

# My title\*

My subtitle if needed

First author

Another author

30 March 2023

First sentence. Second sentence. Third sentence. Fourth sentence.

## 1 Introduction

You can and should cross-reference sections and sub-sections. For instance, Section [2](#) and Section [5.1](#).

## 2 Data

Our data is of penguins (Figure [1](#)).

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\*Code and data are available at: [LINK](#).

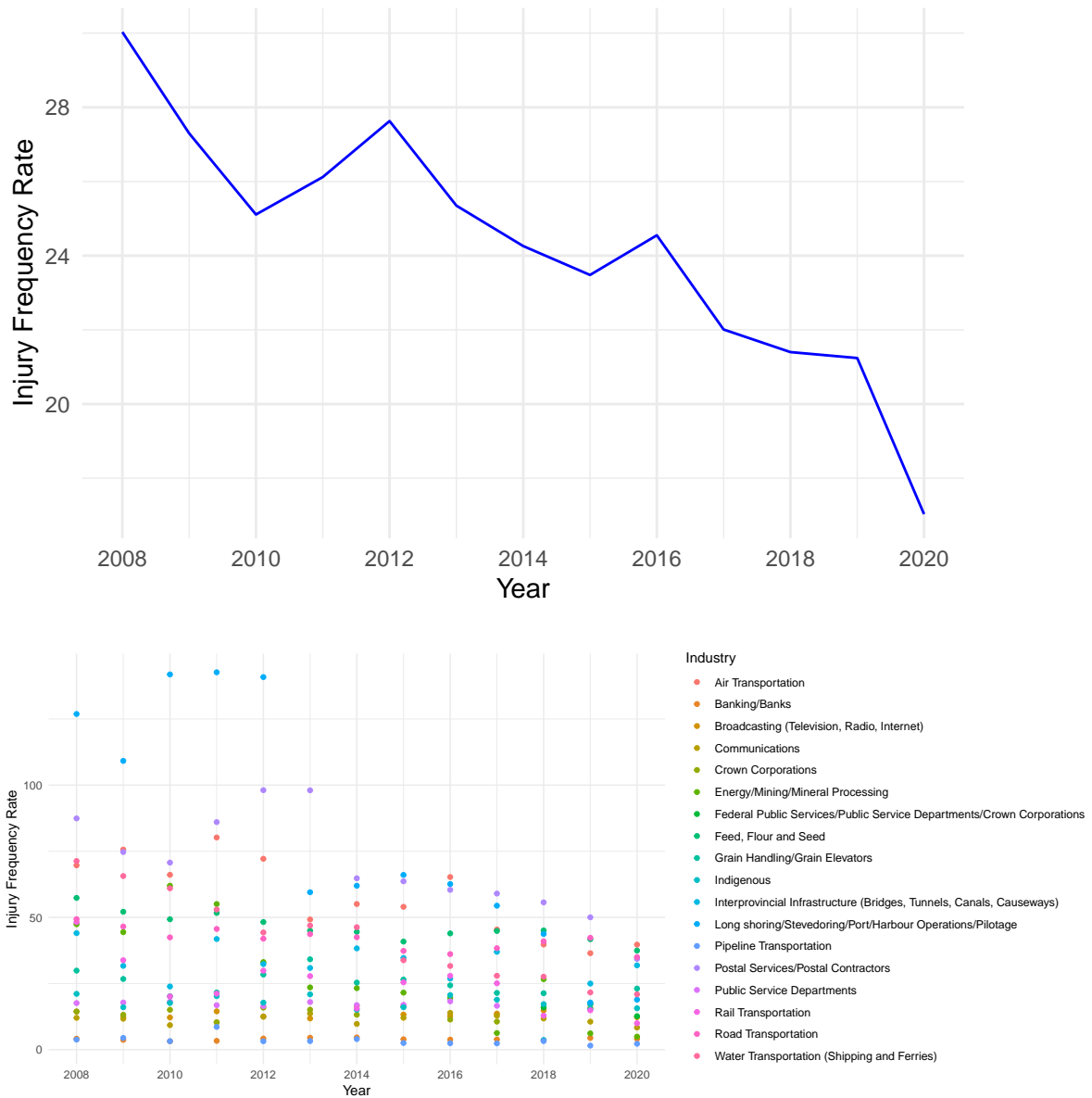


Figure 1: Bills of penguins

Talk more about it.

Also bills and their average (Figure 2). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work.)

Talk way more about it.

### 3 Model

$$Y_{ij} = \beta_0 + \beta_1 Year_i + \beta_2 Industry_j + \beta_3 Year_i Industry_j \quad (1)$$

In Model Equation 1:

- $Y_{ij}$  is the injury frequency rate in  $i^{th}$  year and industry  $j$ .
- $\beta_0$  is the coefficient for intercept.
- $\beta_1$  is the coefficient for the continuous year variable.
- $\beta_2$  is the coefficient corresponding to industry  $j$ .
- $\beta_3$  is the coefficient for the interaction term between  $i^{th}$  year and industry  $j$ .
- The baseline of this model is year 0 and Air Transportation industry.

Table 1: Comparing Model 1 and Model 2's Statistics

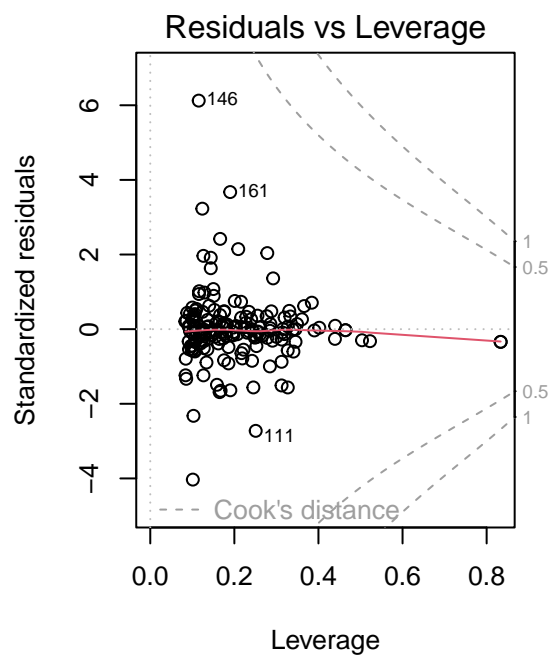
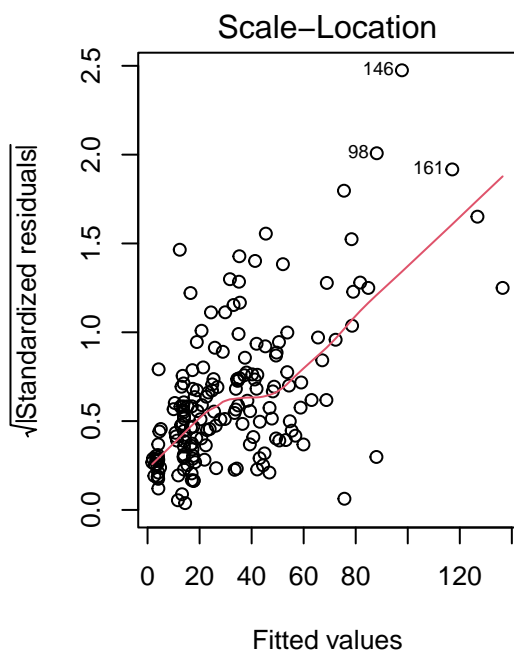
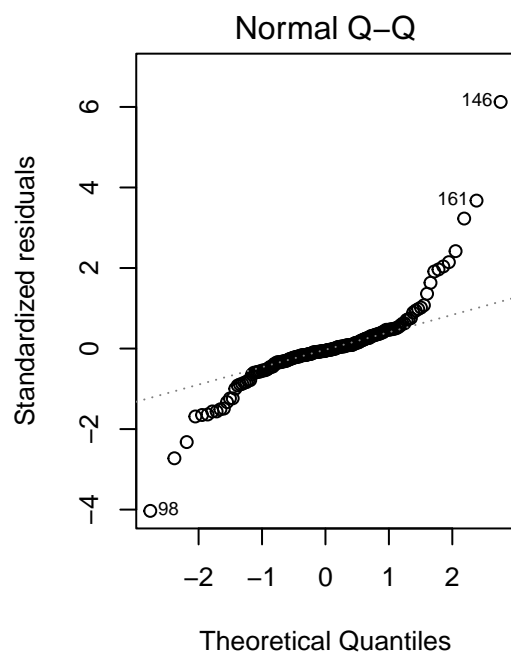
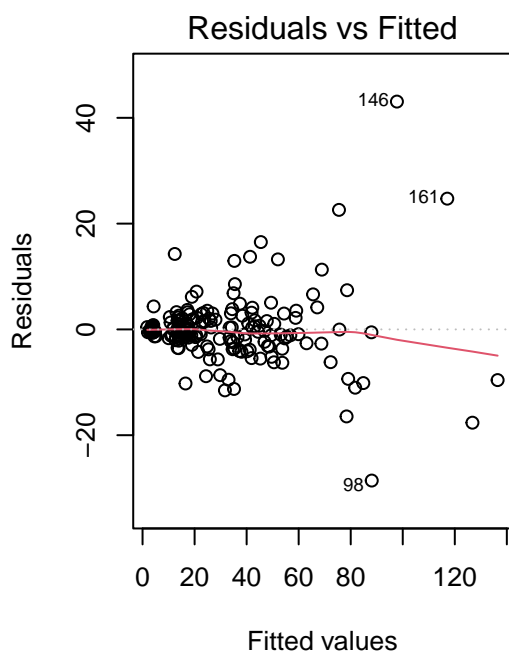
	Model 1	Model 2
(Intercept)	3771.03 (487.75)	6858.39 (1261.02)
IndustryBanking/Banks	-54.07 (5.34)	-6899.55 (1867.60)
IndustryBroadcasting (Television, Radio, Internet)	-44.29 (5.20)	-6868.27 (1818.67)
IndustryCommunications	-49.59 (5.72)	-6545.29 (1892.81)
IndustryCrown Corporations	-48.75 (5.19)	-6444.17 (2081.85)
IndustryEnergy/Mining/Mineral Processing	-29.67 (4.97)	1498.10 (1747.28)
IndustryFederal Public Services/Public Service Departments/Crown Corporations	-34.97 (7.75)	-3481.40 (10747.51)
IndustryFeed, Flour and Seed	-12.49 (5.07)	-4299.77 (1723.77)
IndustryGrain Handling/Grain Elevators	-35.55 (4.97)	-5831.56 (1686.24)
IndustryIndigenous	-41.71 (5.19)	-6384.71 (1724.11)
IndustryInterprovincial Infrastructure (Bridges, Tunnels, Canals, Causeways)	-26.92 (5.19)	-6479.69 (1844.81)
IndustryLong shoring/Stevedoring/Port/Harbour Operations/Pilotage	23.57 (5.19)	12705.87 (1831.60)
IndustryPipeline Transportation	-56.38 (5.07)	-6303.43 (1729.89)
IndustryPostal Services/Postal Contractors	10.57 (5.33)	-512.93 (1791.22)
IndustryPublic Service Departments	-47.68 (5.75)	-6583.88 (3108.52)
IndustryRail Transportation	-35.16 (4.97)	-3174.31 (1722.35)
IndustryRoad Transportation	-16.92 (5.08)	-4923.10 (1737.60)
IndustryWater Transportation (Shipping and Ferries)	-17.59 (5.19)	1559.53 (1822.71)

	Model 1	Model 2
Year	-1.84 (0.24)	-3.38 (0.63)
IndustryBanking/Banks $\times$ Year		3.40 (0.93)
IndustryBroadcasting (Television, Radio, Internet) $\times$ Year		3.39 (0.90)
IndustryCommunications $\times$ Year		3.23 (0.94)
IndustryCrown Corporations $\times$ Year		3.18 (1.03)
IndustryEnergy/Mining/Mineral Processing $\times$ Year		-0.76 (0.87)
IndustryFederal Public Services/Public Service Departments/Crown Corporations $\times$ Year		1.71 (5.32)
IndustryFeed, Flour and Seed $\times$ Year		2.13 (0.86)
IndustryGrain Handling/Grain Elevators $\times$ Year		2.88 (0.84)
IndustryIndigenous $\times$ Year		3.15 (0.86)
IndustryInterprovincial Infrastructure (Bridges, Tunnels, Canals, Causeways) $\times$ Year		3.21 (0.92)
IndustryLong shoring/Stevedoring/Port/Harbour Operations/Pilotage $\times$ Year		-6.30 (0.91)
IndustryPipeline Transportation $\times$ Year		3.10 (0.86)
IndustryPostal Services/Postal Contractors $\times$ Year		0.26 (0.89)
IndustryPublic Service Departments $\times$ Year		3.25 (1.55)
IndustryRail Transportation $\times$ Year		1.56 (0.86)
IndustryRoad Transportation $\times$ Year		2.44 (0.86)
IndustryWater Transportation (Shipping and Ferries) $\times$ Year		-0.78 (0.91)
Num.Obs.	174	174
R2	0.817	0.932

	Model 1	Model 2
R2 Adj.	0.795	0.915
AIC	1366.6	1227.5
BIC	1429.8	1344.4
Log.Lik.	-	-576.767
	663.324	
RMSE	10.95	6.66

Table 2: Comparing RMSE between two models

Dataset	Model 1	Model 2
train	10.9	6.7
test	15.9	9.3





Here's a dumb example of how to use some references: In paper we run our analysis in R (R Core Team 2020). We also use the `tidyverse` which was written by Wickham et al. (2019) If we were interested in baseball data then Friendly et al. (2020) could be useful.

We can use maths by including latex between dollar signs, for instance  $\theta$ .

## 4 Results

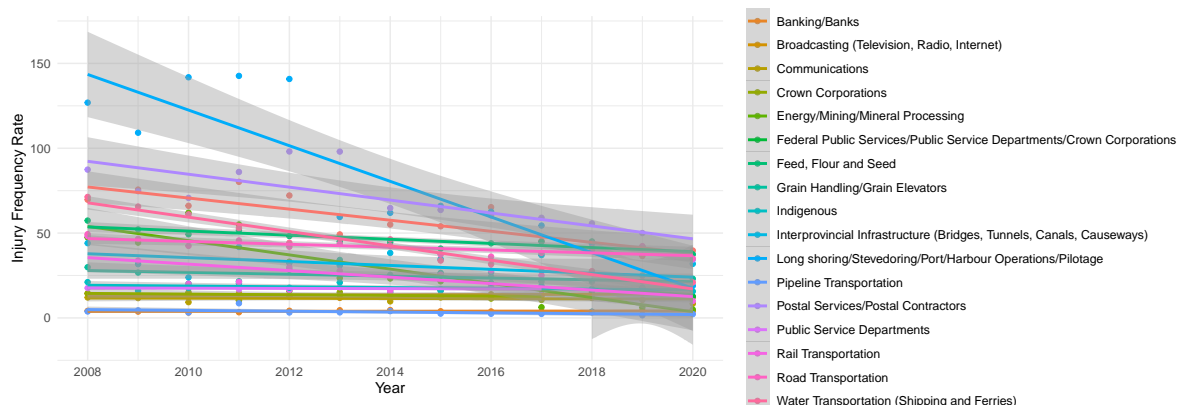


Figure 2: More bills of penguins

## 5 Discussion

### 5.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

### 5.2 Second discussion point

### 5.3 Third discussion point

### 5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

## **Appendix**

### **A Additional details**

## References

- Friendly, Michael, Chris Dalzell, Martin Monkman, and Dennis Murphy. 2020. *Lahman: Sean “Lahman” Baseball Database*. <https://CRAN.R-project.org/package=Lahman>.
- R Core Team. 2020. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D’Agostino McGowan, Romain François, Garrett Grolemond, et al. 2019. “Welcome to the tidyverse.” *Journal of Open Source Software* 4 (43): 1686. <https://doi.org/10.21105/joss.01686>.