DSCI 310: Historical Horse Population in Canada

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```
library(tidyverse)
```

1 Aim

This project explores the historical population of horses in Canada between 1906 and 1972 for each province.

2 Data

Horse population data were sourced from the (Government of Canada 2017a) (http://open.canada.ca/en/open-data) (Government of Canada 2017a, 2017b).

3 Methods

The R programming language (R Core Team, 2019) and the following R packages were used to perform the analysis: knitr (Xie 2014), tidyverse (Wickham 2017), and bookdown (Xie 2016). *Note: this report is adapted from (Timbers 2020) Timbers (2020) .*

4 Results

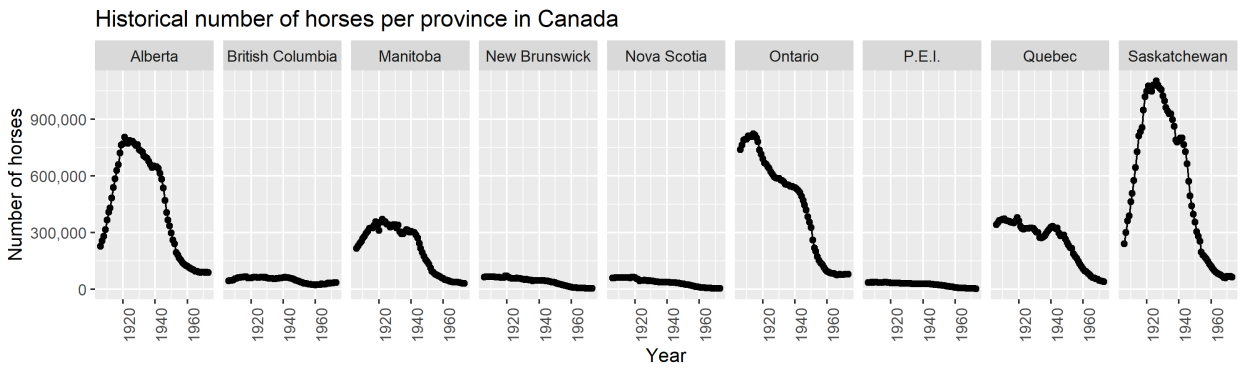

Table 1: Table of standard deviations of horse populations in Canada

Province	Std
Saskatchewan	377265.58
Ontario	266435.32
Alberta	266063.19
Manitoba	122403.87
Quebec	111411.10
New Brunswick	22019.49
Nova Scotia	19879.25
British Columbia	14945.66
P.E.I.	11355.75

Figure 1: Horse populations for all provinces in Canada from 1906 - 1972

We can see from Figure 1 that Ontario, Saskatchewan and Alberta have had the highest horse populations in Canada. All provinces have had a decline in horse populations since 1940. This is likely due to the rebound of the Canadian automotive industry after the Great Depression and the Second World War. An interesting follow-up visualisation would be car sales per year for each Province over the time period visualised above to further support this hypothesis.

Suppose we were interested in looking in more closely at the province with the highest spread (in terms of standard deviation) of horse populations. We present the standard deviations here:

```
horses_sd_table <- read_csv("../../results/horses_sd.csv")
largest_sd <- horses_sd_table$Province[1]
knitr::kable(horses_sd_table, caption = 'Table of standard deviations of horse populations in Canada')
```

Note that we define standard deviation (of a sample) as

$$s = sqrt(sum_{i=1}^{n}(x_i - \bar{x})/(n-1))$$

Additionally, note that in Table 1 we consider the sample standard deviation of the number of horses during the same time span as Figure1.

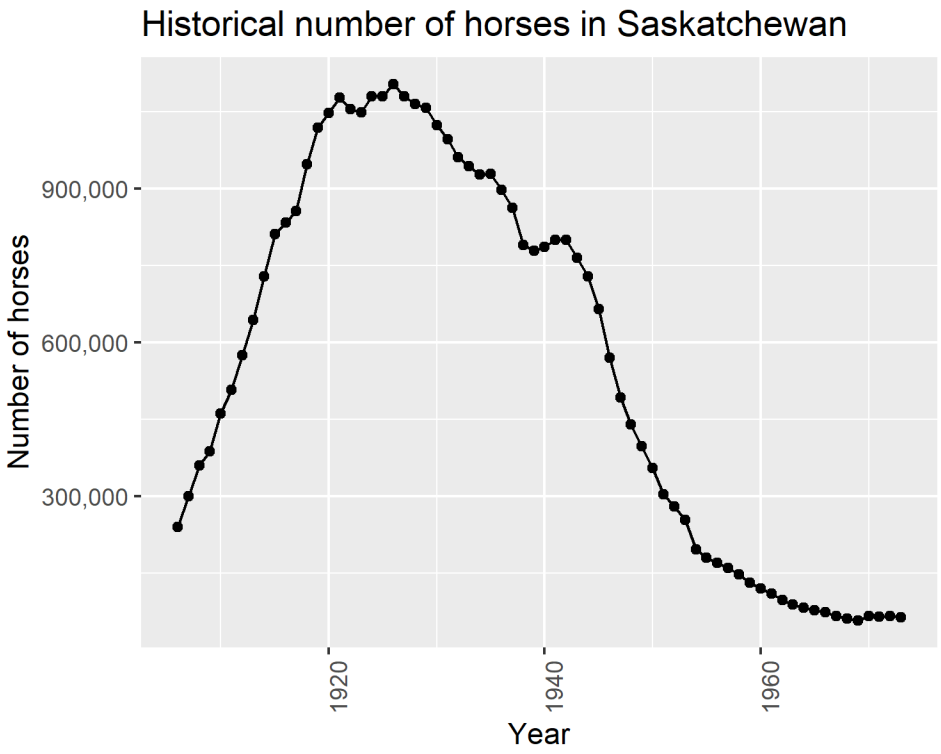

Figure 2: Horse populations for the province with the largest standard deviation

In Figure 2 we zoom in and look at the province of Saskatchewan, which had the largest spread of values in terms of standard deviation.

References

Government of Canada. 2017a. "Horses, Number on Farms at June 1 and at December 1." Open Government - Open Data. https://open.canada.ca/data/en/dataset/a3ecf553-8ec4-4551-a0fe-8df1472c6cf7.

———. 2017b. "Horses, Number on Farms at June 1, Farm Value Per Head and Total Farm Value." Open Government - Open Data. https://open.canada.ca/data/en/dataset/e175ef9c-98f0-49b3-8131-ca0e3895a0cb.

Timbers, Tiffany. 2020. *Historical Horse Population in Canada*. https://github.com/ttimbers/equine_numbers_value_canada_parameters.