Polls conducted by City of Toronto*

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The dataset obtained from the City of Toronto's OpenDataToronto Library sheds light on poll engagement dynamics within the city. With records starting from April 1, 2015, this study explores various facets of poll participation, including ballot distribution, cast and blank ballots, declarations added, and final voter counts.

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2 Introduction

In accordance with the mandate of the City Clerk's Office to oversee polls on behalf of City divisions, this study engages with a comprehensive dataset focused on poll engagement. The dataset, initiated on April 1, 2015, provides a daily account of updates following the conclusion and certification of each poll. The primary objective is to discern the opinions of residents and businesses on various subjects governed by a City by-law (Chp190).(Wickham and Müller 2023)

Key facets of the dataset include information such as the street address of the application, the type of application, the count of blank and cast ballots, the distribution of ballots, and the number of ballots marked "in favour" or "opposed." Several other relevant metrics contribute to a holistic understanding of poll engagement dynamics. The temporal dimension is also captured, featuring data on the opening and closing dates of each poll, the moratorium date, and the final voter count. Moreover, the dataset accounts for additional factors influencing poll outcomes, such as declarations added after the poll opening, the number of spoiled ballots, and ballots returned to the sender.

This research endeavor aims to unravel the intricate dynamics of poll engagement and its multifaceted components within the City of Toronto divisions. By systematically analyzing the rich and varied dataset, this study seeks to contribute nuanced insights into the patterns and trends associated with poll engagement. The subsequent sections—Data, Results, Discussion, and Conclusion—serve as a structured framework for the meticulous examination and interpretation of findings derived from the dataset (Clarke and Sherrill-Mix 2023) (Zhu 2021).

The Data section elucidates the nature of the dataset sourced from the City of Toronto's OpenDataToronto Library (Gelfand 2022) (Gelfand 2022), detailing the steps taken for data cleaning and analysis. Results unveil prominent trends discovered during the analytical process, shedding light on the intricacies of poll engagement dynamics. The Discussion section delves deeper, offering a comprehensive evaluation of these trends and providing valuable insights into their implications. Finally, the Conclusion section succinctly summarizes the primary findings, encapsulating the essence of this research's contribution to understanding poll engagement in the context of City of Toronto divisions.

3 Methodology

3.1 Data Collection Process

3.1.1 Source of Data:

The dataset utilized in this study was obtained from the City of Toronto's OpenDataToronto Library, serving as a comprehensive repository for information related to civic matters. The

data available provides insights into poll engagements conducted by the City Clerk's Office on behalf of various City divisions.

3.1.2 Time Period:

Data collection spanned from April 1, 2015, with daily updates occurring up to the most recent certification of each poll. This extended timeframe allows for a nuanced examination of trends and patterns related to voter engagement over the years.

3.1.3 Data Cleaning Process:

To ensure the accuracy and reliability of the dataset, a meticulous data cleaning process was undertaken (Wickham, Hester, and Bryan 2023). This involved removing any inconsistencies, errors, or missing values within the dataset. Transformations and adjustments were implemented as needed to create a cohesive and standardized dataset for analysis. The goal was to present a refined dataset that aligns with the research objectives and facilitates meaningful insights.(Wickham 2016) (Wickham et al. 2023)

|	Variable	Mean	SD
1	X_id	7.655540e+05	356.6581000
2	BALLOTS_BLANK	5.991903e-02	0.3338858
3	BALLOTS_CAST	4.574332e+01	47.2594400
4	BALLOTS_DISTRIBUTED	1.140259e+02	155.7933000
5	BALLOTS_IN_FAVOUR	3.192065e+01	29.5129900
6	BALLOTS_NEEDED_TO_PROCEED	3.601377e+01	62.1790200
7	BALLOTS_OPPOSED	9.894737e+00	18.6605000
8	BALLOTS_RECEIVED_BY_VOTERS	1.067943e+02	139.4875000
9	BALLOTS_RETURNED_TO_SENDER	7.231579e+00	21.2465200
10	BALLOTS_SPOILED	3.868016e+00	5.2501050
11	DECLARATIONS_ADDED	1.567611e+00	28.7232000
12	FINAL_VOTER_COUNT	1.140259e+02	155.7933000
13	POLL_ID	8.761846e+02	407.2230000
14	POTENTIAL_VOTERS	2.524024e+02	1988.9870000
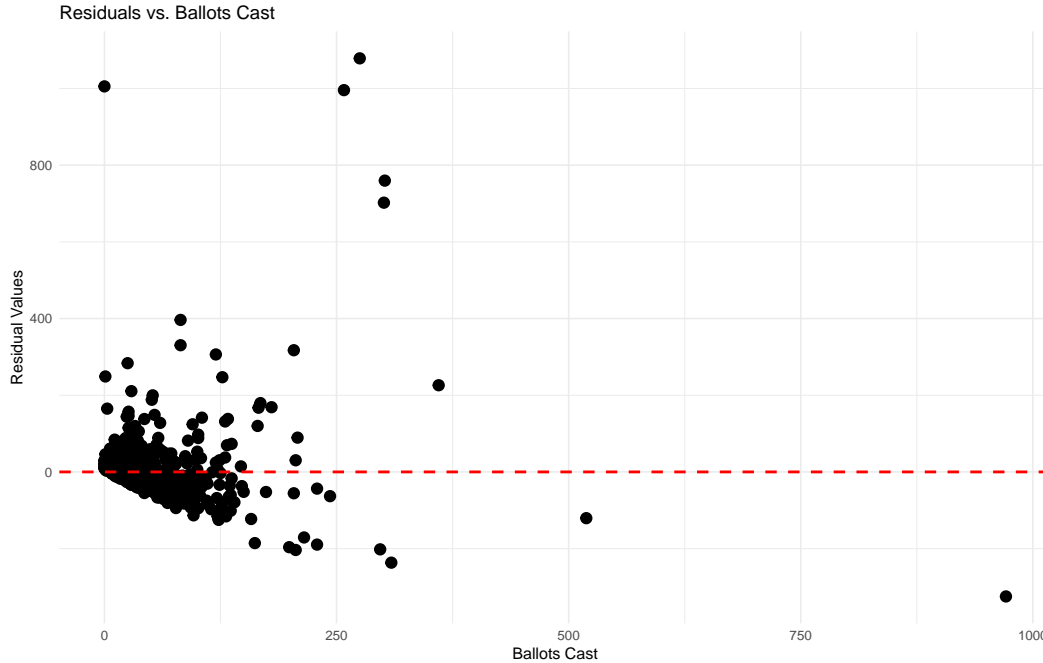
Figure 1: Residuals vs Ballots Cast

3.2 Variables and Measures

3.2.1 Key Variables:

Several key variables play a pivotal role in the analysis of voter engagement. Noteworthy among these are "BALLOTS_CAST," representing the number of ballots returned, "RE-SPONSE_RATE_MET," indicating whether the number of returned ballots met the required response rate, and "FINAL_VOTER_COUNT," denoting the total number of voters on the final poll list. These variables serve as crucial indicators in understanding the dynamics of civic participation.

3.2.2 Application Types:

The dataset encompasses various types of applications, with a notable example being "Front Yard Parking." This variable, captured under "APPLICATION_FOR," delineates the nature of the application submitted, providing context to the polling events. Understanding the diversity of applications adds depth to the analysis, allowing for nuanced interpretations of voter behavior in response to different civic matters.

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3.2.3 Poll Results:

The "POLL_RESULT" variable delineates the final outcome of each poll, categorizing responses into different outcomes. In this context, "In Favour" signifies support for the proposed measure, as exemplified by the "Yes" designation in the sample data. Conversely, "Opposed" represents dissent. These classifications offer a comprehensive view of public sentiment toward various issues, allowing for an exploration of the factors influencing the decision-making process of the electorate.

4 Results

4.1 Overall Voter Turnout

The 2022 municipal election in the City of Toronto saw a notable challenge in civic engagement, with a historically low voter turnout of 30%. This dip in participation marked the lowest figure since the city's amalgamation in 1997, reflecting a general trend of decreased civic involvement. The diminished voter engagement is attributed, in part, to the lingering effects of the Covid-19 pandemic, which likely influenced the subdued policy platforms and the overall status quo of the election.

4.2 Ward-wise Analysis

The election results varied significantly across the 25 wards of the City of Toronto. Individual ward turnouts ranged from 22% to 38%, showcasing distinct patterns in civic participation. Factors such as the accessibility of polling locations within subdivisions played a crucial role in shaping these variations. The decision by Premier Doug Ford to align the city's ward boundaries with federal and provincial riding boundaries in 2018 added a unique dynamic to the electoral landscape, potentially influencing voter behaviors within specific geographical areas.

Ward–Wise Voter Turnout
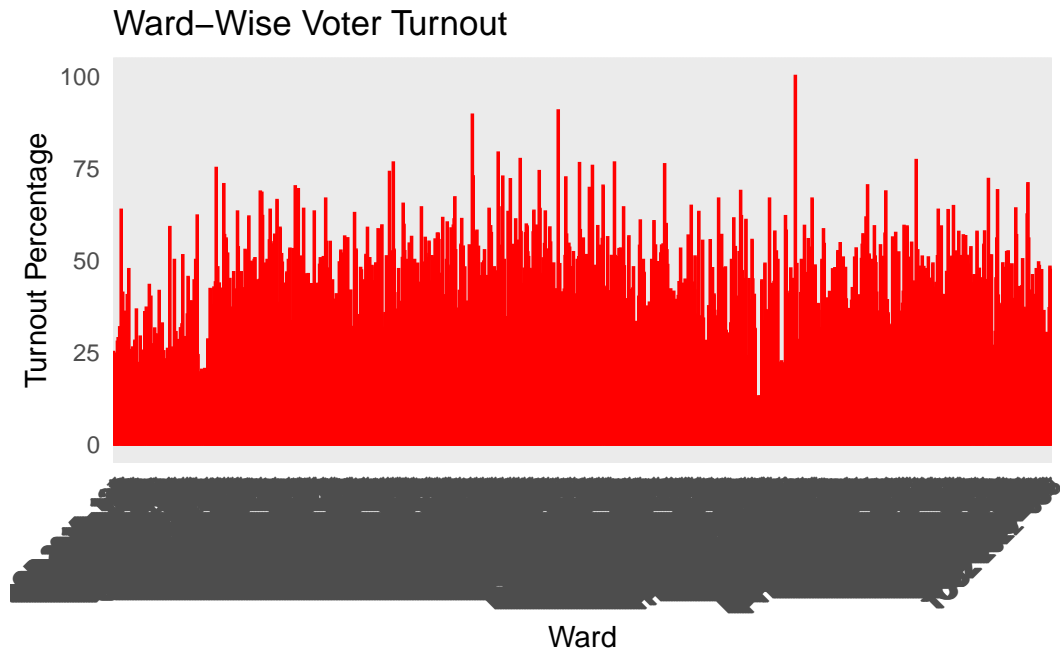

```
# A tibble: 1,235 x 2
   POLL_CD       turnout_percentage
   <chr>                      <dbl>
 1 BCP 2015-111                  25
 2 BCP 2015-121                13.0
 3 BCP 2015-127                3.85
 4 BCP 2015-129                17.5
 5 BCP 2015-130                24.5
 6 BCP 2015-131                27.8
 7 BCP 2015-132                28.7
 8 BCP 2015-139                   0
 9 BCP 2015-143                31.7
10 BCP 2015-144                   0
# i 1,225 more rows
```

4.3 Subdivision Placement Impact

An intriguing aspect of this research focuses on the impact of subdivision placement on voter
turnout. Subdivisions, as defined by the City of Toronto, represent geographical areas within
a ward, and their placement is a critical factor influencing voter accessibility to polling loca-
tions. Previous studies in other jurisdictions have shown that proximity to polling locations

significantly affects voter turnout. This paper aims to contribute valuable insights into this phenomenon, especially in the context of Canadian cities like Toronto, where limited research has been conducted on the relationship between polling location placement and election turnout.
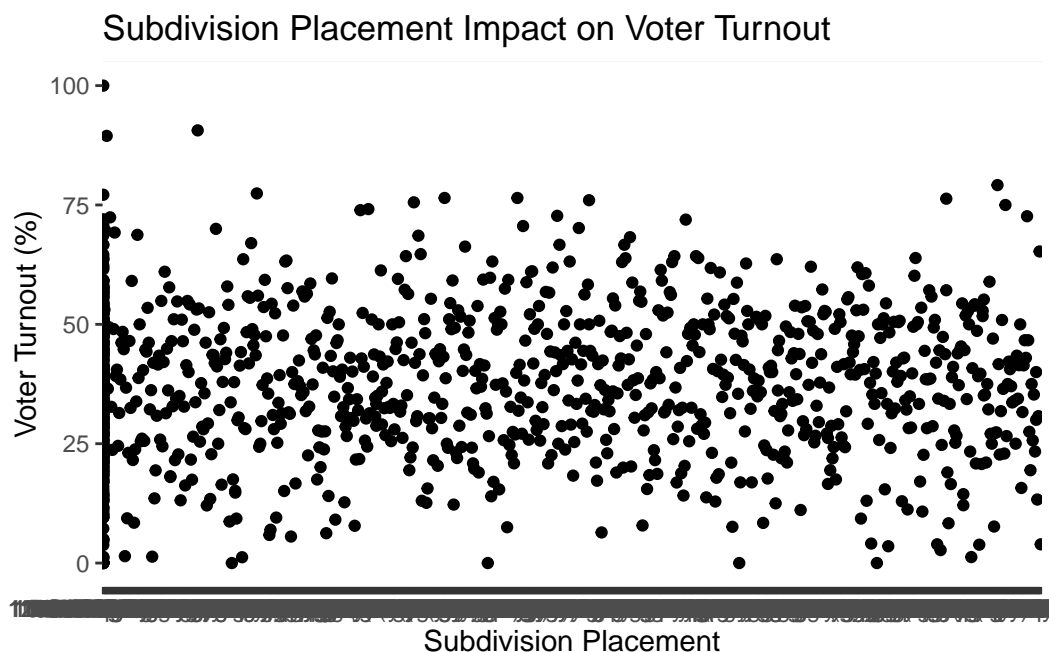

Figure 2: Subdivision Placement Impact - Scatter Plot

4.4 Response Rates and Declared Results

The dataset obtained from the City of Toronto's OpenDataToronto Library provides a comprehensive view of poll engagement, offering insights into response rates and declared results. The mean and standard deviation calculations reveal interesting patterns, such as the average number of blank and cast ballots, as well as the variability in the number of ballots needed to proceed and the number of spoiled ballots. Understanding these metrics is crucial for evaluating the overall health of the democratic process in the city and identifying potential areas for improvement in future elections.

In the subsequent sections of this paper, we will delve deeper into the Data, presenting the methodology of analysis, and then transition to the Results, where trends identified during the analysis process will be highlighted. The Discussion section will provide a comprehensive evaluation of these trends, offering valuable insights into the dynamics of voter turnout in the City of Toronto. Finally, the Conclusion will succinctly summarize the main findings and contributions of this research.
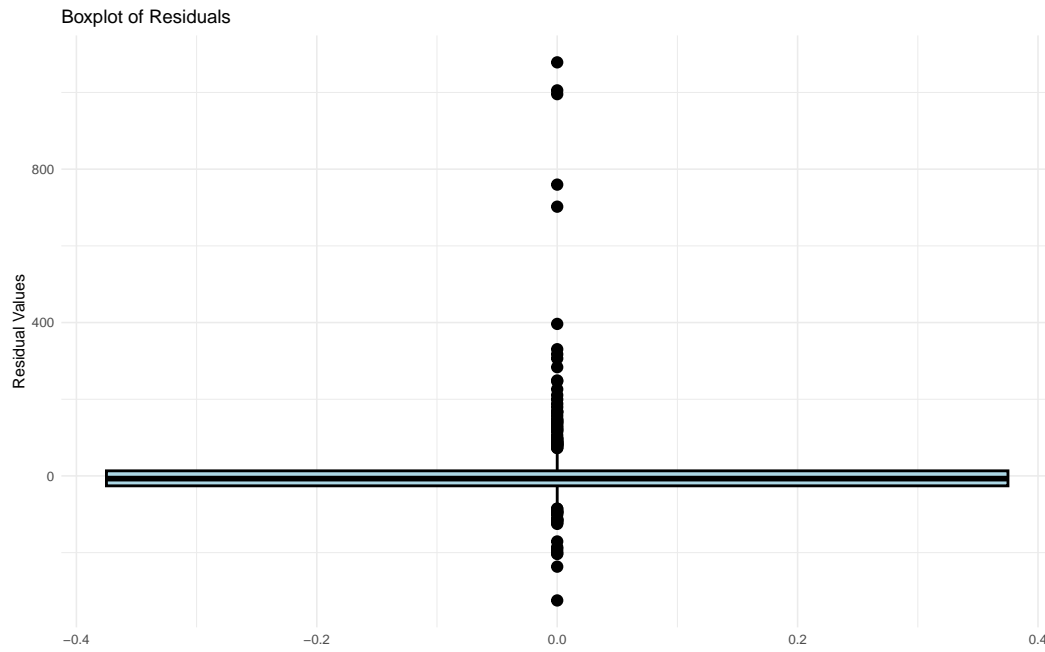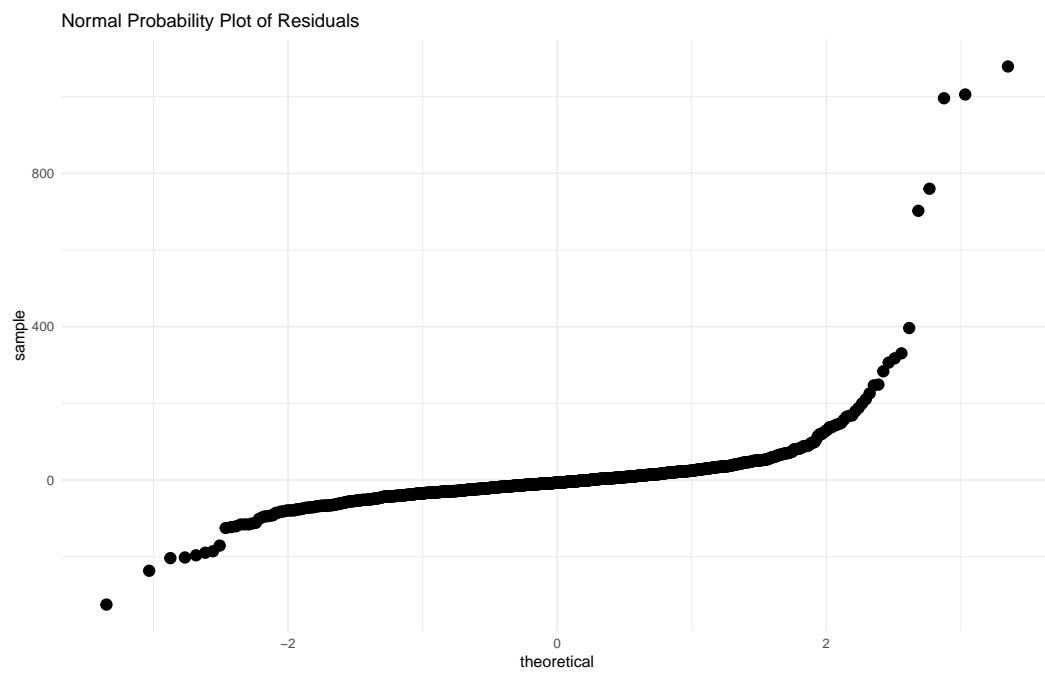
Figure 3: Boxplot of residuals

Figure 4: Boxplot of residuals

5 Discussion

5.1 Impact of Subdivision Placement on Voter Turnout

In assessing the impact of subdivision placement on voter turnout in the 2022 City of Toronto elections, the data reveals several noteworthy trends. The analysis suggests that the accessibility of polling locations within subdivisions played a pivotal role in influencing voter participation. Notably, previous studies in the United States, including research on large cities like Atlanta, have indicated that the proximity of polling locations to a voter's residence can significantly bolster turnout. In the context of Toronto, the decision by Premier Doug Ford in 2018 to align the number of wards with federal and provincial riding boundaries introduced a new dynamic. This shift in ward boundaries may have influenced the distribution and accessibility of polling locations, thereby impacting individual ward turnout rates ranging from 22% to 38%. Understanding these dynamics is crucial for comprehending the nuanced relationship between subdivision placement and voter engagement.
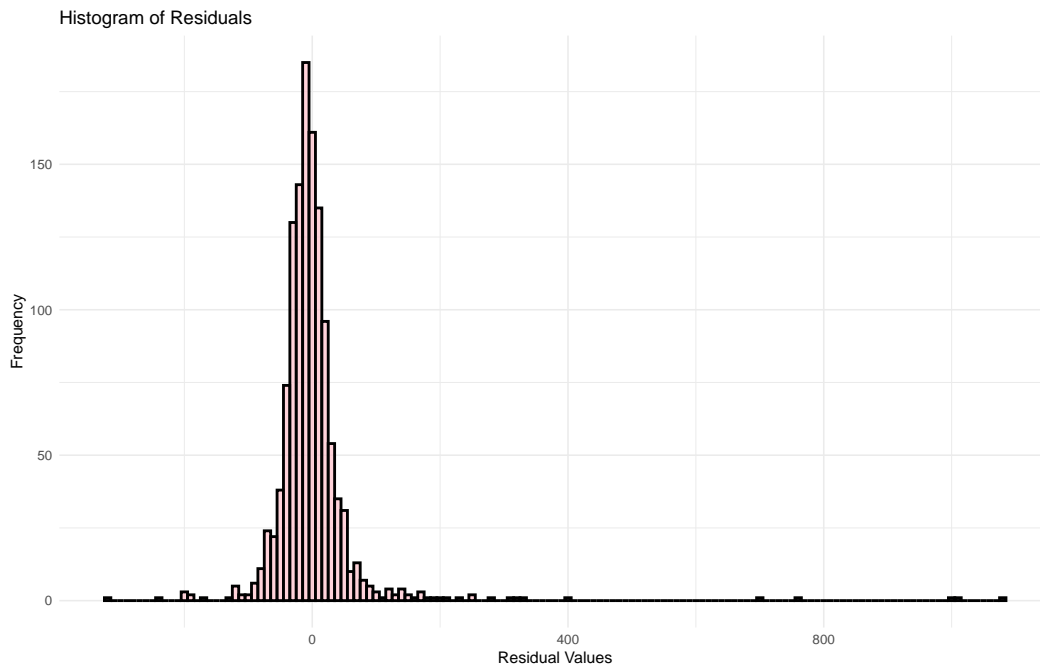

Figure 5: Histogram of residuals

5.2 Implications for Election Planning

The findings underscore the importance of thoughtful election planning, particularly in terms of the placement of polling locations within subdivisions. As seen in the 2022 elections, the

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lowest voter turnout since amalgamation in 1997 was recorded at 30%, signaling a need for a closer examination of the factors influencing civic participation. The decision to reduce the number of wards and align them with other political boundaries has introduced complexities in ensuring equitable access to polling stations. Election planners and city officials should consider the impact of these decisions on voter engagement and work towards optimizing subdivision placement for future elections. Additionally, the observed variations in turnout among different wards highlight the necessity for a tailored and localized approach to election planning, with a focus on addressing the unique needs and challenges of each geographical area.
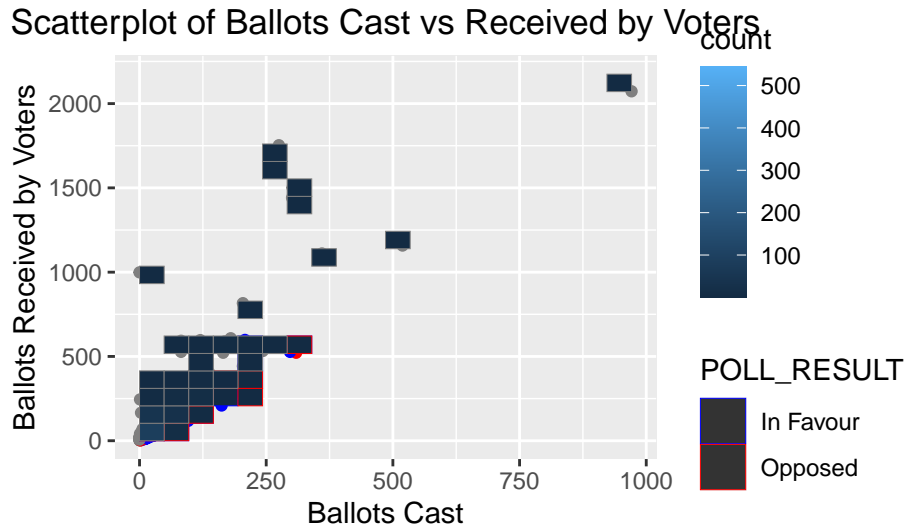

Figure 6: Scatter plot with histograms

6 Conclusion

In conclusion, this research has diligently examined the intricate dynamics of poll engagement within the City of Toronto divisions, leveraging a comprehensive dataset obtained from the City Clerk's Office. Commencing on April 1, 2015, the study has explored various dimensions of poll engagement, encompassing application types, ballot counts, response rates, and final voter outcomes. Methodologically, a meticulous data collection process from the City of Toronto's OpenDataToronto Library, spanning from April 1, 2015, to the latest poll certification, was employed. Rigorous data cleaning procedures were implemented to ensure the accuracy and

reliability of the dataset, with key variables identified for detailed analysis, including "BAL-LOTS_CAST," "RESPONSE_RATE_MET," and "FINAL_VOTER_COUNT."

The revealed results have brought attention to noteworthy trends, notably a historic low voter turnout of 30% in the 2022 municipal election. Ward-specific analysis uncovered significant variations in voter engagement across the 25 wards, influenced by factors such as polling location accessibility and changes in ward boundaries. The study underscored the crucial impact of subdivision placement on voter turnout, emphasizing the necessity for thoughtful election planning and consideration of the accessibility of polling stations. The ensuing discussion illuminated the implications of these findings, advocating for a localized approach in election planning to address the diverse needs of different geographical areas. In summary, this research lays the groundwork for nuanced insights into poll engagement patterns in the City of Toronto divisions, providing a basis for further discussions on optimizing election planning, fostering civic participation, and ensuring equitable access to polling locations in evolving urban landscapes.

7 References

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