SDS315 HW8 - Palash Pawar ppp625

https://github.com/palashpawar/SDS315

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Problem 1

A) Expected creatinine clearance rate for a 55-year-old

I used the linear regression equation: creatclear = 147.81 - 0.62 x age

For a 55-year-old: creatclear = 147.81 - 0.62 x 55 = 113.71 mL/min

This was calculated using the regression formula from the model.

B) How does creatinine clearance rate change with age?

The slope of the regression line is: -0.62 mL/min per per. This means that for every additional year of age, the expected creatinine clearance rate decreases by approximately 0.62 mL/min.

C) Who is healthier for their age?

I computed each person's expected rate and compared it to their actual rate:

40-year-old:

Expected = 147.81 - 0.62 x 40 = 123.01

Difference = 135 - 123.01 = +11.97

60-year-old:

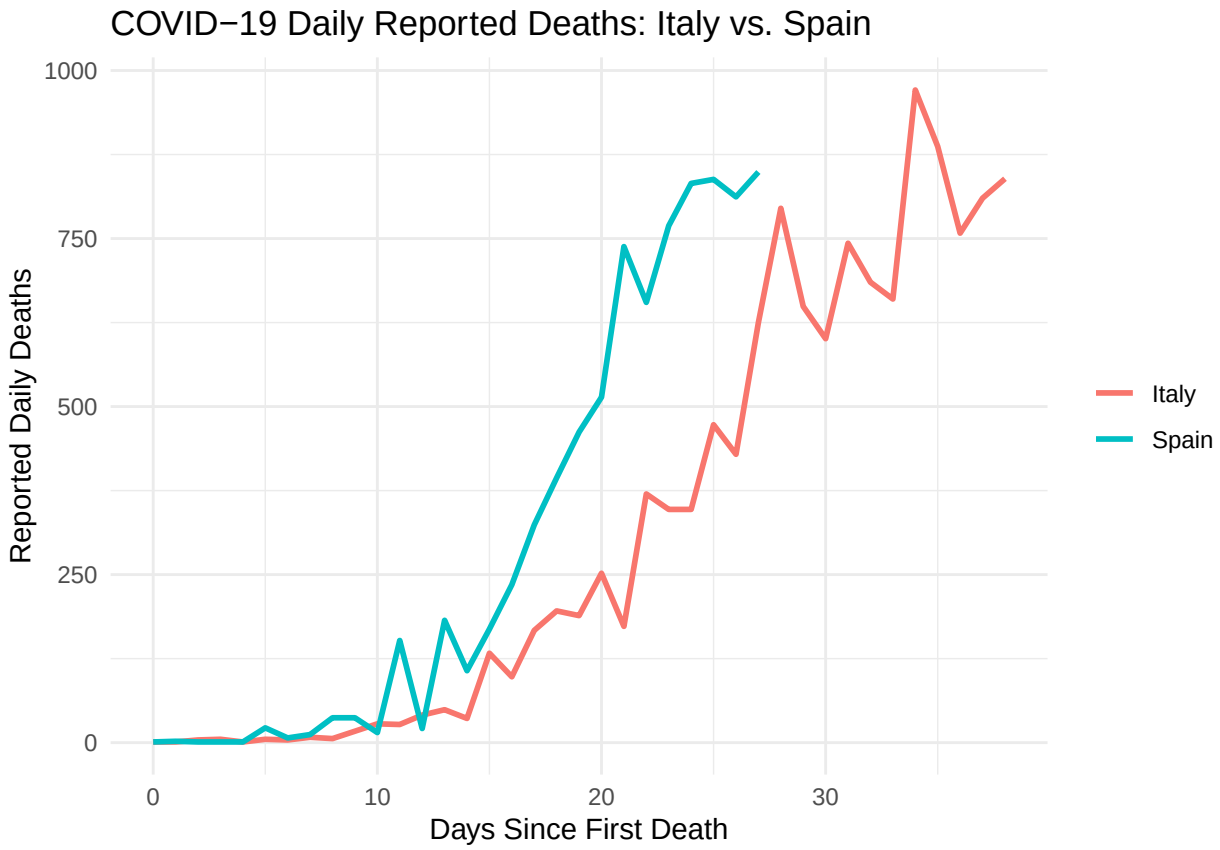
Expected = 147.81 - 0.62 x 60 = 110.61

Difference = 112 - 110.61 = +1.39

Conclusion: The 40-year-old with a rate of 135 is healthier for their age, as their creatinine clearance rate is nearly 12 mL/min above the expected, compared to only 1.4 mL/min above the expected for the 60-year-old.

Problem 2

```
## Italy Growth Rate: 0.183 with 95% CI [ 0.158 , 0.208 ]
## Italy Doubling Time: 3.8 days with 95% CI [ 3.3 , 4.4 ]
## Spain Growth Rate: 0.276 with 95% CI [ 0.233 , 0.32 ]
## Spain Doubling Time: 2.5 days with 95% CI [ 2.2 , 3 ]
```



Problem 3

```
##
## Call:
## lm(formula = log_sales ~ log_price, data = milk)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.65425 -0.18405 -0.01262  0.17986  0.65074
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  4.72060    0.09172   51.47   <2e-16 ***
## log_price   -1.61858    0.08116  -19.94   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2687 on 114 degrees of freedom
## Multiple R-squared:  0.7772, Adjusted R-squared:  0.7753
## F-statistic: 397.7 on 1 and 114 DF,  p-value: < 2.2e-16
```

```
## Elasticity Estimate: -1.618578
```

```
## 95% Bootstrapped CI: [ -1.775557 , -1.458257 ]
```

Conclusion:

To estimate the price elasticity of demand for milk, I log-transformed both price and sales to linearize the power-law model, then fit a linear regression of log(sales) on log(price). The slope of this regression gives the elasticity estimate of -1.62. I used bootstrapping with 1,000 resamples to compute a 95% confidence interval which was [-1.78, -1.46].