaysia:Schooling
    4.161e+00
## CountryMaldives:Schooling
    3.921e+00
## CountryMali:Schooling
    3.571e+00
## CountryMalta:Schooling
    3.568e+00
```



---

```
## CountryMarshall Islands:Schooling
      NA
## CountryMauritania:Schooling
      3.999e+00
## CountryMauritius:Schooling
      5.631e+00
## CountryMexico:Schooling
      6.169e+00
## CountryMicronesia (Federated States of):Schooling
      5.647e+00
## CountryMonaco:Schooling
      NA
## CountryMongolia:Schooling
      3.863e+00
## CountryMontenegro:Schooling
      3.204e+00
## CountryMorocco:Schooling
      4.329e+00
## CountryMozambique:Schooling
      4.560e+00
## CountryMyanmar:Schooling
      9.510e+00
## CountryNamibia:Schooling
      5.013e+00
## CountryNauru:Schooling
      NA
## CountryNepal:Schooling
      3.629e+00
## CountryNetherlands:Schooling
      4.000e+00
## CountryNew Zealand:Schooling
      3.586e+00
## CountryNicaragua:Schooling
      4.139e+00
## CountryNiger:Schooling
      5.787e+00
## CountryNigeria:Schooling
      4.355e+00
## CountryNiue:Schooling
      NA
## CountryNorway:Schooling
      4.417e+00
## CountryOman:Schooling
      3.665e+00
```

---

```
## CountryPakistan:Schooling
    5.338e+00
## CountryPalau:Schooling
    NA
## CountryPanama:Schooling
    4.154e+00
## CountryPapua New Guinea:Schooling
    4.955e+00
## CountryParaguay:Schooling
    3.543e+00
## CountryPeru:Schooling
    4.101e+00
## CountryPhilippines:Schooling
    6.061e+00
## CountryPoland:Schooling
    3.681e+00
## CountryPortugal:Schooling
    5.029e+00
## CountryQatar:Schooling
    3.256e+00
## CountryRepublic of Korea:Schooling
    NA
## CountryRepublic of Moldova:Schooling
    NA
## CountryRomania:Schooling
    3.395e+00
## CountryRussian Federation:Schooling
    4.573e+00
## CountryRwanda:Schooling
    3.587e+00
## CountrySaint Kitts and Nevis:Schooling
    NA
## CountrySaint Lucia:Schooling
    4.678e+00
## CountrySaint Vincent and the Grenadines:Schooling
    5.982e+00
## CountrySamoa:Schooling
    5.439e+00
## CountrySan Marino:Schooling
    NA
## CountrySao Tome and Principe:Schooling
    4.913e+00
## CountrySaudi Arabia:Schooling
    3.663e+00
```

---

```

## CountrySenegal:Schooling
    7.591e+00
## CountrySerbia:Schooling
    5.148e+00
## CountrySeychelles:Schooling
    3.680e+00
## CountrySierra Leone:Schooling
    1.537e+01
## CountrySingapore:Schooling
    3.585e+00
## CountrySlovakia:Schooling
    4.998e+00
## CountrySlovenia:Schooling
    3.652e+00
## CountrySolomon Islands:Schooling
    4.207e+00
## CountrySomalia:Schooling
    NA
## CountrySouth Africa:Schooling
    7.861e+00
## CountrySouth Sudan:Schooling
    3.383e+00
## CountrySpain:Schooling
    3.646e+00
## CountrySri Lanka:Schooling
    1.502e+01
## CountrySudan:Schooling
    7.222e+00
## CountrySuriname:Schooling
    5.599e+00
## CountrySwaziland:Schooling
    6.684e+00
## CountrySweden:Schooling
    7.920e+00
## CountrySwitzerland:Schooling
    6.261e+00
## CountrySyrian Arab Republic:Schooling
    4.069e+00
## CountryTajikistan:Schooling
    4.902e+00
## CountryThailand:Schooling
    5.830e+00
## CountryThe former Yugoslav republic of Macedonia:Schooling
    3.727e+00

```

---

```

## CountryTimor-Leste:Schooling
    3.229e+00
## CountryTogo:Schooling
    4.472e+00
## CountryTonga:Schooling
    3.488e+00
## CountryTrinidad and Tobago:Schooling
    9.651e+00
## CountryTunisia:Schooling
    6.796e+00
## CountryTurkey:Schooling
    3.834e+00
## CountryTurkmenistan:Schooling
    3.275e+00
## CountryTuvalu:Schooling
    NA
## CountryUganda:Schooling
    3.523e+00
## CountryUkraine:Schooling
    4.691e+00
## CountryUnited Arab Emirates:Schooling
    1.525e+01
## CountryUnited Kingdom of Great Britain and Northern Ireland:Schooling
    NA
## CountryUnited Republic of Tanzania:Schooling
    NA
## CountryUnited States of America:Schooling
    NA
## CountryUruguay:Schooling
    3.635e+00
## CountryUzbekistan:Schooling
    5.678e+00
## CountryVanuatu:Schooling
    9.464e+00
## CountryVenezuela (Bolivarian Republic of):Schooling
    3.610e+00
## CountryViet Nam:Schooling
    1.404e+01
## CountryYemen:Schooling
    4.677e+00
## CountryZambia:Schooling
    1.854e+01
## CountryZimbabwe:Schooling
    3.929e+00

```

```

## CountryAlbania:Diphtheria
    9.570e-01
## CountryAlgeria:Diphtheria
    1.168e+00
## CountryAngola:Diphtheria
    5.619e-02
## CountryAntigua and Barbuda:Diphtheria
    4.461e-01
## CountryArgentina:Diphtheria
    1.445e-01
## CountryArmenia:Diphtheria
    5.541e-02
## CountryAustralia:Diphtheria
    1.988e+00
## CountryAustria:Diphtheria
    3.441e-01
## CountryAzerbaijan:Diphtheria
    1.966e-01
## CountryBahamas:Diphtheria
    3.818e-01
## CountryBahrain:Diphtheria
    1.649e+00
## CountryBangladesh:Diphtheria
    1.677e-01
## CountryBarbados:Diphtheria
    1.652e-01
## CountryBelarus:Diphtheria
    5.128e-02
## CountryBelgium:Diphtheria
    1.922e+00
## CountryBelize:Diphtheria
    3.968e-01
## CountryBenin:Diphtheria
    5.629e-02
## CountryBhutan:Diphtheria
    2.136e-01
## CountryBolivia (Plurinational State of):Diphtheria
    4.500e-01
## CountryBosnia and Herzegovina:Diphtheria
    5.094e-02
##
    t value
## (Intercept)
    -0.261

```

---

## CountryAlbania	-0.633
## CountryAlgeria	-0.002
## CountryAngola	-1.336
## CountryAntigua and Barbuda	0.106
## CountryArgentina	0.046
## CountryArmenia	0.092
## CountryAustralia	0.219
## CountryAustria	-0.075
## CountryAzerbaijan	-1.042
## CountryBahamas	0.252
## CountryBahrain	0.116
## CountryBangladesh	0.692
## CountryBarbados	0.094
## CountryBelarus	0.335
## CountryBelgium	-0.347
## CountryBelize	0.133
## CountryBenin	0.033
## CountryBhutan	-0.050
## CountryBolivia (Plurinational State of)	-1.637
## CountryBosnia and Herzegovina	0.336
## CountryBotswana	-0.508
## CountryBrazil	0.876

---

```
## CountryBrunei Darussalam
    -0.453
## CountryBulgaria
    0.056
## CountryBurkina Faso
    -0.121
## CountryBurundi
    -0.054
## CountryCabo Verde
    -0.186
## CountryCambodia
    0.013
## CountryCameroon
    0.130
## CountryCanada
    0.342
## CountryCentral African Republic
    -0.052
## CountryChad
    -0.995
## CountryChile
    0.113
## CountryChina
    -0.221
## CountryColombia
    -0.075
## CountryComoros
    -1.289
## CountryCongo
    -0.743
## CountryCook Islands
    1.547
## CountryCosta Rica
    0.084
## CountryCôte d'Ivoire
    -0.896
## CountryCroatia
    -0.148
## CountryCuba
    0.188
## CountryCyprus
    -0.002
## CountryCzechia
    -0.021
```

---

## CountryDemocratic People's Republic of Korea	-0.319
## CountryDemocratic Republic of the Congo	-0.230
## CountryDenmark	0.283
## CountryDjibouti	2.195
## CountryDominica	1.385
## CountryDominican Republic	-1.445
## CountryEcuador	0.020
## CountryEgypt	0.579
## CountryEl Salvador	-0.036
## CountryEquatorial Guinea	-0.077
## CountryEritrea	-1.637
## CountryEstonia	-1.144
## CountryEthiopia	0.186
## CountryFiji	0.128
## CountryFinland	-0.332
## CountryFrance	0.260
## CountryGabon	-0.980
## CountryGambia	0.032
## CountryGeorgia	0.160
## CountryGermany	-0.132
## CountryGhana	-0.040
## CountryGreece	-0.644



---

```
## CountryGrenada
    -0.573
## CountryGuatemala
    0.825
## CountryGuinea
    -0.343
## CountryGuinea-Bissau
    -0.228
## CountryGuyana
    0.128
## CountryHaiti
    4.021
## CountryHonduras
    0.047
## CountryHungary
    -0.075
## CountryIceland
    1.445
## CountryIndia
    -0.056
## CountryIndonesia
    0.095
## CountryIran (Islamic Republic of)
    -0.106
## CountryIraq
    -1.710
## CountryIreland
    0.750
## CountryIsrael
    -0.255
## CountryItaly
    0.524
## CountryJamaica
    0.069
## CountryJapan
    0.169
## CountryJordan
    0.115
## CountryKazakhstan
    -0.351
## CountryKenya
    0.359
## CountryKiribati
    0.116
```

---

```
## CountryKuwait
    0.187
## CountryKyrgyzstan
   -1.334
## CountryLao People's Democratic Republic
    1.435
## CountryLatvia
    2.439
## CountryLebanon
    0.114
## CountryLesotho
    0.351
## CountryLiberia
    0.844
## CountryLibya
    1.095
## CountryLithuania
   -0.678
## CountryLuxembourg
    0.166
## CountryMadagascar
    2.473
## CountryMalawi
    0.181
## CountryMalaysia
    0.070
## CountryMaldives
   -1.028
## CountryMali
   -0.425
## CountryMalta
   -0.075
## CountryMarshall Islands
    0.435
## CountryMauritania
    1.002
## CountryMauritius
   -0.074
## CountryMexico
    0.256
## CountryMicronesia (Federated States of)
    0.146
## CountryMonaco
    1.608
```

---

## CountryMongolia	-0.022
## CountryMontenegro	0.102
## CountryMorocco	0.808
## CountryMozambique	-1.049
## CountryMyanmar	-0.155
## CountryNamibia	0.470
## CountryNauru	3.802
## CountryNepal	-0.304
## CountryNetherlands	-0.033
## CountryNew Zealand	0.179
## CountryNicaragua	0.282
## CountryNiger	2.090
## CountryNigeria	0.783
## CountryNiue	1.507
## CountryNorway	0.376
## CountryOman	0.031
## CountryPakistan	0.083
## CountryPalau	0.134
## CountryPanama	0.188
## CountryPapua New Guinea	0.139
## CountryParaguay	-0.910
## CountryPeru	-0.142

---

## CountryPhilippines	0.185
## CountryPoland	0.092
## CountryPortugal	-0.359
## CountryQatar	0.185
## CountryRepublic of Korea	-0.079
## CountryRepublic of Moldova	1.030
## CountryRomania	0.633
## CountryRussian Federation	0.025
## CountryRwanda	-1.454
## CountrySaint Kitts and Nevis	0.107
## CountrySaint Lucia	-0.032
## CountrySaint Vincent and the Grenadines	0.632
## CountrySamoa	-0.408
## CountrySan Marino	0.715
## CountrySao Tome and Principe	0.281
## CountrySaudi Arabia	0.173
## CountrySenegal	-0.688
## CountrySerbia	0.205
## CountrySeychelles	0.090
## CountrySierra Leone	0.807
## CountrySingapore	0.749
## CountrySlovakia	-0.004

---

```
## CountrySlovenia
    -0.427
## CountrySolomon Islands
    0.120
## CountrySomalia
    -0.304
## CountrySouth Africa
    1.735
## CountrySouth Sudan
    -0.170
## CountrySpain
    -0.774
## CountrySri Lanka
    0.366
## CountrySudan
    1.045
## CountrySuriname
    1.497
## CountrySwaziland
    -0.970
## CountrySweden
    -0.288
## CountrySwitzerland
    -0.709
## CountrySyrian Arab Republic
    1.342
## CountryTajikistan
    0.008
## CountryThailand
    -0.184
## CountryThe former Yugoslav republic of Macedonia
    0.048
## CountryTimor-Leste
    -0.445
## CountryTogo
    0.137
## CountryTonga
    0.174
## CountryTrinidad and Tobago
    0.698
## CountryTunisia
    0.163
## CountryTurkey
    -0.622
```

---

```

## CountryTurkmenistan
    -0.135
## CountryTuvalu
    0.442
## CountryUganda
    0.915
## CountryUkraine
    0.090
## CountryUnited Arab Emirates
    0.094
## CountryUnited Kingdom of Great Britain and Northern Ireland
    0.354
## CountryUnited Republic of Tanzania
    0.837
## CountryUnited States of America
    0.142
## CountryUruguay
    0.180
## CountryUzbekistan
    0.141
## CountryVanuatu
    -0.985
## CountryVenezuela (Bolivarian Republic of)
    0.218
## CountryViet Nam
    0.017
## CountryYemen
    -0.966
## CountryZambia
    0.664
## CountryZimbabwe
    -2.556
## Year
    0.286
## HIV.AIDS
    1.978
## Schooling
    0.036
## Diphtheria
    1.610
## Adult.Mortality
    -0.417
## Measles
    0.218

```

---

```
## Alcohol
    -0.088
## Polio
    -2.278
## thinness.5.9.years
    0.339
## Total.expenditure
    0.159
## percentage.expenditure
    -0.067
## CountryAlbania:Year
    0.630
## CountryAlgeria:Year
    0.006
## CountryAngola:Year
    1.326
## CountryAntigua and Barbuda:Year
    -0.097
## CountryArgentina:Year
    -0.033
## CountryArmenia:Year
    -0.079
## CountryAustralia:Year
    -0.214
## CountryAustria:Year
    0.026
## CountryAzerbaijan:Year
    1.075
## CountryBahamas:Year
    -0.248
## CountryBahrain:Year
    -0.097
## CountryBangladesh:Year
    -0.699
## CountryBarbados:Year
    -0.087
## CountryBelarus:Year
    -0.330
## CountryBelgium:Year
    0.269
## CountryBelize:Year
    -0.129
## CountryBenin:Year
    -0.031
```

---

```
## CountryBhutan:Year
    0.049
## CountryBolivia (Plurinational State of):Year
    1.672
## CountryBosnia and Herzegovina:Year
   -0.326
## CountryBotswana:Year
    0.362
## CountryBrazil:Year
   -0.836
## CountryBrunei Darussalam:Year
    0.459
## CountryBulgaria:Year
   -0.044
## CountryBurkina Faso:Year
    0.117
## CountryBurundi:Year
    0.055
## CountryCabo Verde:Year
    0.178
## CountryCambodia:Year
   -0.014
## CountryCameroon:Year
   -0.130
## CountryCanada:Year
   -0.571
## CountryCentral African Republic:Year
    0.130
## CountryChad:Year
    0.993
## CountryChile:Year
   -0.117
## CountryChina:Year
    0.223
## CountryColombia:Year
    0.083
## CountryComoros:Year
    1.289
## CountryCongo:Year
    0.722
## CountryCook Islands:Year
    NA
## CountryCosta Rica:Year
   -0.078
```



---

```
## CountryCôte d'Ivoire:Year
    0.889
## CountryCroatia:Year
    0.158
## CountryCuba:Year
   -0.162
## CountryCyprus:Year
   -0.003
## CountryCzechia:Year
    0.024
## CountryDemocratic People's Republic of Korea:Year
    0.346
## CountryDemocratic Republic of the Congo:Year
    0.231
## CountryDenmark:Year
   -0.278
## CountryDjibouti:Year
   -2.212
## CountryDominica:Year
      NA
## CountryDominican Republic:Year
    1.459
## CountryEcuador:Year
   -0.004
## CountryEgypt:Year
   -0.589
## CountryEl Salvador:Year
    0.020
## CountryEquatorial Guinea:Year
    0.076
## CountryEritrea:Year
    1.617
## CountryEstonia:Year
    1.124
## CountryEthiopia:Year
   -0.180
## CountryFiji:Year
   -0.122
## CountryFinland:Year
    0.427
## CountryFrance:Year
   -0.308
## CountryGabon:Year
    0.960
```

---

```
## CountryGambia:Year
    -0.011
## CountryGeorgia:Year
    -0.159
## CountryGermany:Year
    0.218
## CountryGhana:Year
    0.038
## CountryGreece:Year
    0.673
## CountryGrenada:Year
    0.673
## CountryGuatemala:Year
    -0.898
## CountryGuinea:Year
    0.340
## CountryGuinea-Bissau:Year
    0.227
## CountryGuyana:Year
    -0.132
## CountryHaiti:Year
    -3.908
## CountryHonduras:Year
    -0.041
## CountryHungary:Year
    0.086
## CountryIceland:Year
    -1.476
## CountryIndia:Year
    0.061
## CountryIndonesia:Year
    -0.092
## CountryIran (Islamic Republic of):Year
    0.107
## CountryIraq:Year
    1.232
## CountryIreland:Year
    -0.792
## CountryIsrael:Year
    0.308
## CountryItaly:Year
    -0.563
## CountryJamaica:Year
    -0.061
```

---

```
## CountryJapan:Year
    -0.162
## CountryJordan:Year
    -0.106
## CountryKazakhstan:Year
    0.357
## CountryKenya:Year
    -0.352
## CountryKiribati:Year
    -0.111
## CountryKuwait:Year
    -0.178
## CountryKyrgyzstan:Year
    1.293
## CountryLao People's Democratic Republic:Year
    -1.440
## CountryLatvia:Year
    -2.384
## CountryLebanon:Year
    -0.097
## CountryLesotho:Year
    -0.336
## CountryLiberia:Year
    -0.820
## CountryLibya:Year
    -1.009
## CountryLithuania:Year
    0.672
## CountryLuxembourg:Year
    -0.176
## CountryMadagascar:Year
    -2.390
## CountryMalawi:Year
    -0.181
## CountryMalaysia:Year
    -0.068
## CountryMaldives:Year
    1.041
## CountryMali:Year
    0.423
## CountryMalta:Year
    0.087
## CountryMarshall Islands:Year
    NA
```

---

```
## CountryMauritania:Year
    -1.007
## CountryMauritius:Year
    0.084
## CountryMexico:Year
    -0.254
## CountryMicronesia (Federated States of):Year
    -0.142
## CountryMonaco:Year
    NA
## CountryMongolia:Year
    0.032
## CountryMontenegro:Year
    -0.094
## CountryMorocco:Year
    -0.809
## CountryMozambique:Year
    1.056
## CountryMyanmar:Year
    0.060
## CountryNamibia:Year
    -0.450
## CountryNauru:Year
    NA
## CountryNepal:Year
    0.306
## CountryNetherlands:Year
    0.053
## CountryNew Zealand:Year
    -0.205
## CountryNicaragua:Year
    -0.295
## CountryNiger:Year
    -2.108
## CountryNigeria:Year
    -0.795
## CountryNiue:Year
    NA
## CountryNorway:Year
    -0.415
## CountryOman:Year
    -0.015
## CountryPakistan:Year
    -0.079
```

---

```
## CountryPalau:Year
    NA
## CountryPanama:Year
    -0.172
## CountryPapua New Guinea:Year
    -0.186
## CountryParaguay:Year
    0.919
## CountryPeru:Year
    0.143
## CountryPhilippines:Year
    -0.169
## CountryPoland:Year
    -0.091
## CountryPortugal:Year
    0.303
## CountryQatar:Year
    -0.176
## CountryRepublic of Korea:Year
    0.112
## CountryRepublic of Moldova:Year
    -1.024
## CountryRomania:Year
    -0.616
## CountryRussian Federation:Year
    0.003
## CountryRwanda:Year
    1.436
## CountrySaint Kitts and Nevis:Year
    NA
## CountrySaint Lucia:Year
    0.033
## CountrySaint Vincent and the Grenadines:Year
    -0.476
## CountrySamoa:Year
    0.387
## CountrySan Marino:Year
    NA
## CountrySao Tome and Principe:Year
    -0.277
## CountrySaudi Arabia:Year
    -0.169
## CountrySenegal:Year
    0.692
```

---

```
## CountrySerbia:Year
    -0.202
## CountrySeychelles:Year
    -0.082
## CountrySierra Leone:Year
    -0.811
## CountrySingapore:Year
    -0.706
## CountrySlovakia:Year
    0.015
## CountrySlovenia:Year
    0.475
## CountrySolomon Islands:Year
    -0.112
## CountrySomalia:Year
    0.294
## CountrySouth Africa:Year
    -1.598
## CountrySouth Sudan:Year
    0.166
## CountrySpain:Year
    0.816
## CountrySri Lanka:Year
    -0.447
## CountrySudan:Year
    -1.077
## CountrySuriname:Year
    -1.504
## CountrySwaziland:Year
    0.965
## CountrySweden:Year
    0.551
## CountrySwitzerland:Year
    0.576
## CountrySyrian Arab Republic:Year
    -1.364
## CountryTajikistan:Year
    0.010
## CountryThailand:Year
    0.194
## CountryThe former Yugoslav republic of Macedonia:Year
    -0.040
## CountryTimor-Leste:Year
    0.448
```

---

```

## CountryTogo:Year
    -0.137
## CountryTonga:Year
    -0.164
## CountryTrinidad and Tobago:Year
    -0.637
## CountryTunisia:Year
    -0.152
## CountryTurkey:Year
    0.637
## CountryTurkmenistan:Year
    0.147
## CountryTuvalu:Year
    NA
## CountryUganda:Year
    -0.913
## CountryUkraine:Year
    -0.081
## CountryUnited Arab Emirates:Year
    -0.088
## CountryUnited Kingdom of Great Britain and Northern Ireland:Year
    -0.416
## CountryUnited Republic of Tanzania:Year
    -0.837
## CountryUnited States of America:Year
    -0.134
## CountryUruguay:Year
    -0.168
## CountryUzbekistan:Year
    -0.128
## CountryVanuatu:Year
    0.912
## CountryVenezuela (Bolivarian Republic of):Year
    -0.205
## CountryViet Nam:Year
    -0.015
## CountryYemen:Year
    0.808
## CountryZambia:Year
    -0.532
## CountryZimbabwe:Year
    2.527
## CountryAlbania:HIV.AIDS
    NA

```

---

```

## CountryAlgeria:HIV.AIDS
    NA
## CountryAngola:HIV.AIDS
    2.231
## CountryAntigua and Barbuda:HIV.AIDS
    -0.030
## CountryArgentina:HIV.AIDS
    NA
## CountryArmenia:HIV.AIDS
    NA
## CountryAustralia:HIV.AIDS
    NA
## CountryAustria:HIV.AIDS
    NA
## CountryAzerbaijan:HIV.AIDS
    NA
## CountryBahamas:HIV.AIDS
    -0.043
## CountryBahrain:HIV.AIDS
    NA
## CountryBangladesh:HIV.AIDS
    NA
## CountryBarbados:HIV.AIDS
    -0.230
## CountryBelarus:HIV.AIDS
    NA
## CountryBelgium:HIV.AIDS
    NA
## CountryBelize:HIV.AIDS
    -0.536
## CountryBenin:HIV.AIDS
    -0.022
## CountryBhutan:HIV.AIDS
    0.145
## CountryBolivia (Plurinational State of):HIV.AIDS
    1.474
## CountryBosnia and Herzegovina:HIV.AIDS
    NA
## CountryBotswana:HIV.AIDS
    -2.371
## CountryBrazil:HIV.AIDS
    NA
## CountryBrunei Darussalam:HIV.AIDS
    NA

```



---

```

## CountryBulgaria:HIV.AIDS
    NA
## CountryBurkina Faso:HIV.AIDS
    0.196
## CountryBurundi:HIV.AIDS
    -0.146
## CountryCabo Verde:HIV.AIDS
    -1.759
## CountryCambodia:HIV.AIDS
    -0.127
## CountryCameroon:HIV.AIDS
    -0.754
## CountryCanada:HIV.AIDS
    NA
## CountryCentral African Republic:HIV.AIDS
    -2.177
## CountryChad:HIV.AIDS
    -0.199
## CountryChile:HIV.AIDS
    NA
## CountryChina:HIV.AIDS
    NA
## CountryColombia:HIV.AIDS
    NA
## CountryComoros:HIV.AIDS
    -1.393
## CountryCongo:HIV.AIDS
    -1.869
## CountryCook Islands:HIV.AIDS
    NA
## CountryCosta Rica:HIV.AIDS
    NA
## CountryCôte d'Ivoire:HIV.AIDS
    -1.682
## CountryCroatia:HIV.AIDS
    NA
## CountryCuba:HIV.AIDS
    NA
## CountryCyprus:HIV.AIDS
    NA
## CountryCzechia:HIV.AIDS
    NA
## CountryDemocratic People's Republic of Korea:HIV.AIDS
    NA

```

---

```

## CountryDemocratic Republic of the Congo:HIV.AIDS
    -0.093
## CountryDenmark:HIV.AIDS
    NA
## CountryDjibouti:HIV.AIDS
    0.203
## CountryDominica:HIV.AIDS
    NA
## CountryDominican Republic:HIV.AIDS
    1.405
## CountryEcuador:HIV.AIDS
    -0.187
## CountryEgypt:HIV.AIDS
    NA
## CountryEl Salvador:HIV.AIDS
    -0.983
## CountryEquatorial Guinea:HIV.AIDS
    -1.034
## CountryEritrea:HIV.AIDS
    1.948
## CountryEstonia:HIV.AIDS
    NA
## CountryEthiopia:HIV.AIDS
    -0.838
## CountryFiji:HIV.AIDS
    NA
## CountryFinland:HIV.AIDS
    NA
## CountryFrance:HIV.AIDS
    NA
## CountryGabon:HIV.AIDS
    -0.940
## CountryGambia:HIV.AIDS
    0.131
## CountryGeorgia:HIV.AIDS
    NA
## CountryGermany:HIV.AIDS
    NA
## CountryGhana:HIV.AIDS
    3.636
## CountryGreece:HIV.AIDS
    NA
## CountryGrenada:HIV.AIDS
    NA

```

---

```
## CountryGuatemala:HIV.AIDS
    -1.168
## CountryGuinea:HIV.AIDS
    0.106
## CountryGuinea-Bissau:HIV.AIDS
    -0.083
## CountryGuyana:HIV.AIDS
    -0.760
## CountryHaiti:HIV.AIDS
    -6.032
## CountryHonduras:HIV.AIDS
    -0.291
## CountryHungary:HIV.AIDS
    NA
## CountryIceland:HIV.AIDS
    NA
## CountryIndia:HIV.AIDS
    -0.047
## CountryIndonesia:HIV.AIDS
    0.108
## CountryIran (Islamic Republic of):HIV.AIDS
    NA
## CountryIraq:HIV.AIDS
    NA
## CountryIreland:HIV.AIDS
    NA
## CountryIsrael:HIV.AIDS
    NA
## CountryItaly:HIV.AIDS
    NA
## CountryJamaica:HIV.AIDS
    -0.416
## CountryJapan:HIV.AIDS
    NA
## CountryJordan:HIV.AIDS
    NA
## CountryKazakhstan:HIV.AIDS
    NA
## CountryKenya:HIV.AIDS
    -0.360
## CountryKiribati:HIV.AIDS
    NA
## CountryKuwait:HIV.AIDS
    NA
```

---

```

## CountryKyrgyzstan:HIV.AIDS
    -1.952
## CountryLao People's Democratic Republic:HIV.AIDS
    2.033
## CountryLatvia:HIV.AIDS
    NA
## CountryLebanon:HIV.AIDS
    NA
## CountryLesotho:HIV.AIDS
    -2.651
## CountryLiberia:HIV.AIDS
    -1.401
## CountryLibya:HIV.AIDS
    NA
## CountryLithuania:HIV.AIDS
    NA
## CountryLuxembourg:HIV.AIDS
    NA
## CountryMadagascar:HIV.AIDS
    -0.720
## CountryMalawi:HIV.AIDS
    -1.677
## CountryMalaysia:HIV.AIDS
    NA
## CountryMaldives:HIV.AIDS
    NA
## CountryMali:HIV.AIDS
    -0.208
## CountryMalta:HIV.AIDS
    NA
## CountryMarshall Islands:HIV.AIDS
    NA
## CountryMauritania:HIV.AIDS
    -0.424
## CountryMauritius:HIV.AIDS
    -0.043
## CountryMexico:HIV.AIDS
    NA
## CountryMicronesia (Federated States of):HIV.AIDS
    NA
## CountryMonaco:HIV.AIDS
    NA
## CountryMongolia:HIV.AIDS
    NA

```

---

```

## CountryMontenegro:HIV.AIDS
    NA
## CountryMorocco:HIV.AIDS
    NA
## CountryMozambique:HIV.AIDS
    0.292
## CountryMyanmar:HIV.AIDS
    -1.165
## CountryNamibia:HIV.AIDS
    -2.791
## CountryNauru:HIV.AIDS
    NA
## CountryNepal:HIV.AIDS
    0.258
## CountryNetherlands:HIV.AIDS
    NA
## CountryNew Zealand:HIV.AIDS
    NA
## CountryNicaragua:HIV.AIDS
    -0.969
## CountryNiger:HIV.AIDS
    0.781
## CountryNigeria:HIV.AIDS
    -0.719
## CountryNiue:HIV.AIDS
    NA
## CountryNorway:HIV.AIDS
    NA
## CountryOman:HIV.AIDS
    NA
## CountryPakistan:HIV.AIDS
    NA
## CountryPalau:HIV.AIDS
    NA
## CountryPanama:HIV.AIDS
    -0.017
## CountryPapua New Guinea:HIV.AIDS
    1.562
## CountryParaguay:HIV.AIDS
    2.170
## CountryPeru:HIV.AIDS
    -0.039
## CountryPhilippines:HIV.AIDS
    NA

```

---

```

## CountryPoland:HIV.AIDS
    NA
## CountryPortugal:HIV.AIDS
    NA
## CountryQatar:HIV.AIDS
    NA
## CountryRepublic of Korea:HIV.AIDS
    NA
## CountryRepublic of Moldova:HIV.AIDS
    NA
## CountryRomania:HIV.AIDS
    NA
## CountryRussian Federation:HIV.AIDS
    -0.673
## CountryRwanda:HIV.AIDS
    -0.514
## CountrySaint Kitts and Nevis:HIV.AIDS
    NA
## CountrySaint Lucia:HIV.AIDS
    -0.106
## CountrySaint Vincent and the Grenadines:HIV.AIDS
    0.411
## CountrySamoa:HIV.AIDS
    NA
## CountrySan Marino:HIV.AIDS
    NA
## CountrySao Tome and Principe:HIV.AIDS
    -0.129
## CountrySaudi Arabia:HIV.AIDS
    NA
## CountrySenegal:HIV.AIDS
    0.155
## CountrySerbia:HIV.AIDS
    NA
## CountrySeychelles:HIV.AIDS
    NA
## CountrySierra Leone:HIV.AIDS
    -0.583
## CountrySingapore:HIV.AIDS
    NA
## CountrySlovakia:HIV.AIDS
    NA
## CountrySlovenia:HIV.AIDS
    NA

```

---

```

## CountrySolomon Islands:HIV.AIDS
    NA
## CountrySomalia:HIV.AIDS
    -1.856
## CountrySouth Africa:HIV.AIDS
    -4.152
## CountrySouth Sudan:HIV.AIDS
    -0.884
## CountrySpain:HIV.AIDS
    NA
## CountrySri Lanka:HIV.AIDS
    NA
## CountrySudan:HIV.AIDS
    -0.650
## CountrySuriname:HIV.AIDS
    -2.627
## CountrySwaziland:HIV.AIDS
    -1.940
## CountrySweden:HIV.AIDS
    NA
## CountrySwitzerland:HIV.AIDS
    NA
## CountrySyrian Arab Republic:HIV.AIDS
    NA
## CountryTajikistan:HIV.AIDS
    0.050
## CountryThailand:HIV.AIDS
    0.211
## CountryThe former Yugoslav republic of Macedonia:HIV.AIDS
    NA
## CountryTimor-Leste:HIV.AIDS
    NA
## CountryTogo:HIV.AIDS
    -0.812
## CountryTonga:HIV.AIDS
    NA
## CountryTrinidad and Tobago:HIV.AIDS
    0.088
## CountryTunisia:HIV.AIDS
    NA
## CountryTurkey:HIV.AIDS
    NA
## CountryTurkmenistan:HIV.AIDS
    NA

```

---

```

## CountryTuvalu:HIV.AIDS
    NA
## CountryUganda:HIV.AIDS
    -1.985
## CountryUkraine:HIV.AIDS
    -0.221
## CountryUnited Arab Emirates:HIV.AIDS
    NA
## CountryUnited Kingdom of Great Britain and Northern Ireland:HIV.AIDS
    NA
## CountryUnited Republic of Tanzania:HIV.AIDS
    -2.206
## CountryUnited States of America:HIV.AIDS
    NA
## CountryUruguay:HIV.AIDS
    NA
## CountryUzbekistan:HIV.AIDS
    -0.170
## CountryVanuatu:HIV.AIDS
    NA
## CountryVenezuela (Bolivarian Republic of):HIV.AIDS
    NA
## CountryViet Nam:HIV.AIDS
    -0.016
## CountryYemen:HIV.AIDS
    NA
## CountryZambia:HIV.AIDS
    -0.264
## CountryZimbabwe:HIV.AIDS
    NA
## CountryAlbania:Schooling
    -0.006
## CountryAlgeria:Schooling
    -0.012
## CountryAngola:Schooling
    -0.768
## CountryAntigua and Barbuda:Schooling
    -0.034
## CountryArgentina:Schooling
    -0.205
## CountryArmenia:Schooling
    0.023
## CountryAustralia:Schooling
    0.328

```



---

```
## CountryAustria:Schooling
    -0.172
## CountryAzerbaijan:Schooling
    -0.354
## CountryBahamas:Schooling
    0.238
## CountryBahrain:Schooling
    -0.049
## CountryBangladesh:Schooling
    0.960
## CountryBarbados:Schooling
    -0.038
## CountryBelarus:Schooling
    0.273
## CountryBelgium:Schooling
    0.289
## CountryBelize:Schooling
    0.048
## CountryBenin:Schooling
    -0.026
## CountryBhutan:Schooling
    0.053
## CountryBolivia (Plurinational State of):Schooling
    -1.195
## CountryBosnia and Herzegovina:Schooling
    -0.018
## CountryBotswana:Schooling
    0.062
## CountryBrazil:Schooling
    -0.335
## CountryBrunei Darussalam:Schooling
    -0.255
## CountryBulgaria:Schooling
    -0.127
## CountryBurkina Faso:Schooling
    0.241
## CountryBurundi:Schooling
    -0.019
## CountryCabo Verde:Schooling
    0.228
## CountryCambodia:Schooling
    0.453
## CountryCameroon:Schooling
    0.018
```

---

```

## CountryCanada:Schooling
    1.989
## CountryCentral African Republic:Schooling
    -2.596
## CountryChad:Schooling
    -0.995
## CountryChile:Schooling
    0.440
## CountryChina:Schooling
    -0.075
## CountryColombia:Schooling
    -0.172
## CountryComoros:Schooling
    0.482
## CountryCongo:Schooling
    0.849
## CountryCook Islands:Schooling
    NA
## CountryCosta Rica:Schooling
    -0.013
## CountryCôte d'Ivoire:Schooling
    NA
## CountryCroatia:Schooling
    -0.170
## CountryCuba:Schooling
    -0.082
## CountryCyprus:Schooling
    0.100
## CountryCzechia:Schooling
    NA
## CountryDemocratic People's Republic of Korea:Schooling
    NA
## CountryDemocratic Republic of the Congo:Schooling
    NA
## CountryDenmark:Schooling
    0.352
## CountryDjibouti:Schooling
    2.319
## CountryDominica:Schooling
    NA
## CountryDominican Republic:Schooling
    -0.895
## CountryEcuador:Schooling
    -0.217

```

---

```
## CountryEgypt:Schooling
    0.935
## CountryEl Salvador:Schooling
    0.502
## CountryEquatorial Guinea:Schooling
   -0.028
## CountryEritrea:Schooling
    1.772
## CountryEstonia:Schooling
   -1.621
## CountryEthiopia:Schooling
   -0.137
## CountryFiji:Schooling
    0.039
## CountryFinland:Schooling
    0.032
## CountryFrance:Schooling
    3.003
## CountryGabon:Schooling
   -0.106
## CountryGambia:Schooling
   -0.626
## CountryGeorgia:Schooling
    0.095
## CountryGermany:Schooling
    0.101
## CountryGhana:Schooling
    1.330
## CountryGreece:Schooling
    0.876
## CountryGrenada:Schooling
   -1.826
## CountryGuatemala:Schooling
    2.929
## CountryGuinea:Schooling
   -0.014
## CountryGuinea-Bissau:Schooling
   -0.154
## CountryGuyana:Schooling
   -0.013
## CountryHaiti:Schooling
   -0.465
## CountryHonduras:Schooling
   -0.074
```

---

```
## CountryHungary:Schooling
    -0.004
## CountryIceland:Schooling
    2.119
## CountryIndia:Schooling
    -0.039
## CountryIndonesia:Schooling
    0.008
## CountryIran (Islamic Republic of):Schooling
    -0.465
## CountryIraq:Schooling
    1.791
## CountryIreland:Schooling
    1.680
## CountryIsrael:Schooling
    -0.523
## CountryItaly:Schooling
    0.389
## CountryJamaica:Schooling
    -0.012
## CountryJapan:Schooling
    0.096
## CountryJordan:Schooling
    -0.047
## CountryKazakhstan:Schooling
    -0.297
## CountryKenya:Schooling
    -0.256
## CountryKiribati:Schooling
    -0.024
## CountryKuwait:Schooling
    -0.041
## CountryKyrgyzstan:Schooling
    0.286
## CountryLao People's Democratic Republic:Schooling
    1.461
## CountryLatvia:Schooling
    0.019
## CountryLebanon:Schooling
    0.002
## CountryLesotho:Schooling
    -0.478
## CountryLiberia:Schooling
    -1.978
```

---

```
## CountryLibya:Schooling
    -1.139
## CountryLithuania:Schooling
    0.575
## CountryLuxembourg:Schooling
    2.245
## CountryMadagascar:Schooling
    -1.231
## CountryMalawi:Schooling
    0.034
## CountryMalaysia:Schooling
    0.004
## CountryMaldives:Schooling
    0.498
## CountryMali:Schooling
    -0.319
## CountryMalta:Schooling
    0.214
## CountryMarshall Islands:Schooling
    NA
## CountryMauritania:Schooling
    1.053
## CountryMauritius:Schooling
    -0.253
## CountryMexico:Schooling
    0.278
## CountryMicronesia (Federated States of):Schooling
    0.054
## CountryMonaco:Schooling
    NA
## CountryMongolia:Schooling
    0.029
## CountryMontenegro:Schooling
    -0.042
## CountryMorocco:Schooling
    0.560
## CountryMozambique:Schooling
    -0.890
## CountryMyanmar:Schooling
    0.654
## CountryNamibia:Schooling
    -0.266
## CountryNauru:Schooling
    NA
```

---

```
## CountryNepal:Schooling
    0.072
## CountryNetherlands:Schooling
   -0.181
## CountryNew Zealand:Schooling
    1.165
## CountryNicaragua:Schooling
    0.656
## CountryNiger:Schooling
    3.552
## CountryNigeria:Schooling
    0.944
## CountryNiue:Schooling
     NA
## CountryNorway:Schooling
    0.550
## CountryOman:Schooling
   -0.028
## CountryPakistan:Schooling
    0.043
## CountryPalau:Schooling
     NA
## CountryPanama:Schooling
   -0.261
## CountryPapua New Guinea:Schooling
    0.847
## CountryParaguay:Schooling
   -1.487
## CountryPeru:Schooling
    0.485
## CountryPhilippines:Schooling
    0.160
## CountryPoland:Schooling
    0.034
## CountryPortugal:Schooling
    0.555
## CountryQatar:Schooling
   -0.032
## CountryRepublic of Korea:Schooling
     NA
## CountryRepublic of Moldova:Schooling
     NA
## CountryRomania:Schooling
    0.020
```

---

```

## CountryRussian Federation:Schooling
    0.110
## CountryRwanda:Schooling
    1.758
## CountrySaint Kitts and Nevis:Schooling
    NA
## CountrySaint Lucia:Schooling
   -0.051
## CountrySaint Vincent and the Grenadines:Schooling
   -3.573
## CountrySamoa:Schooling
    0.454
## CountrySan Marino:Schooling
    NA
## CountrySao Tome and Principe:Schooling
    0.050
## CountrySaudi Arabia:Schooling
    0.006
## CountrySenegal:Schooling
   -0.550
## CountrySerbia:Schooling
    0.150
## CountrySeychelles:Schooling
   -0.130
## CountrySierra Leone:Schooling
    0.814
## CountrySingapore:Schooling
    0.914
## CountrySlovakia:Schooling
   -0.089
## CountrySlovenia:Schooling
   -0.268
## CountrySolomon Islands:Schooling
    0.004
## CountrySomalia:Schooling
    NA
## CountrySouth Africa:Schooling
   -2.687
## CountrySouth Sudan:Schooling
   -0.046
## CountrySpain:Schooling
   -1.337
## CountrySri Lanka:Schooling
    0.641

```

---

```

## CountrySudan:Schooling
    2.665
## CountrySuriname:Schooling
    2.084
## CountrySwaziland:Schooling
    0.256
## CountrySweden:Schooling
    0.653
## CountrySwitzerland:Schooling
   -1.268
## CountrySyrian Arab Republic:Schooling
    1.615
## CountryTajikistan:Schooling
   -0.351
## CountryThailand:Schooling
   -0.002
## CountryThe former Yugoslav republic of Macedonia:Schooling
    0.028
## CountryTimor-Leste:Schooling
   -0.039
## CountryTogo:Schooling
   -0.053
## CountryTonga:Schooling
   -0.054
## CountryTrinidad and Tobago:Schooling
   -1.321
## CountryTunisia:Schooling
    0.066
## CountryTurkey:Schooling
   -0.653
## CountryTurkmenistan:Schooling
   -0.075
## CountryTuvalu:Schooling
    NA
## CountryUganda:Schooling
   -0.370
## CountryUkraine:Schooling
   -0.098
## CountryUnited Arab Emirates:Schooling
    0.042
## CountryUnited Kingdom of Great Britain and Northern Ireland:Schooling
    NA
## CountryUnited Republic of Tanzania:Schooling
    NA

```



---

```

## CountryUnited States of America:Schooling
    NA
## CountryUruguay:Schooling
    0.022
## CountryUzbekistan:Schooling
   -0.085
## CountryVanuatu:Schooling
    0.541
## CountryVenezuela (Bolivarian Republic of):Schooling
   -0.019
## CountryViet Nam:Schooling
   -0.011
## CountryYemen:Schooling
    0.107
## CountryZambia:Schooling
   -1.777
## CountryZimbabwe:Schooling
    1.033
## CountryAlbania:Diphtheria
   -0.383
## CountryAlgeria:Diphtheria
    0.107
## CountryAngola:Diphtheria
   -1.124
## CountryAntigua and Barbuda:Diphtheria
   -0.168
## CountryArgentina:Diphtheria
   -0.387
## CountryArmenia:Diphtheria
   -1.401
## CountryAustralia:Diphtheria
    0.801
## CountryAustria:Diphtheria
   -4.115
## CountryAzerbaijan:Diphtheria
   -3.288
## CountryBahamas:Diphtheria
    0.010
## CountryBahrain:Diphtheria
   -0.051
## CountryBangladesh:Diphtheria
    0.028
## CountryBarbados:Diphtheria
   -0.451

```

```

## CountryBelarus:Diphtheria
    -1.434
## CountryBelgium:Diphtheria
    0.370
## CountryBelize:Diphtheria
    -0.205
## CountryBenin:Diphtheria
    -1.424
## CountryBhutan:Diphtheria
    0.123
## CountryBolivia (Plurinational State of):Diphtheria
    -1.424
## CountryBosnia and Herzegovina:Diphtheria
    -1.628
##
    Pr(>|t|)
## (Intercept)
    0.794503
## CountryAlbania
    0.526866
## CountryAlgeria
    0.998535
## CountryAngola
    0.181875
## CountryAntigua and Barbuda
    0.915490
## CountryArgentina
    0.962947
## CountryArmenia
    0.926856
## CountryAustralia
    0.826514
## CountryAustria
    0.940429
## CountryAzerbaijan
    0.297570
## CountryBahamas
    0.800852
## CountryBahrain
    0.907909
## CountryBangladesh
    0.488935
## CountryBarbados
    0.925327

```

---

```
## CountryBelarus
    0.737598
## CountryBelgium
    0.728889
## CountryBelize
    0.894301
## CountryBenin
    0.973752
## CountryBhutan
    0.959802
## CountryBolivia (Plurinational State of)
    0.101941
## CountryBosnia and Herzegovina
    0.737261
## CountryBotswana
    0.611714
## CountryBrazil
    0.381101
## CountryBrunei Darussalam
    0.650500
## CountryBulgaria
    0.954973
## CountryBurkina Faso
    0.904028
## CountryBurundi
    0.957240
## CountryCabo Verde
    0.852407
## CountryCambodia
    0.989983
## CountryCameroon
    0.896311
## CountryCanada
    0.732143
## CountryCentral African Republic
    0.958585
## CountryChad
    0.319955
## CountryChile
    0.910148
## CountryChina
    0.825201
## CountryColombia
    0.939893
```

---

```
## CountryComoros
    0.197681
## CountryCongo
    0.457701
## CountryCook Islands
    0.122146
## CountryCosta Rica
    0.933015
## CountryCôte d'Ivoire
    0.370604
## CountryCroatia
    0.882481
## CountryCuba
    0.850634
## CountryCyprus
    0.998801
## CountryCzechia
    0.983369
## CountryDemocratic People's Republic of Korea
    0.750021
## CountryDemocratic Republic of the Congo
    0.818136
## CountryDenmark
    0.777333
## CountryDjibouti
    0.028410
## CountryDominica
    0.166384
## CountryDominican Republic
    0.148727
## CountryEcuador
    0.984290
## CountryEgypt
    0.562451
## CountryEl Salvador
    0.971192
## CountryEquatorial Guinea
    0.938598
## CountryEritrea
    0.102017
## CountryEstonia
    0.252774
## CountryEthiopia
    0.852675
```

---

```
## CountryFiji
    0.897905
## CountryFinland
    0.739594
## CountryFrance
    0.794672
## CountryGabon
    0.327168
## CountryGambia
    0.974147
## CountryGeorgia
    0.872733
## CountryGermany
    0.895121
## CountryGhana
    0.968185
## CountryGreece
    0.519650
## CountryGrenada
    0.567097
## CountryGuatemala
    0.409655
## CountryGuinea
    0.731670
## CountryGuinea-Bissau
    0.819896
## CountryGuyana
    0.898199
## CountryHaiti
    6.26e-05
## CountryHonduras
    0.962257
## CountryHungary
    0.940227
## CountryIceland
    0.148923
## CountryIndia
    0.955649
## CountryIndonesia
    0.924084
## CountryIran (Islamic Republic of)
    0.915713
## CountryIraq
    0.087686
```

---

```
## CountryIreland
    0.453420
## CountryIsrael
    0.798466
## CountryItaly
    0.600322
## CountryJamaica
    0.945095
## CountryJapan
    0.866132
## CountryJordan
    0.908365
## CountryKazakhstan
    0.725660
## CountryKenya
    0.719480
## CountryKiribati
    0.908019
## CountryKuwait
    0.851361
## CountryKyrgyzstan
    0.182564
## CountryLao People's Democratic Republic
    0.151578
## CountryLatvia
    0.014900
## CountryLebanon
    0.908950
## CountryLesotho
    0.725920
## CountryLiberia
    0.398824
## CountryLibya
    0.274009
## CountryLithuania
    0.498180
## CountryLuxembourg
    0.868014
## CountryMadagascar
    0.013577
## CountryMalawi
    0.856486
## CountryMalaysia
    0.944284
```

---

## CountryMaldives	0.304273
## CountryMali	0.671138
## CountryMalta	0.940264
## CountryMarshall Islands	0.663401
## CountryMauritania	0.316850
## CountryMauritius	0.941019
## CountryMexico	0.797729
## CountryMicronesia (Federated States of)	0.883753
## CountryMonaco	0.108125
## CountryMongolia	0.982838
## CountryMontenegro	0.919038
## CountryMorocco	0.419293
## CountryMozambique	0.294615
## CountryMyanmar	0.876810
## CountryNamibia	0.638620
## CountryNauru	0.000153
## CountryNepal	0.761205
## CountryNetherlands	0.973920
## CountryNew Zealand	0.858248
## CountryNicaragua	0.778362
## CountryNiger	0.036876
## CountryNigeria	0.433692

---

```
## CountryNiue
    0.132130
## CountryNorway
    0.706724
## CountryOman
    0.975244
## CountryPakistan
    0.933881
## CountryPalau
    0.893058
## CountryPanama
    0.850699
## CountryPapua New Guinea
    0.889548
## CountryParaguay
    0.362955
## CountryPeru
    0.887354
## CountryPhilippines
    0.853121
## CountryPoland
    0.926763
## CountryPortugal
    0.719668
## CountryQatar
    0.853627
## CountryRepublic of Korea
    0.936942
## CountryRepublic of Moldova
    0.303365
## CountryRomania
    0.527076
## CountryRussian Federation
    0.979751
## CountryRwanda
    0.146408
## CountrySaint Kitts and Nevis
    0.914661
## CountrySaint Lucia
    0.974641
## CountrySaint Vincent and the Grenadines
    0.527633
## CountrySamoa
    0.683511
```



---

```
## CountrySan Marino
    0.474992
## CountrySao Tome and Principe
    0.779116
## CountrySaudi Arabia
    0.862944
## CountrySenegal
    0.491674
## CountrySerbia
    0.837569
## CountrySeychelles
    0.928638
## CountrySierra Leone
    0.419659
## CountrySingapore
    0.454088
## CountrySlovakia
    0.996446
## CountrySlovenia
    0.669170
## CountrySolomon Islands
    0.904451
## CountrySomalia
    0.761010
## CountrySouth Africa
    0.083024
## CountrySouth Sudan
    0.865093
## CountrySpain
    0.439278
## CountrySri Lanka
    0.714812
## CountrySudan
    0.296482
## CountrySuriname
    0.134853
## CountrySwaziland
    0.332545
## CountrySweden
    0.773253
## CountrySwitzerland
    0.478481
## CountrySyrian Arab Republic
    0.180064
```

---

```
## CountryTajikistan
    0.993822
## CountryThailand
    0.854141
## CountryThe former Yugoslav republic of Macedonia
    0.962072
## CountryTimor-Leste
    0.656174
## CountryTogo
    0.890737
## CountryTonga
    0.861679
## CountryTrinidad and Tobago
    0.485192
## CountryTunisia
    0.870451
## CountryTurkey
    0.534125
## CountryTurkmenistan
    0.892394
## CountryTuvalu
    0.658641
## CountryUganda
    0.360510
## CountryUkraine
    0.928255
## CountryUnited Arab Emirates
    0.925144
## CountryUnited Kingdom of Great Britain and Northern Ireland
    0.723109
## CountryUnited Republic of Tanzania
    0.402682
## CountryUnited States of America
    0.887383
## CountryUruguay
    0.857513
## CountryUzbekistan
    0.887573
## CountryVanuatu
    0.324967
## CountryVenezuela (Bolivarian Republic of)
    0.827441
## CountryViet Nam
    0.986773
```

---

```

## CountryYemen
    0.334449
## CountryZambia
    0.506792
## CountryZimbabwe
    0.010762
## Year
    0.774936
## HIV.AIDS
    0.048263
## Schooling
    0.971352
## Diphtheria
    0.107683
## Adult.Mortality
    0.676923
## Measles
    0.827220
## Alcohol
    0.930173
## Polio
    0.022944
## thinness.5.9.years
    0.734498
## Total.expenditure
    0.873624
## percentage.expenditure
    0.946497
## CountryAlbania:Year
    0.528861
## CountryAlgeria:Year
    0.995137
## CountryAngola:Year
    0.185118
## CountryAntigua and Barbuda:Year
    0.922624
## CountryArgentina:Year
    0.973581
## CountryArmenia:Year
    0.936834
## CountryAustralia:Year
    0.830789
## CountryAustria:Year
    0.979211

```

---

```
## CountryAzerbaijan:Year
    0.282720
## CountryBahamas:Year
    0.804432
## CountryBahrain:Year
    0.922991
## CountryBangladesh:Year
    0.484875
## CountryBarbados:Year
    0.930543
## CountryBelarus:Year
    0.741230
## CountryBelgium:Year
    0.788195
## CountryBelize:Year
    0.897769
## CountryBenin:Year
    0.975435
## CountryBhutan:Year
    0.960559
## CountryBolivia (Plurinational State of):Year
    0.094922
## CountryBosnia and Herzegovina:Year
    0.744617
## CountryBotswana:Year
    0.717358
## CountryBrazil:Year
    0.403373
## CountryBrunei Darussalam:Year
    0.646241
## CountryBulgaria:Year
    0.964851
## CountryBurkina Faso:Year
    0.906570
## CountryBurundi:Year
    0.956460
## CountryCabo Verde:Year
    0.858745
## CountryCambodia:Year
    0.989143
## CountryCameroon:Year
    0.896497
## CountryCanada:Year
    0.568165
```

---

```
## CountryCentral African Republic:Year
    0.896309
## CountryChad:Year
    0.320807
## CountryChile:Year
    0.906723
## CountryChina:Year
    0.823776
## CountryColombia:Year
    0.934237
## CountryComoros:Year
    0.197838
## CountryCongo:Year
    0.470562
## CountryCook Islands:Year
    NA
## CountryCosta Rica:Year
    0.938037
## CountryCôte d'Ivoire:Year
    0.374233
## CountryCroatia:Year
    0.874333
## CountryCuba:Year
    0.871605
## CountryCyprus:Year
    0.997275
## CountryCzechia:Year
    0.980753
## CountryDemocratic People's Republic of Korea:Year
    0.729636
## CountryDemocratic Republic of the Congo:Year
    0.817031
## CountryDenmark:Year
    0.781447
## CountryDjibouti:Year
    0.027205
## CountryDominica:Year
    NA
## CountryDominican Republic:Year
    0.144884
## CountryEcuador:Year
    0.997117
## CountryEgypt:Year
    0.555882
```

---

```
## CountryEl Salvador:Year
    0.983915
## CountryEquatorial Guinea:Year
    0.939386
## CountryEritrea:Year
    0.106287
## CountryEstonia:Year
    0.261418
## CountryEthiopia:Year
    0.857511
## CountryFiji:Year
    0.903306
## CountryFinland:Year
    0.669202
## CountryFrance:Year
    0.758063
## CountryGabon:Year
    0.337482
## CountryGambia:Year
    0.991214
## CountryGeorgia:Year
    0.873540
## CountryGermany:Year
    0.827501
## CountryGhana:Year
    0.969919
## CountryGreece:Year
    0.501077
## CountryGrenada:Year
    0.501135
## CountryGuatemala:Year
    0.369159
## CountryGuinea:Year
    0.734172
## CountryGuinea-Bissau:Year
    0.820595
## CountryGuyana:Year
    0.895063
## CountryHaiti:Year
    9.98e-05
## CountryHonduras:Year
    0.967445
## CountryHungary:Year
    0.931754
```

---

```
## CountryIceland:Year
    0.140226
## CountryIndia:Year
    0.951096
## CountryIndonesia:Year
    0.926487
## CountryIran (Islamic Republic of):Year
    0.914762
## CountryIraq:Year
    0.218405
## CountryIreland:Year
    0.428755
## CountryIsrael:Year
    0.758496
## CountryItaly:Year
    0.573623
## CountryJamaica:Year
    0.951140
## CountryJapan:Year
    0.871399
## CountryJordan:Year
    0.915748
## CountryKazakhstan:Year
    0.720986
## CountryKenya:Year
    0.725121
## CountryKiribati:Year
    0.911982
## CountryKuwait:Year
    0.858954
## CountryKyrgyzstan:Year
    0.196285
## CountryLao People's Democratic Republic:Year
    0.150260
## CountryLatvia:Year
    0.017320
## CountryLebanon:Year
    0.922916
## CountryLesotho:Year
    0.736823
## CountryLiberia:Year
    0.412199
## CountryLibya:Year
    0.313163
```

---

```
## CountryLithuania:Year
    0.501993
## CountryLuxembourg:Year
    0.860209
## CountryMadagascar:Year
    0.017056
## CountryMalawi:Year
    0.856675
## CountryMalaysia:Year
    0.946171
## CountryMaldives:Year
    0.298292
## CountryMali:Year
    0.672617
## CountryMalta:Year
    0.930539
## CountryMarshall Islands:Year
    NA
## CountryMauritania:Year
    0.314266
## CountryMauritius:Year
    0.933353
## CountryMexico:Year
    0.799259
## CountryMicronesia (Federated States of):Year
    0.887160
## CountryMonaco:Year
    NA
## CountryMongolia:Year
    0.974692
## CountryMontenegro:Year
    0.925393
## CountryMorocco:Year
    0.418794
## CountryMozambique:Year
    0.291446
## CountryMyanmar:Year
    0.952346
## CountryNamibia:Year
    0.653052
## CountryNauru:Year
    NA
## CountryNepal:Year
    0.759471
```



---

```
## CountryNetherlands:Year
    0.958125
## CountryNew Zealand:Year
    0.837461
## CountryNicaragua:Year
    0.768056
## CountryNiger:Year
    0.035264
## CountryNigeria:Year
    0.426996
## CountryNiue:Year
    NA
## CountryNorway:Year
    0.678586
## CountryOman:Year
    0.988392
## CountryPakistan:Year
    0.937038
## CountryPalau:Year
    NA
## CountryPanama:Year
    0.863814
## CountryPapua New Guinea:Year
    0.852669
## CountryParaguay:Year
    0.358214
## CountryPeru:Year
    0.885980
## CountryPhilippines:Year
    0.865816
## CountryPoland:Year
    0.927334
## CountryPortugal:Year
    0.762143
## CountryQatar:Year
    0.860440
## CountryRepublic of Korea:Year
    0.910541
## CountryRepublic of Moldova:Year
    0.306121
## CountryRomania:Year
    0.538227
## CountryRussian Federation:Year
    0.997832
```

---

```
## CountryRwanda:Year
    0.151351
## CountrySaint Kitts and Nevis:Year
    NA
## CountrySaint Lucia:Year
    0.974063
## CountrySaint Vincent and the Grenadines:Year
    0.633875
## CountrySamoa:Year
    0.699068
## CountrySan Marino:Year
    NA
## CountrySao Tome and Principe:Year
    0.781739
## CountrySaudi Arabia:Year
    0.865853
## CountrySenegal:Year
    0.489289
## CountrySerbia:Year
    0.840303
## CountrySeychelles:Year
    0.934859
## CountrySierra Leone:Year
    0.417562
## CountrySingapore:Year
    0.480594
## CountrySlovakia:Year
    0.988209
## CountrySlovenia:Year
    0.635141
## CountrySolomon Islands:Year
    0.910635
## CountrySomalia:Year
    0.769014
## CountrySouth Africa:Year
    0.110401
## CountrySouth Sudan:Year
    0.868584
## CountrySpain:Year
    0.414737
## CountrySri Lanka:Year
    0.655248
## CountrySudan:Year
    0.281542
```

---

```

## CountrySuriname:Year
    0.133040
## CountrySwaziland:Year
    0.334610
## CountrySweden:Year
    0.581835
## CountrySwitzerland:Year
    0.564719
## CountrySyrian Arab Republic:Year
    0.172865
## CountryTajikistan:Year
    0.991940
## CountryThailand:Year
    0.846385
## CountryThe former Yugoslav republic of Macedonia:Year
    0.968115
## CountryTimor-Leste:Year
    0.654173
## CountryTogo:Year
    0.891403
## CountryTonga:Year
    0.870156
## CountryTrinidad and Tobago:Year
    0.524317
## CountryTunisia:Year
    0.878858
## CountryTurkey:Year
    0.524514
## CountryTurkmenistan:Year
    0.882953
## CountryTuvalu:Year
    NA
## CountryUganda:Year
    0.361494
## CountryUkraine:Year
    0.935811
## CountryUnited Arab Emirates:Year
    0.930018
## CountryUnited Kingdom of Great Britain and Northern Ireland:Year
    0.677593
## CountryUnited Republic of Tanzania:Year
    0.403071
## CountryUnited States of America:Year
    0.893429

```

---

```

## CountryUruguay:Year
    0.866650
## CountryUzbekistan:Year
    0.898562
## CountryVanuatu:Year
    0.361924
## CountryVenezuela (Bolivarian Republic of):Year
    0.837462
## CountryViet Nam:Year
    0.988360
## CountryYemen:Year
    0.419423
## CountryZambia:Year
    0.594776
## CountryZimbabwe:Year
    0.011671
## CountryAlbania:HIV.AIDS
    NA
## CountryAlgeria:HIV.AIDS
    NA
## CountryAngola:HIV.AIDS
    0.025890
## CountryAntigua and Barbuda:HIV.AIDS
    0.976342
## CountryArgentina:HIV.AIDS
    NA
## CountryArmenia:HIV.AIDS
    NA
## CountryAustralia:HIV.AIDS
    NA
## CountryAustria:HIV.AIDS
    NA
## CountryAzerbaijan:HIV.AIDS
    NA
## CountryBahamas:HIV.AIDS
    0.966030
## CountryBahrain:HIV.AIDS
    NA
## CountryBangladesh:HIV.AIDS
    NA
## CountryBarbados:HIV.AIDS
    0.818073
## CountryBelarus:HIV.AIDS
    NA

```

---

```
## CountryBelgium:HIV.AIDS
    NA
## CountryBelize:HIV.AIDS
    0.592035
## CountryBenin:HIV.AIDS
    0.982061
## CountryBhutan:HIV.AIDS
    0.884807
## CountryBolivia (Plurinational State of):HIV.AIDS
    0.140747
## CountryBosnia and Herzegovina:HIV.AIDS
    NA
## CountryBotswana:HIV.AIDS
    0.017948
## CountryBrazil:HIV.AIDS
    NA
## CountryBrunei Darussalam:HIV.AIDS
    NA
## CountryBulgaria:HIV.AIDS
    NA
## CountryBurkina Faso:HIV.AIDS
    0.844933
## CountryBurundi:HIV.AIDS
    0.883932
## CountryCabo Verde:HIV.AIDS
    0.078875
## CountryCambodia:HIV.AIDS
    0.899071
## CountryCameroon:HIV.AIDS
    0.450883
## CountryCanada:HIV.AIDS
    NA
## CountryCentral African Republic:HIV.AIDS
    0.029733
## CountryChad:HIV.AIDS
    0.842228
## CountryChile:HIV.AIDS
    NA
## CountryChina:HIV.AIDS
    NA
## CountryColombia:HIV.AIDS
    NA
## CountryComoros:HIV.AIDS
    0.164054
```

---

```
## CountryCongo:HIV.AIDS
    0.062003
## CountryCook Islands:HIV.AIDS
    NA
## CountryCosta Rica:HIV.AIDS
    NA
## CountryCôte d'Ivoire:HIV.AIDS
    0.092985
## CountryCroatia:HIV.AIDS
    NA
## CountryCuba:HIV.AIDS
    NA
## CountryCyprus:HIV.AIDS
    NA
## CountryCzechia:HIV.AIDS
    NA
## CountryDemocratic People's Republic of Korea:HIV.AIDS
    NA
## CountryDemocratic Republic of the Congo:HIV.AIDS
    0.925902
## CountryDenmark:HIV.AIDS
    NA
## CountryDjibouti:HIV.AIDS
    0.839462
## CountryDominica:HIV.AIDS
    NA
## CountryDominican Republic:HIV.AIDS
    0.160483
## CountryEcuador:HIV.AIDS
    0.851858
## CountryEgypt:HIV.AIDS
    NA
## CountryEl Salvador:HIV.AIDS
    0.326026
## CountryEquatorial Guinea:HIV.AIDS
    0.301438
## CountryEritrea:HIV.AIDS
    0.051677
## CountryEstonia:HIV.AIDS
    NA
## CountryEthiopia:HIV.AIDS
    0.402078
## CountryFiji:HIV.AIDS
    NA
```

---

```
## CountryFinland:HIV.AIDS
      NA
## CountryFrance:HIV.AIDS
      NA
## CountryGabon:HIV.AIDS
      0.347565
## CountryGambia:HIV.AIDS
      0.895840
## CountryGeorgia:HIV.AIDS
      NA
## CountryGermany:HIV.AIDS
      NA
## CountryGhana:HIV.AIDS
      0.000293
## CountryGreece:HIV.AIDS
      NA
## CountryGrenada:HIV.AIDS
      NA
## CountryGuatemala:HIV.AIDS
      0.242981
## CountryGuinea:HIV.AIDS
      0.915424
## CountryGuinea-Bissau:HIV.AIDS
      0.933853
## CountryGuyana:HIV.AIDS
      0.447434
## CountryHaiti:HIV.AIDS
      2.35e-09
## CountryHonduras:HIV.AIDS
      0.770883
## CountryHungary:HIV.AIDS
      NA
## CountryIceland:HIV.AIDS
      NA
## CountryIndia:HIV.AIDS
      0.962403
## CountryIndonesia:HIV.AIDS
      0.914119
## CountryIran (Islamic Republic of):HIV.AIDS
      NA
## CountryIraq:HIV.AIDS
      NA
## CountryIreland:HIV.AIDS
      NA
```

---

```
## CountryIsrael:HIV.AIDS
    NA
## CountryItaly:HIV.AIDS
    NA
## CountryJamaica:HIV.AIDS
    0.677670
## CountryJapan:HIV.AIDS
    NA
## CountryJordan:HIV.AIDS
    NA
## CountryKazakhstan:HIV.AIDS
    NA
## CountryKenya:HIV.AIDS
    0.719117
## CountryKiribati:HIV.AIDS
    NA
## CountryKuwait:HIV.AIDS
    NA
## CountryKyrgyzstan:HIV.AIDS
    0.051231
## CountryLao People's Democratic Republic:HIV.AIDS
    0.042344
## CountryLatvia:HIV.AIDS
    NA
## CountryLebanon:HIV.AIDS
    NA
## CountryLesotho:HIV.AIDS
    0.008162
## CountryLiberia:HIV.AIDS
    0.161412
## CountryLibya:HIV.AIDS
    NA
## CountryLithuania:HIV.AIDS
    NA
## CountryLuxembourg:HIV.AIDS
    NA
## CountryMadagascar:HIV.AIDS
    0.471973
## CountryMalawi:HIV.AIDS
    0.093946
## CountryMalaysia:HIV.AIDS
    NA
## CountryMaldives:HIV.AIDS
    NA
```



---

```
## CountryMali:HIV.AIDS
    0.835450
## CountryMalta:HIV.AIDS
    NA
## CountryMarshall Islands:HIV.AIDS
    NA
## CountryMauritania:HIV.AIDS
    0.671402
## CountryMauritius:HIV.AIDS
    0.965688
## CountryMexico:HIV.AIDS
    NA
## CountryMicronesia (Federated States of):HIV.AIDS
    NA
## CountryMonaco:HIV.AIDS
    NA
## CountryMongolia:HIV.AIDS
    NA
## CountryMontenegro:HIV.AIDS
    NA
## CountryMorocco:HIV.AIDS
    NA
## CountryMozambique:HIV.AIDS
    0.770092
## CountryMyanmar:HIV.AIDS
    0.244339
## CountryNamibia:HIV.AIDS
    0.005361
## CountryNauru:HIV.AIDS
    NA
## CountryNepal:HIV.AIDS
    0.796225
## CountryNetherlands:HIV.AIDS
    NA
## CountryNew Zealand:HIV.AIDS
    NA
## CountryNicaragua:HIV.AIDS
    0.332836
## CountryNiger:HIV.AIDS
    0.434729
## CountryNigeria:HIV.AIDS
    0.472435
## CountryNiue:HIV.AIDS
    NA
```

```
## CountryNorway:HIV.AIDS
    NA
## CountryOman:HIV.AIDS
    NA
## CountryPakistan:HIV.AIDS
    NA
## CountryPalau:HIV.AIDS
    NA
## CountryPanama:HIV.AIDS
    0.986626
## CountryPapua New Guinea:HIV.AIDS
    0.118551
## CountryParaguay:HIV.AIDS
    0.030292
## CountryPeru:HIV.AIDS
    0.968561
## CountryPhilippines:HIV.AIDS
    NA
## CountryPoland:HIV.AIDS
    NA
## CountryPortugal:HIV.AIDS
    NA
## CountryQatar:HIV.AIDS
    NA
## CountryRepublic of Korea:HIV.AIDS
    NA
## CountryRepublic of Moldova:HIV.AIDS
    NA
## CountryRomania:HIV.AIDS
    NA
## CountryRussian Federation:HIV.AIDS
    0.500992
## CountryRwanda:HIV.AIDS
    0.607072
## CountrySaint Kitts and Nevis:HIV.AIDS
    NA
## CountrySaint Lucia:HIV.AIDS
    0.915622
## CountrySaint Vincent and the Grenadines:HIV.AIDS
    0.680930
## CountrySamoa:HIV.AIDS
    NA
## CountrySan Marino:HIV.AIDS
    NA
```

---

```
## CountrySao Tome and Principe:HIV.AIDS
    0.897437
## CountrySaudi Arabia:HIV.AIDS
    NA
## CountrySenegal:HIV.AIDS
    0.877075
## CountrySerbia:HIV.AIDS
    NA
## CountrySeychelles:HIV.AIDS
    NA
## CountrySierra Leone:HIV.AIDS
    0.559859
## CountrySingapore:HIV.AIDS
    NA
## CountrySlovakia:HIV.AIDS
    NA
## CountrySlovenia:HIV.AIDS
    NA
## CountrySolomon Islands:HIV.AIDS
    NA
## CountrySomalia:HIV.AIDS
    0.063810
## CountrySouth Africa:HIV.AIDS
    3.60e-05
## CountrySouth Sudan:HIV.AIDS
    0.377190
## CountrySpain:HIV.AIDS
    NA
## CountrySri Lanka:HIV.AIDS
    NA
## CountrySudan:HIV.AIDS
    0.516001
## CountrySuriname:HIV.AIDS
    0.008759
## CountrySwaziland:HIV.AIDS
    0.052690
## CountrySweden:HIV.AIDS
    NA
## CountrySwitzerland:HIV.AIDS
    NA
## CountrySyrian Arab Republic:HIV.AIDS
    NA
## CountryTajikistan:HIV.AIDS
    0.959918
```

---

```

## CountryThailand:HIV.AIDS
    0.833068
## CountryThe former Yugoslav republic of Macedonia:HIV.AIDS
    NA
## CountryTimor-Leste:HIV.AIDS
    NA
## CountryTogo:HIV.AIDS
    0.417153
## CountryTonga:HIV.AIDS
    NA
## CountryTrinidad and Tobago:HIV.AIDS
    0.929684
## CountryTunisia:HIV.AIDS
    NA
## CountryTurkey:HIV.AIDS
    NA
## CountryTurkmenistan:HIV.AIDS
    NA
## CountryTuvalu:HIV.AIDS
    NA
## CountryUganda:HIV.AIDS
    0.047423
## CountryUkraine:HIV.AIDS
    0.825114
## CountryUnited Arab Emirates:HIV.AIDS
    NA
## CountryUnited Kingdom of Great Britain and Northern Ireland:HIV.AIDS
    NA
## CountryUnited Republic of Tanzania:HIV.AIDS
    0.027617
## CountryUnited States of America:HIV.AIDS
    NA
## CountryUruguay:HIV.AIDS
    NA
## CountryUzbekistan:HIV.AIDS
    0.864972
## CountryVanuatu:HIV.AIDS
    NA
## CountryVenezuela (Bolivarian Republic of):HIV.AIDS
    NA
## CountryViet Nam:HIV.AIDS
    0.987327
## CountryYemen:HIV.AIDS
    NA

```

---

```

## CountryZambia:HIV.AIDS
    0.792066
## CountryZimbabwe:HIV.AIDS
    NA
## CountryAlbania:Schooling
    0.995059
## CountryAlgeria:Schooling
    0.990456
## CountryAngola:Schooling
    0.442564
## CountryAntigua and Barbuda:Schooling
    0.972761
## CountryArgentina:Schooling
    0.837409
## CountryArmenia:Schooling
    0.981955
## CountryAustralia:Schooling
    0.742772
## CountryAustria:Schooling
    0.863657
## CountryAzerbaijan:Schooling
    0.723261
## CountryBahamas:Schooling
    0.811736
## CountryBahrain:Schooling
    0.961205
## CountryBangladesh:Schooling
    0.337374
## CountryBarbados:Schooling
    0.969646
## CountryBelarus:Schooling
    0.784707
## CountryBelgium:Schooling
    0.772674
## CountryBelize:Schooling
    0.961362
## CountryBenin:Schooling
    0.979393
## CountryBhutan:Schooling
    0.957420
## CountryBolivia (Plurinational State of):Schooling
    0.232211
## CountryBosnia and Herzegovina:Schooling
    0.985632

```

---

```
## CountryBotswana:Schooling
    0.950476
## CountryBrazil:Schooling
    0.737635
## CountryBrunei Darussalam:Schooling
    0.798584
## CountryBulgaria:Schooling
    0.898702
## CountryBurkina Faso:Schooling
    0.809652
## CountryBurundi:Schooling
    0.984641
## CountryCabo Verde:Schooling
    0.819391
## CountryCambodia:Schooling
    0.650761
## CountryCameroon:Schooling
    0.985982
## CountryCanada:Schooling
    0.046950
## CountryCentral African Republic:Schooling
    0.009572
## CountryChad:Schooling
    0.319938
## CountryChile:Schooling
    0.659753
## CountryChina:Schooling
    0.940068
## CountryColombia:Schooling
    0.863326
## CountryComoros:Schooling
    0.629845
## CountryCongo:Schooling
    0.396296
## CountryCook Islands:Schooling
    NA
## CountryCosta Rica:Schooling
    0.989974
## CountryCôte d'Ivoire:Schooling
    NA
## CountryCroatia:Schooling
    0.864861
## CountryCuba:Schooling
    0.934800
```

---

```

## CountryCyprus:Schooling
    0.920355
## CountryCzechia:Schooling
    NA
## CountryDemocratic People's Republic of Korea:Schooling
    NA
## CountryDemocratic Republic of the Congo:Schooling
    NA
## CountryDenmark:Schooling
    0.725157
## CountryDjibouti:Schooling
    0.020590
## CountryDominica:Schooling
    NA
## CountryDominican Republic:Schooling
    0.370804
## CountryEcuador:Schooling
    0.828077
## CountryEgypt:Schooling
    0.350157
## CountryEl Salvador:Schooling
    0.615565
## CountryEquatorial Guinea:Schooling
    0.977686
## CountryEritrea:Schooling
    0.076684
## CountryEstonia:Schooling
    0.105448
## CountryEthiopia:Schooling
    0.891230
## CountryFiji:Schooling
    0.969288
## CountryFinland:Schooling
    0.974755
## CountryFrance:Schooling
    0.002747
## CountryGabon:Schooling
    0.915600
## CountryGambia:Schooling
    0.531635
## CountryGeorgia:Schooling
    0.924515
## CountryGermany:Schooling
    0.919459

```

---

```
## CountryGhana:Schooling
    0.183836
## CountryGreece:Schooling
    0.381062
## CountryGrenada:Schooling
    0.068152
## CountryGuatemala:Schooling
    0.003481
## CountryGuinea:Schooling
    0.989130
## CountryGuinea-Bissau:Schooling
    0.878000
## CountryGuyana:Schooling
    0.989438
## CountryHaiti:Schooling
    0.641833
## CountryHonduras:Schooling
    0.940939
## CountryHungary:Schooling
    0.996461
## CountryIceland:Schooling
    0.034364
## CountryIndia:Schooling
    0.968943
## CountryIndonesia:Schooling
    0.993308
## CountryIran (Islamic Republic of):Schooling
    0.641965
## CountryIraq:Schooling
    0.073671
## CountryIreland:Schooling
    0.093396
## CountryIsrael:Schooling
    0.600934
## CountryItaly:Schooling
    0.697248
## CountryJamaica:Schooling
    0.990453
## CountryJapan:Schooling
    0.923892
## CountryJordan:Schooling
    0.962429
## CountryKazakhstan:Schooling
    0.766221
```



---

```
## CountryKenya:Schooling
    0.797697
## CountryKiribati:Schooling
    0.980602
## CountryKuwait:Schooling
    0.967634
## CountryKyrgyzstan:Schooling
    0.774582
## CountryLao People's Democratic Republic:Schooling
    0.144417
## CountryLatvia:Schooling
    0.984739
## CountryLebanon:Schooling
    0.998669
## CountryLesotho:Schooling
    0.632874
## CountryLiberia:Schooling
    0.048229
## CountryLibya:Schooling
    0.255090
## CountryLithuania:Schooling
    0.565427
## CountryLuxembourg:Schooling
    0.025024
## CountryMadagascar:Schooling
    0.218734
## CountryMalawi:Schooling
    0.972869
## CountryMalaysia:Schooling
    0.996668
## CountryMaldives:Schooling
    0.618282
## CountryMali:Schooling
    0.749526
## CountryMalta:Schooling
    0.830625
## CountryMarshall Islands:Schooling
    NA
## CountryMauritania:Schooling
    0.292461
## CountryMauritius:Schooling
    0.800215
## CountryMexico:Schooling
    0.781231
```

---

```
## CountryMicronesia (Federated States of):Schooling
    0.957192
```

```
## CountryMonaco:Schooling
    NA
```

```
## CountryMongolia:Schooling
    0.977008
```

```
## CountryMontenegro:Schooling
    0.966149
```

```
## CountryMorocco:Schooling
    0.575385
```

```
## CountryMozambique:Schooling
    0.373765
```

```
## CountryMyanmar:Schooling
    0.513546
```

```
## CountryNamibia:Schooling
    0.790428
```

```
## CountryNauru:Schooling
    NA
```

```
## CountryNepal:Schooling
    0.942854
```

```
## CountryNetherlands:Schooling
    0.856387
```

```
## CountryNew Zealand:Schooling
    0.244240
```

```
## CountryNicaragua:Schooling
    0.511927
```

```
## CountryNiger:Schooling
    0.000402
```

```
## CountryNigeria:Schooling
    0.345246
```

```
## CountryNiue:Schooling
    NA
```

```
## CountryNorway:Schooling
    0.582263
```

```
## CountryOman:Schooling
    0.977600
```

```
## CountryPakistan:Schooling
    0.965590
```

```
## CountryPalau:Schooling
    NA
```

```
## CountryPanama:Schooling
    0.794467
```

```
## CountryPapua New Guinea:Schooling
    0.397104
```

---

```
## CountryParaguay:Schooling
    0.137490
## CountryPeru:Schooling
    0.627479
## CountryPhilippines:Schooling
    0.872567
## CountryPoland:Schooling
    0.972513
## CountryPortugal:Schooling
    0.578955
## CountryQatar:Schooling
    0.974559
## CountryRepublic of Korea:Schooling
    NA
## CountryRepublic of Moldova:Schooling
    NA
## CountryRomania:Schooling
    0.984082
## CountryRussian Federation:Schooling
    0.912588
## CountryRwanda:Schooling
    0.079072
## CountrySaint Kitts and Nevis:Schooling
    NA
## CountrySaint Lucia:Schooling
    0.959544
## CountrySaint Vincent and the Grenadines:Schooling
    0.000372
## CountrySamoa:Schooling
    0.650279
## CountrySan Marino:Schooling
    NA
## CountrySao Tome and Principe:Schooling
    0.960137
## CountrySaudi Arabia:Schooling
    0.995455
## CountrySenegal:Schooling
    0.582397
## CountrySerbia:Schooling
    0.881121
## CountrySeychelles:Schooling
    0.896744
## CountrySierra Leone:Schooling
    0.415788
```

---

```
## CountrySingapore:Schooling
    0.360743
## CountrySlovakia:Schooling
    0.929311
## CountrySlovenia:Schooling
    0.788410
## CountrySolomon Islands:Schooling
    0.997123
## CountrySomalia:Schooling
    NA
## CountrySouth Africa:Schooling
    0.007349
## CountrySouth Sudan:Schooling
    0.962966
## CountrySpain:Schooling
    0.181566
## CountrySri Lanka:Schooling
    0.521491
## CountrySudan:Schooling
    0.007845
## CountrySuriname:Schooling
    0.037456
## CountrySwaziland:Schooling
    0.797662
## CountrySweden:Schooling
    0.513994
## CountrySwitzerland:Schooling
    0.205143
## CountrySyrian Arab Republic:Schooling
    0.106629
## CountryTajikistan:Schooling
    0.725655
## CountryThailand:Schooling
    0.998534
## CountryThe former Yugoslav republic of Macedonia:Schooling
    0.977910
## CountryTimor-Leste:Schooling
    0.969273
## CountryTogo:Schooling
    0.957642
## CountryTonga:Schooling
    0.957091
## CountryTrinidad and Tobago:Schooling
    0.186928
```

---

```

## CountryTunisia:Schooling
    0.947319
## CountryTurkey:Schooling
    0.514136
## CountryTurkmenistan:Schooling
    0.940475
## CountryTuvalu:Schooling
    NA
## CountryUganda:Schooling
    0.711433
## CountryUkraine:Schooling
    0.921829
## CountryUnited Arab Emirates:Schooling
    0.966633
## CountryUnited Kingdom of Great Britain and Northern Ireland:Schooling
    NA
## CountryUnited Republic of Tanzania:Schooling
    NA
## CountryUnited States of America:Schooling
    NA
## CountryUruguay:Schooling
    0.982501
## CountryUzbekistan:Schooling
    0.932227
## CountryVanuatu:Schooling
    0.588531
## CountryVenezuela (Bolivarian Republic of):Schooling
    0.984499
## CountryViet Nam:Schooling
    0.991602
## CountryYemen:Schooling
    0.915057
## CountryZambia:Schooling
    0.075956
## CountryZimbabwe:Schooling
    0.301949
## CountryAlbania:Diphtheria
    0.701874
## CountryAlgeria:Diphtheria
    0.914940
## CountryAngola:Diphtheria
    0.261319
## CountryAntigua and Barbuda:Diphtheria
    0.866272

```

---

```

## CountryArgentina:Diphtheria
    0.698588
## CountryArmenia:Diphtheria
    0.161420
## CountryAustralia:Diphtheria
    0.423242
## CountryAustria:Diphtheria
    4.21e-05
## CountryAzerbaijan:Diphtheria
    0.001046
## CountryBahamas:Diphtheria
    0.991785
## CountryBahrain:Diphtheria
    0.959269
## CountryBangladesh:Diphtheria
    0.977524
## CountryBarbados:Diphtheria
    0.651789
## CountryBelarus:Diphtheria
    0.151975
## CountryBelgium:Diphtheria
    0.711148
## CountryBelize:Diphtheria
    0.837654
## CountryBenin:Diphtheria
    0.154795
## CountryBhutan:Diphtheria
    0.902386
## CountryBolivia (Plurinational State of):Diphtheria
    0.154692
## CountryBosnia and Herzegovina:Diphtheria
    0.103780
##

## (Intercept)

## CountryAlbania

## CountryAlgeria

## CountryAngola

## CountryAntigua and Barbuda

```

---

## CountryArgentina

## CountryArmenia

## CountryAustralia

## CountryAustria

## CountryAzerbaijan

## CountryBahamas

## CountryBahrain

## CountryBangladesh

## CountryBarbados

## CountryBelarus

## CountryBelgium

## CountryBelize

## CountryBenin

## CountryBhutan

## CountryBolivia (Plurinational State of)

## CountryBosnia and Herzegovina

## CountryBotswana

## CountryBrazil

## CountryBrunei Darussalam

## CountryBulgaria

## CountryBurkina Faso

## CountryBurundi

---

## CountryCabo Verde

## CountryCambodia

## CountryCameroon

## CountryCanada

## CountryCentral African Republic

## CountryChad

## CountryChile

## CountryChina

## CountryColombia

## CountryComoros

## CountryCongo

## CountryCook Islands

## CountryCosta Rica

## CountryCôte d'Ivoire

## CountryCroatia

## CountryCuba

## CountryCyprus

## CountryCzechia

## CountryDemocratic People's Republic of Korea

## CountryDemocratic Republic of the Congo

## CountryDenmark

## CountryDjibouti

\*



---

## CountryDominica

## CountryDominican Republic

## CountryEcuador

## CountryEgypt

## CountryEl Salvador

## CountryEquatorial Guinea

## CountryEritrea

## CountryEstonia

## CountryEthiopia

## CountryFiji

## CountryFinland

## CountryFrance

## CountryGabon

## CountryGambia

## CountryGeorgia

## CountryGermany

## CountryGhana

## CountryGreece

## CountryGrenada

## CountryGuatemala

## CountryGuinea

## CountryGuinea-Bissau

---

```
## CountryGuyana

## CountryHaiti
    ***

## CountryHonduras

## CountryHungary

## CountryIceland

## CountryIndia

## CountryIndonesia

## CountryIran (Islamic Republic of)

## CountryIraq
    .

## CountryIreland

## CountryIsrael

## CountryItaly

## CountryJamaica

## CountryJapan

## CountryJordan

## CountryKazakhstan

## CountryKenya

## CountryKiribati

## CountryKuwait

## CountryKyrgyzstan

## CountryLao People's Democratic Republic

## CountryLatvia
    *
```

---

## CountryLebanon

## CountryLesotho

## CountryLiberia

## CountryLibya

## CountryLithuania

## CountryLuxembourg

## CountryMadagascar  
\*

## CountryMalawi

## CountryMalaysia

## CountryMaldives

## CountryMali

## CountryMalta

## CountryMarshall Islands

## CountryMauritania

## CountryMauritius

## CountryMexico

## CountryMicronesia (Federated States of)

## CountryMonaco

## CountryMongolia

## CountryMontenegro

## CountryMorocco

## CountryMozambique

---

```
## CountryMyanmar

## CountryNamibia

## CountryNauru
    ***
## CountryNepal

## CountryNetherlands

## CountryNew Zealand

## CountryNicaragua

## CountryNiger
    *
## CountryNigeria

## CountryNiue

## CountryNorway

## CountryOman

## CountryPakistan

## CountryPalau

## CountryPanama

## CountryPapua New Guinea

## CountryParaguay

## CountryPeru

## CountryPhilippines

## CountryPoland

## CountryPortugal

## CountryQatar
```

---

## CountryRepublic of Korea

## CountryRepublic of Moldova

## CountryRomania

## CountryRussian Federation

## CountryRwanda

## CountrySaint Kitts and Nevis

## CountrySaint Lucia

## CountrySaint Vincent and the Grenadines

## CountrySamoa

## CountrySan Marino

## CountrySao Tome and Principe

## CountrySaudi Arabia

## CountrySenegal

## CountrySerbia

## CountrySeychelles

## CountrySierra Leone

## CountrySingapore

## CountrySlovakia

## CountrySlovenia

## CountrySolomon Islands

## CountrySomalia

## CountrySouth Africa

.

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## CountrySouth Sudan

## CountrySpain

## CountrySri Lanka

## CountrySudan

## CountrySuriname

## CountrySwaziland

## CountrySweden

## CountrySwitzerland

## CountrySyrian Arab Republic

## CountryTajikistan

## CountryThailand

## CountryThe former Yugoslav republic of Macedonia

## CountryTimor-Leste

## CountryTogo

## CountryTonga

## CountryTrinidad and Tobago

## CountryTunisia

## CountryTurkey

## CountryTurkmenistan

## CountryTuvalu

## CountryUganda

## CountryUkraine

---

## CountryUnited Arab Emirates

## CountryUnited Kingdom of Great Britain and Northern Ireland

## CountryUnited Republic of Tanzania

## CountryUnited States of America

## CountryUruguay

## CountryUzbekistan

## CountryVanuatu

## CountryVenezuela (Bolivarian Republic of)

## CountryViet Nam

## CountryYemen

## CountryZambia

## CountryZimbabwe

    \*

## Year

## HIV.AIDS

    \*

## Schooling

## Diphtheria

## Adult.Mortality

## Measles

## Alcohol

## Polio

    \*

## thinness.5.9.years

## Total.expenditure

---

## percentage.expenditure

## CountryAlbania:Year

## CountryAlgeria:Year

## CountryAngola:Year

## CountryAntigua and Barbuda:Year

## CountryArgentina:Year

## CountryArmenia:Year

## CountryAustralia:Year

## CountryAustria:Year

## CountryAzerbaijan:Year

## CountryBahamas:Year

## CountryBahrain:Year

## CountryBangladesh:Year

## CountryBarbados:Year

## CountryBelarus:Year

## CountryBelgium:Year

## CountryBelize:Year

## CountryBenin:Year

## CountryBhutan:Year

## CountryBolivia (Plurinational State of):Year

## CountryBosnia and Herzegovina:Year

## CountryBotswana:Year



---

## CountryBrazil:Year

## CountryBrunei Darussalam:Year

## CountryBulgaria:Year

## CountryBurkina Faso:Year

## CountryBurundi:Year

## CountryCabo Verde:Year

## CountryCambodia:Year

## CountryCameroon:Year

## CountryCanada:Year

## CountryCentral African Republic:Year

## CountryChad:Year

## CountryChile:Year

## CountryChina:Year

## CountryColombia:Year

## CountryComoros:Year

## CountryCongo:Year

## CountryCook Islands:Year

## CountryCosta Rica:Year

## CountryCôte d'Ivoire:Year

## CountryCroatia:Year

## CountryCuba:Year

## CountryCyprus:Year

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## CountryCzechia:Year

## CountryDemocratic People's Republic of Korea:Year

## CountryDemocratic Republic of the Congo:Year

## CountryDenmark:Year

## CountryDjibouti:Year  
\*

## CountryDominica:Year

## CountryDominican Republic:Year

## CountryEcuador:Year

## CountryEgypt:Year

## CountryEl Salvador:Year

## CountryEquatorial Guinea:Year

## CountryEritrea:Year

## CountryEstonia:Year

## CountryEthiopia:Year

## CountryFiji:Year

## CountryFinland:Year

## CountryFrance:Year

## CountryGabon:Year

## CountryGambia:Year

## CountryGeorgia:Year

## CountryGermany:Year

## CountryGhana:Year

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```
## CountryGreece:Year
## CountryGrenada:Year
## CountryGuatemala:Year
## CountryGuinea:Year
## CountryGuinea-Bissau:Year
## CountryGuyana:Year
## CountryHaiti:Year
    ***
## CountryHonduras:Year
## CountryHungary:Year
## CountryIceland:Year
## CountryIndia:Year
## CountryIndonesia:Year
## CountryIran (Islamic Republic of):Year
## CountryIraq:Year
## CountryIreland:Year
## CountryIsrael:Year
## CountryItaly:Year
## CountryJamaica:Year
## CountryJapan:Year
## CountryJordan:Year
## CountryKazakhstan:Year
## CountryKenya:Year
```

---

## CountryKiribati:Year

## CountryKuwait:Year

## CountryKyrgyzstan:Year

## CountryLao People's Democratic Republic:Year

## CountryLatvia:Year  
\*

## CountryLebanon:Year

## CountryLesotho:Year

## CountryLiberia:Year

## CountryLibya:Year

## CountryLithuania:Year

## CountryLuxembourg:Year

## CountryMadagascar:Year  
\*

## CountryMalawi:Year

## CountryMalaysia:Year

## CountryMaldives:Year

## CountryMali:Year

## CountryMalta:Year

## CountryMarshall Islands:Year

## CountryMauritania:Year

## CountryMauritius:Year

## CountryMexico:Year

## CountryMicronesia (Federated States of):Year

---

## CountryMonaco:Year

## CountryMongolia:Year

## CountryMontenegro:Year

## CountryMorocco:Year

## CountryMozambique:Year

## CountryMyanmar:Year

## CountryNamibia:Year

## CountryNauru:Year

## CountryNepal:Year

## CountryNetherlands:Year

## CountryNew Zealand:Year

## CountryNicaragua:Year

## CountryNiger:Year

    \*

## CountryNigeria:Year

## CountryNiue:Year

## CountryNorway:Year

## CountryOman:Year

## CountryPakistan:Year

## CountryPalau:Year

## CountryPanama:Year

## CountryPapua New Guinea:Year

## CountryParaguay:Year

---

## CountryPeru:Year

## CountryPhilippines:Year

## CountryPoland:Year

## CountryPortugal:Year

## CountryQatar:Year

## CountryRepublic of Korea:Year

## CountryRepublic of Moldova:Year

## CountryRomania:Year

## CountryRussian Federation:Year

## CountryRwanda:Year

## CountrySaint Kitts and Nevis:Year

## CountrySaint Lucia:Year

## CountrySaint Vincent and the Grenadines:Year

## CountrySamoa:Year

## CountrySan Marino:Year

## CountrySao Tome and Principe:Year

## CountrySaudi Arabia:Year

## CountrySenegal:Year

## CountrySerbia:Year

## CountrySeychelles:Year

## CountrySierra Leone:Year

## CountrySingapore:Year

---

## CountrySlovakia:Year

## CountrySlovenia:Year

## CountrySolomon Islands:Year

## CountrySomalia:Year

## CountrySouth Africa:Year

## CountrySouth Sudan:Year

## CountrySpain:Year

## CountrySri Lanka:Year

## CountrySudan:Year

## CountrySuriname:Year

## CountrySwaziland:Year

## CountrySweden:Year

## CountrySwitzerland:Year

## CountrySyrian Arab Republic:Year

## CountryTajikistan:Year

## CountryThailand:Year

## CountryThe former Yugoslav republic of Macedonia:Year

## CountryTimor-Leste:Year

## CountryTogo:Year

## CountryTonga:Year

## CountryTrinidad and Tobago:Year

## CountryTunisia:Year

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```
## CountryTurkey:Year

## CountryTurkmenistan:Year

## CountryTuvalu:Year

## CountryUganda:Year

## CountryUkraine:Year

## CountryUnited Arab Emirates:Year

## CountryUnited Kingdom of Great Britain and Northern Ireland:Year

## CountryUnited Republic of Tanzania:Year

## CountryUnited States of America:Year

## CountryUruguay:Year

## CountryUzbekistan:Year

## CountryVanuatu:Year

## CountryVenezuela (Bolivarian Republic of):Year

## CountryViet Nam:Year

## CountryYemen:Year

## CountryZambia:Year

## CountryZimbabwe:Year
    *
## CountryAlbania:HIV.AIDS

## CountryAlgeria:HIV.AIDS

## CountryAngola:HIV.AIDS
    *
## CountryAntigua and Barbuda:HIV.AIDS

## CountryArgentina:HIV.AIDS
```



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## CountryArmenia:HIV.AIDS

## CountryAustralia:HIV.AIDS

## CountryAustria:HIV.AIDS

## CountryAzerbaijan:HIV.AIDS

## CountryBahamas:HIV.AIDS

## CountryBahrain:HIV.AIDS

## CountryBangladesh:HIV.AIDS

## CountryBarbados:HIV.AIDS

## CountryBelarus:HIV.AIDS

## CountryBelgium:HIV.AIDS

## CountryBelize:HIV.AIDS

## CountryBenin:HIV.AIDS

## CountryBhutan:HIV.AIDS

## CountryBolivia (Plurinational State of):HIV.AIDS

## CountryBosnia and Herzegovina:HIV.AIDS

## CountryBotswana:HIV.AIDS

    \*

## CountryBrazil:HIV.AIDS

## CountryBrunei Darussalam:HIV.AIDS

## CountryBulgaria:HIV.AIDS

## CountryBurkina Faso:HIV.AIDS

## CountryBurundi:HIV.AIDS

## CountryCabo Verde:HIV.AIDS

    .

---

## CountryCambodia:HIV.AIDS

## CountryCameroon:HIV.AIDS

## CountryCanada:HIV.AIDS

## CountryCentral African Republic:HIV.AIDS  
\*

## CountryChad:HIV.AIDS

## CountryChile:HIV.AIDS

## CountryChina:HIV.AIDS

## CountryColombia:HIV.AIDS

## CountryComoros:HIV.AIDS

## CountryCongo:HIV.AIDS  
.

## CountryCook Islands:HIV.AIDS

## CountryCosta Rica:HIV.AIDS

## CountryCôte d'Ivoire:HIV.AIDS  
.

## CountryCroatia:HIV.AIDS

## CountryCuba:HIV.AIDS

## CountryCyprus:HIV.AIDS

## CountryCzechia:HIV.AIDS

## CountryDemocratic People's Republic of Korea:HIV.AIDS

## CountryDemocratic Republic of the Congo:HIV.AIDS

## CountryDenmark:HIV.AIDS

## CountryDjibouti:HIV.AIDS

## CountryDominica:HIV.AIDS

---

## CountryDominican Republic:HIV.AIDS

## CountryEcuador:HIV.AIDS

## CountryEgypt:HIV.AIDS

## CountryEl Salvador:HIV.AIDS

## CountryEquatorial Guinea:HIV.AIDS

## CountryEritrea:HIV.AIDS

## CountryEstonia:HIV.AIDS

## CountryEthiopia:HIV.AIDS

## CountryFiji:HIV.AIDS

## CountryFinland:HIV.AIDS

## CountryFrance:HIV.AIDS

## CountryGabon:HIV.AIDS

## CountryGambia:HIV.AIDS

## CountryGeorgia:HIV.AIDS

## CountryGermany:HIV.AIDS

## CountryGhana:HIV.AIDS

\*\*\*

## CountryGreece:HIV.AIDS

## CountryGrenada:HIV.AIDS

## CountryGuatemala:HIV.AIDS

## CountryGuinea:HIV.AIDS

## CountryGuinea-Bissau:HIV.AIDS

## CountryGuyana:HIV.AIDS

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```
## CountryHaiti:HIV.AIDS
***
## CountryHonduras:HIV.AIDS

## CountryHungary:HIV.AIDS

## CountryIceland:HIV.AIDS

## CountryIndia:HIV.AIDS

## CountryIndonesia:HIV.AIDS

## CountryIran (Islamic Republic of):HIV.AIDS

## CountryIraq:HIV.AIDS

## CountryIreland:HIV.AIDS

## CountryIsrael:HIV.AIDS

## CountryItaly:HIV.AIDS

## CountryJamaica:HIV.AIDS

## CountryJapan:HIV.AIDS

## CountryJordan:HIV.AIDS

## CountryKazakhstan:HIV.AIDS

## CountryKenya:HIV.AIDS

## CountryKiribati:HIV.AIDS

## CountryKuwait:HIV.AIDS

## CountryKyrgyzstan:HIV.AIDS
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## CountryLao People's Democratic Republic:HIV.AIDS
*
## CountryLatvia:HIV.AIDS

## CountryLebanon:HIV.AIDS
```

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```
## CountryLesotho:HIV.AIDS
  **
## CountryLiberia:HIV.AIDS

## CountryLibya:HIV.AIDS

## CountryLithuania:HIV.AIDS

## CountryLuxembourg:HIV.AIDS

## CountryMadagascar:HIV.AIDS

## CountryMalawi:HIV.AIDS
  .
## CountryMalaysia:HIV.AIDS

## CountryMaldives:HIV.AIDS

## CountryMali:HIV.AIDS

## CountryMalta:HIV.AIDS

## CountryMarshall Islands:HIV.AIDS

## CountryMauritania:HIV.AIDS

## CountryMauritius:HIV.AIDS

## CountryMexico:HIV.AIDS

## CountryMicronesia (Federated States of):HIV.AIDS

## CountryMonaco:HIV.AIDS

## CountryMongolia:HIV.AIDS

## CountryMontenegro:HIV.AIDS

## CountryMorocco:HIV.AIDS

## CountryMozambique:HIV.AIDS

## CountryMyanmar:HIV.AIDS
```

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```
## CountryNamibia:HIV.AIDS
  **
## CountryNauru:HIV.AIDS

## CountryNepal:HIV.AIDS

## CountryNetherlands:HIV.AIDS

## CountryNew Zealand:HIV.AIDS

## CountryNicaragua:HIV.AIDS

## CountryNiger:HIV.AIDS

## CountryNigeria:HIV.AIDS

## CountryNiue:HIV.AIDS

## CountryNorway:HIV.AIDS

## CountryOman:HIV.AIDS

## CountryPakistan:HIV.AIDS

## CountryPalau:HIV.AIDS

## CountryPanama:HIV.AIDS

## CountryPapua New Guinea:HIV.AIDS

## CountryParaguay:HIV.AIDS
  *
## CountryPeru:HIV.AIDS

## CountryPhilippines:HIV.AIDS

## CountryPoland:HIV.AIDS

## CountryPortugal:HIV.AIDS

## CountryQatar:HIV.AIDS

## CountryRepublic of Korea:HIV.AIDS
```

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## CountryRepublic of Moldova:HIV.AIDS

## CountryRomania:HIV.AIDS

## CountryRussian Federation:HIV.AIDS

## CountryRwanda:HIV.AIDS

## CountrySaint Kitts and Nevis:HIV.AIDS

## CountrySaint Lucia:HIV.AIDS

## CountrySaint Vincent and the Grenadines:HIV.AIDS

## CountrySamoa:HIV.AIDS

## CountrySan Marino:HIV.AIDS

## CountrySao Tome and Principe:HIV.AIDS

## CountrySaudi Arabia:HIV.AIDS

## CountrySenegal:HIV.AIDS

## CountrySerbia:HIV.AIDS

## CountrySeychelles:HIV.AIDS

## CountrySierra Leone:HIV.AIDS

## CountrySingapore:HIV.AIDS

## CountrySlovakia:HIV.AIDS

## CountrySlovenia:HIV.AIDS

## CountrySolomon Islands:HIV.AIDS

## CountrySomalia:HIV.AIDS

    .

## CountrySouth Africa:HIV.AIDS

    \*\*\*

## CountrySouth Sudan:HIV.AIDS

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## CountrySpain:HIV.AIDS

## CountrySri Lanka:HIV.AIDS

## CountrySudan:HIV.AIDS

## CountrySuriname:HIV.AIDS

    \*\*

## CountrySwaziland:HIV.AIDS

    .

## CountrySweden:HIV.AIDS

## CountrySwitzerland:HIV.AIDS

## CountrySyrian Arab Republic:HIV.AIDS

## CountryTajikistan:HIV.AIDS

## CountryThailand:HIV.AIDS

## CountryThe former Yugoslav republic of Macedonia:HIV.AIDS

## CountryTimor-Leste:HIV.AIDS

## CountryTogo:HIV.AIDS

## CountryTonga:HIV.AIDS

## CountryTrinidad and Tobago:HIV.AIDS

## CountryTunisia:HIV.AIDS

## CountryTurkey:HIV.AIDS

## CountryTurkmenistan:HIV.AIDS

## CountryTuvalu:HIV.AIDS

## CountryUganda:HIV.AIDS

    \*

## CountryUkraine:HIV.AIDS

## CountryUnited Arab Emirates:HIV.AIDS



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## CountryUnited Kingdom of Great Britain and Northern Ireland:HIV.AIDS

## CountryUnited Republic of Tanzania:HIV.AIDS

\*

## CountryUnited States of America:HIV.AIDS

## CountryUruguay:HIV.AIDS

## CountryUzbekistan:HIV.AIDS

## CountryVanuatu:HIV.AIDS

## CountryVenezuela (Bolivarian Republic of):HIV.AIDS

## CountryViet Nam:HIV.AIDS

## CountryYemen:HIV.AIDS

## CountryZambia:HIV.AIDS

## CountryZimbabwe:HIV.AIDS

## CountryAlbania:Schooling

## CountryAlgeria:Schooling

## CountryAngola:Schooling

## CountryAntigua and Barbuda:Schooling

## CountryArgentina:Schooling

## CountryArmenia:Schooling

## CountryAustralia:Schooling

## CountryAustria:Schooling

## CountryAzerbaijan:Schooling

## CountryBahamas:Schooling

## CountryBahrain:Schooling

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## CountryBangladesh:Schooling

## CountryBarbados:Schooling

## CountryBelarus:Schooling

## CountryBelgium:Schooling

## CountryBelize:Schooling

## CountryBenin:Schooling

## CountryBhutan:Schooling

## CountryBolivia (Plurinational State of):Schooling

## CountryBosnia and Herzegovina:Schooling

## CountryBotswana:Schooling

## CountryBrazil:Schooling

## CountryBrunei Darussalam:Schooling

## CountryBulgaria:Schooling

## CountryBurkina Faso:Schooling

## CountryBurundi:Schooling

## CountryCabo Verde:Schooling

## CountryCambodia:Schooling

## CountryCameroon:Schooling

## CountryCanada:Schooling

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## CountryCentral African Republic:Schooling

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## CountryChad:Schooling

## CountryChile:Schooling

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## CountryChina:Schooling

## CountryColombia:Schooling

## CountryComoros:Schooling

## CountryCongo:Schooling

## CountryCook Islands:Schooling

## CountryCosta Rica:Schooling

## CountryCôte d'Ivoire:Schooling

## CountryCroatia:Schooling

## CountryCuba:Schooling

## CountryCyprus:Schooling

## CountryCzechia:Schooling

## CountryDemocratic People's Republic of Korea:Schooling

## CountryDemocratic Republic of the Congo:Schooling

## CountryDenmark:Schooling

## CountryDjibouti:Schooling

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## CountryDominica:Schooling

## CountryDominican Republic:Schooling

## CountryEcuador:Schooling

## CountryEgypt:Schooling

## CountryEl Salvador:Schooling

## CountryEquatorial Guinea:Schooling

## CountryEritrea:Schooling

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## CountryEstonia:Schooling
## CountryEthiopia:Schooling
## CountryFiji:Schooling
## CountryFinland:Schooling
## CountryFrance:Schooling
    **
## CountryGabon:Schooling
## CountryGambia:Schooling
## CountryGeorgia:Schooling
## CountryGermany:Schooling
## CountryGhana:Schooling
## CountryGreece:Schooling
## CountryGrenada:Schooling
    .
## CountryGuatemala:Schooling
    **
## CountryGuinea:Schooling
## CountryGuinea-Bissau:Schooling
## CountryGuyana:Schooling
## CountryHaiti:Schooling
## CountryHonduras:Schooling
## CountryHungary:Schooling
## CountryIceland:Schooling
    *
## CountryIndia:Schooling
## CountryIndonesia:Schooling
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## CountryIran (Islamic Republic of):Schooling
## CountryIraq:Schooling
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## CountryIreland:Schooling
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## CountryIsrael:Schooling
## CountryItaly:Schooling
## CountryJamaica:Schooling
## CountryJapan:Schooling
## CountryJordan:Schooling
## CountryKazakhstan:Schooling
## CountryKenya:Schooling
## CountryKiribati:Schooling
## CountryKuwait:Schooling
## CountryKyrgyzstan:Schooling
## CountryLao People's Democratic Republic:Schooling
## CountryLatvia:Schooling
## CountryLebanon:Schooling
## CountryLesotho:Schooling
## CountryLiberia:Schooling
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## CountryLibya:Schooling
## CountryLithuania:Schooling
## CountryLuxembourg:Schooling
*
## CountryMadagascar:Schooling
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## CountryMalawi:Schooling

## CountryMalaysia:Schooling

## CountryMaldives:Schooling

## CountryMali:Schooling

## CountryMalta:Schooling

## CountryMarshall Islands:Schooling

## CountryMauritania:Schooling

## CountryMauritius:Schooling

## CountryMexico:Schooling

## CountryMicronesia (Federated States of):Schooling

## CountryMonaco:Schooling

## CountryMongolia:Schooling

## CountryMontenegro:Schooling

## CountryMorocco:Schooling

## CountryMozambique:Schooling

## CountryMyanmar:Schooling

## CountryNamibia:Schooling

## CountryNauru:Schooling

## CountryNepal:Schooling

## CountryNetherlands:Schooling

## CountryNew Zealand:Schooling

## CountryNicaragua:Schooling

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## CountryNiger:Schooling
    ***
## CountryNigeria:Schooling
## CountryNiue:Schooling
## CountryNorway:Schooling
## CountryOman:Schooling
## CountryPakistan:Schooling
## CountryPalau:Schooling
## CountryPanama:Schooling
## CountryPapua New Guinea:Schooling
## CountryParaguay:Schooling
## CountryPeru:Schooling
## CountryPhilippines:Schooling
## CountryPoland:Schooling
## CountryPortugal:Schooling
## CountryQatar:Schooling
## CountryRepublic of Korea:Schooling
## CountryRepublic of Moldova:Schooling
## CountryRomania:Schooling
## CountryRussian Federation:Schooling
## CountryRwanda:Schooling
    .
## CountrySaint Kitts and Nevis:Schooling
## CountrySaint Lucia:Schooling
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## CountrySaint Vincent and the Grenadines:Schooling

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## CountrySamoa:Schooling

## CountrySan Marino:Schooling

## CountrySao Tome and Principe:Schooling

## CountrySaudi Arabia:Schooling

## CountrySenegal:Schooling

## CountrySerbia:Schooling

## CountrySeychelles:Schooling

## CountrySierra Leone:Schooling

## CountrySingapore:Schooling

## CountrySlovakia:Schooling

## CountrySlovenia:Schooling

## CountrySolomon Islands:Schooling

## CountrySomalia:Schooling

## CountrySouth Africa:Schooling

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## CountrySouth Sudan:Schooling

## CountrySpain:Schooling

## CountrySri Lanka:Schooling

## CountrySudan:Schooling

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## CountrySuriname:Schooling

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## CountrySwaziland:Schooling

## CountrySweden:Schooling



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## CountrySwitzerland:Schooling

## CountrySyrian Arab Republic:Schooling

## CountryTajikistan:Schooling

## CountryThailand:Schooling

## CountryThe former Yugoslav republic of Macedonia:Schooling

## CountryTimor-Leste:Schooling

## CountryTogo:Schooling

## CountryTonga:Schooling

## CountryTrinidad and Tobago:Schooling

## CountryTunisia:Schooling

## CountryTurkey:Schooling

## CountryTurkmenistan:Schooling

## CountryTuvalu:Schooling

## CountryUganda:Schooling

## CountryUkraine:Schooling

## CountryUnited Arab Emirates:Schooling

## CountryUnited Kingdom of Great Britain and Northern Ireland:Schooling

## CountryUnited Republic of Tanzania:Schooling

## CountryUnited States of America:Schooling

## CountryUruguay:Schooling

## CountryUzbekistan:Schooling

## CountryVanuatu:Schooling

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## CountryVenezuela (Bolivarian Republic of):Schooling

## CountryViet Nam:Schooling

## CountryYemen:Schooling

## CountryZambia:Schooling

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## CountryZimbabwe:Schooling

## CountryAlbania:Diphtheria

## CountryAlgeria:Diphtheria

## CountryAngola:Diphtheria

## CountryAntigua and Barbuda:Diphtheria

## CountryArgentina:Diphtheria

## CountryArmenia:Diphtheria

## CountryAustralia:Diphtheria

## CountryAustria:Diphtheria

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## CountryAzerbaijan:Diphtheria

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## CountryBahamas:Diphtheria

## CountryBahrain:Diphtheria

## CountryBangladesh:Diphtheria

## CountryBarbados:Diphtheria

## CountryBelarus:Diphtheria

## CountryBelgium:Diphtheria

## CountryBelize:Diphtheria

## CountryBenin:Diphtheria

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## CountryBhutan:Diphtheria

## CountryBolivia (Plurinational State of):Diphtheria

## CountryBosnia and Herzegovina:Diphtheria

## [ reached getOption("max.print") -- omitted 1516 rows ]
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.263 on 913 degrees of freedom
## Multiple R-squared:  0.9945, Adjusted R-squared:  0.9824
## F-statistic: 81.84 on 2024 and 913 DF,  p-value: < 2.2e-16

# F test
anova(final_fit, my_fit_interaction)

## Analysis of Variance Table
##
## Model 1: Life.expectancy ~ Country + Year + HIV.AIDS + Schooling + Dipht
heria +
##      Adult.Mortality + Measles + Alcohol + Polio + Total.expenditure +
##      percentage.expenditure
## Model 2: Life.expectancy ~ Country * Year + HIV.AIDS * Country + Schooli
ng *
##      Country + Diphtheria * Country + Adult.Mortality * Country +
##      Measles * Country + Alcohol * Country + Polio * Country +
##      thinness.5.9.years * Country + Total.expenditure * Country +
##      percentage.expenditure * Country
##   Res.Df    RSS   Df Sum of Sq    F    Pr(>F)
## 1    2735 9853.1
## 2     913 1455.8 1822    8397.3 2.8904 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

# assess performance
set.seed(251203021)
n = nrow(dataLife)
idx_tr = sample(n,round(0.70*n),replace=FALSE)

dataLife_tr = dataLife[idx_tr,]
dataLife_ts = dataLife[-idx_tr,]

dataLife_tr = rbind(dataLife_tr, dataLife_ts[which(dataLife_ts$Country=='C
ook Islands' | dataLife_ts$Country=='San Marino' | dataLife_ts$Country=='Mar
```

```

shall Islands' | dataLife_ts$Country=='Tuvalu') ,])
#dataLife_tr = rbind(dataLife_tr, dataLife_ts[which(dataLife_ts$Country=='
Palau' | dataLife_ts$Country=='Saint Kitts' | dataLife_ts$Country=='Nevis')
,])
#dataLife_tr = rbind(dataLife_tr, dataLife_ts[which(dataLife_ts$Country=='
Nauru' | dataLife_ts$Country=='Saint Kitts' | dataLife_ts$Country=='Nevis')
, ])

my_fit_train = lm(Life.expectancy ~ Country*Year + HIV.AIDS*Country + Schoo
ling*Country + Diphtheria*Country + Adult.Mortality*Country + Measles*Count
ry + Alcohol*Country + Polio*Country + thinness.5.9.years*Country + Total.e
xpenditure*Country + percentage.expenditure*Country, data=dataLife_tr)

ypr = predict(my_fit_train,newdata=dataLife_ts)

## Warning in predict.lm(my_fit_train, newdata = dataLife_ts): prediction f
rom a
## rank-deficient fit may be misleading

mse = mean((ypr- dataLife_ts$Life.expectancy)^2)
mse

## [1] 5.975332e+19

```