Canadian Political Contributions Forecasting

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Problem Statement

I will be forecasting the political contributions Data for the 4 major parties in Canadian federal politics. Using the Root Mean Squared Error and Mean Absolute Error

Liberals

NDP

Conservative

Bloc Québécois

Use Cases

This project is a foundational piece that can have many uses.

1. Effective budgeting for parties
2. Predicting the budget of other parties
3. Proxy for the support of a party
4. Provides an insight into a key affecter of political success

DataSet

- Data comes from Elections Canada
- Data is organised by year contribution was made or election date it happened in
- Contributions are monetary and non-monetary
- Which party received the contribution
- I grouped the party which joined into the **Conservative** party.

Distribution of Data

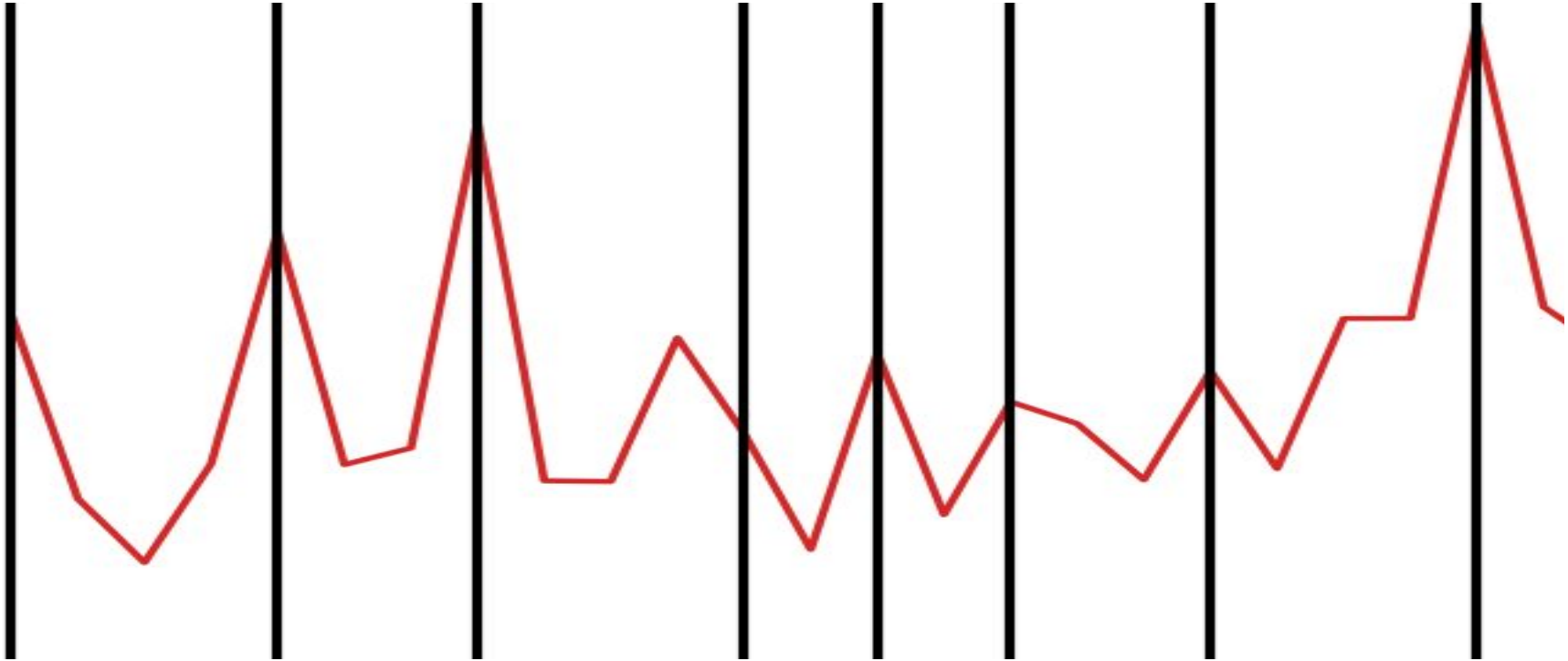
- These data were highly skewed from some donations in the millions of dollars making the average donation much higher than the median.
- I am not sure why donations of this size are present as the legal limit is only $1,775/year as of 2024
- The vast majority of contributions are small
- Seasonality was not present
- Only the **Conservative** party had a noticeable trend

Two Patterns Emerge

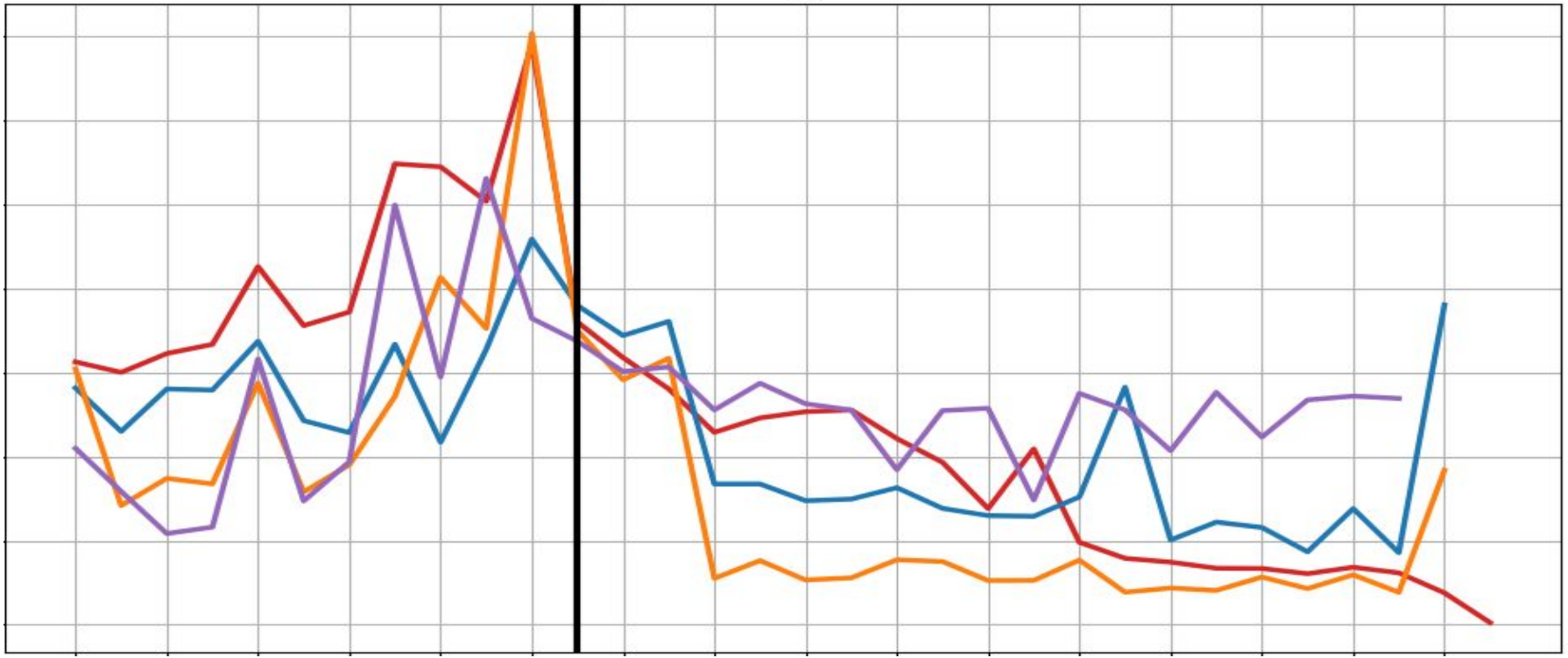
1. Election years have higher contribution amounts
2. Contributions after 2004 are much smaller on average

Patterns added as independent variables to my models

Liberals Contributions with Election Year Bars



Average Contribution Size, Bar is 2004



Modeling Approach

I split my data from 1993 to 2019 then forecast out the next 4 years of comparing it to the real data from that time.

Created a Baseline model for each party using its mean

I used two metric the Root Mean Squared Error and the Mean Absolute Error to evaluate my models.

Then I compared the RMSE and MAE to a baseline model

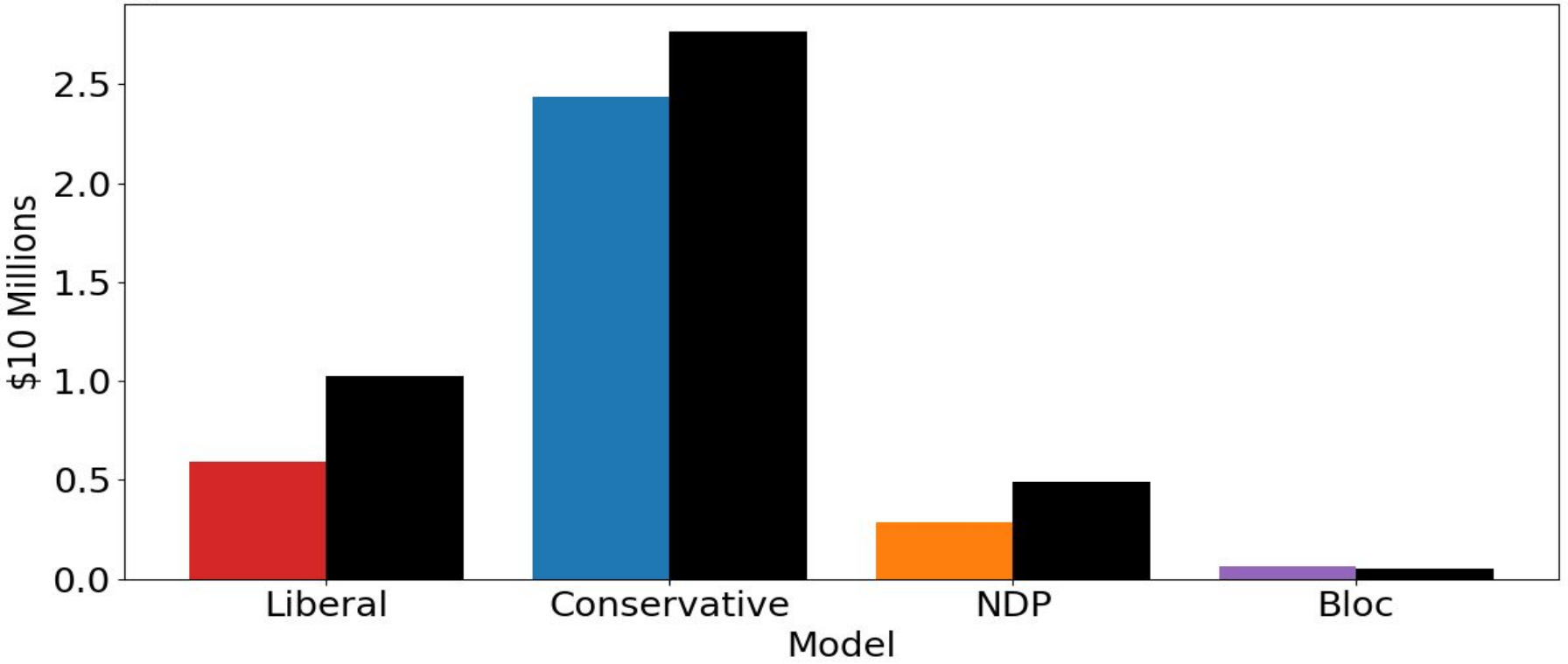
I used Linear models, scaled Linear Models and ARIMA models

NDP Baseline Forecast

Best **Liberals** Forecast, Auto - Regressive Linear Model

Best **Conservative** Model

Comparing the Model and Baseline RMSE



Conclusions

The **Liberals** and **NDP** forecasts are generally accurate and helpful

Conservative: Modeling showed too little improvement tobe useful

Bloc Québécois: Modeling was worse than the baseline

None of my models explain most of yearly contribution data

Looking to the Future

Political life is complex but there is more data readily available

1. The proportion of seats each party has in the legislature that year
2. Polling on the popularity of the parties
3. By-election results
4. Looking for regional trends
5. Trying different models