City Council Turnout Analysis

We examine the change in voter turnout over the various CC election years (2011, 2013, 2015, and 2017).[1] We are answering an essential question: **How has voter turnout by precinct changed across city council election year**?

Part 1: "Volatility" of Voter Turnout

To begin, we examine the volatility of voter turnout in each election year. Here we are examining the voter turnout of each specific precinct, that is, the percentage of registered voters in a specific precinct who cast a ballot in the election.

First finding the mean:

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Mean voter turnout 2011: 18.3 %
Mean voter turnout 2013: 38.5 %
Mean voter turnout 2015: 13.9 %
Mean voter turnout 2017: 28.3 %
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As we can see, 2013 has the highest average voter turnout.

Then the median:

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Median voter turnout 2011: 17.0 %
Median voter turnout 2013: 37.3 %
Median voter turnout 2015: 13.5 %
Median voter turnout 2017: 27.8 %
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Again, 2013 is the highest.

Finding that 2013 and 2017 had the highest voter turnout rates across all precincts due to the fact that they coincided with the Mayoral Elections of those same years.

Next, we determine the "Top 20 Precincts" which have the most volatile voter turnout. That is, have the greatest average change in voter turnout in that specific precinct based on election year. Listed in descending order:

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[1] Note that we are excluding the 2019 City Council Race in this analysis for the time being since it is missing essential voter turnout data. However, we plan to add this to our analysis as soon as the data becomes available.

WP	Turnout2011	Turnout2013	Turnout2015	Turnout2017	AvgChange
112	21.5	60.1	14.8	39.7	36.3
114	14.0	52.4	8.3	34.4	36.2
111	20.3	57.0	15.7	39.7	34.0
2013	27.0	64.9	19.8	38.8	34.0
113	17.1	51.5	9.5	33.2	33.4
2017	26.7	61.6	17.2	35.8	32.6
2019	33.2	65.9	22.4	40.9	31.6
101	18.7	52.0	13.5	35.4	31.2
2012	35.1	67.3	23.4	40.4	31.0
2014	36.5	67.8	26.9	45.7	30.3
2011	31.7	62.5	23.1	43.5	30.2
2007	29.8	59.7	20.8	42.3	30.1
206	25.8	50.8	14.1	42.5	30.0
203	21.4	49.1	14.4	39.8	29.3
1903	23.0	51.9	17.0	40.7	29.2
109	10.2	43.0	9.9	31.5	29.2
2015	20.0	49.4	12.2	32.7	29.0
2010	29.4	57.2	17.8	37.0	28.8
205	21.1	45.5	10.4	37.3	28.8
2001	24.7	53.2	15.8	36.3	28.8
2016	27.5	58.1	17.8	33.4	28.8

Simply from looking at the raw data, we can see that Ward 1 (East Boston), sees a lot of volatility.

Visualizing this change across elections on a bar chart, we have:
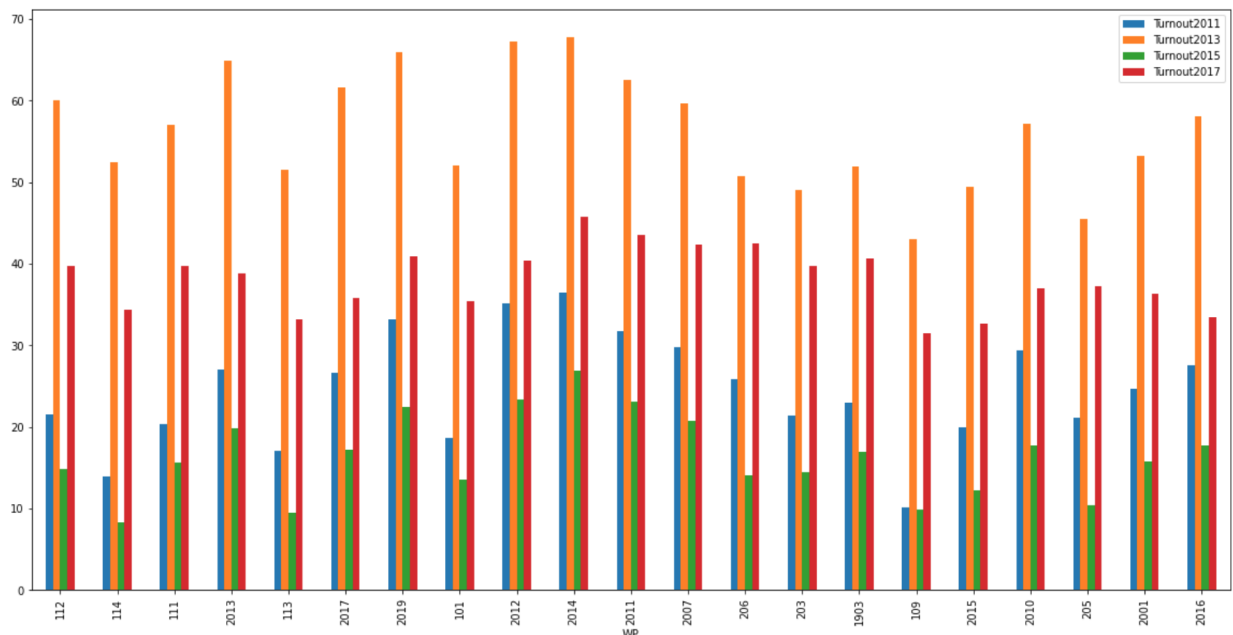
We can clearly see that voter turnout is highly volatile across each of these precincts.

Listing the demographic breakdown of each of these precincts:

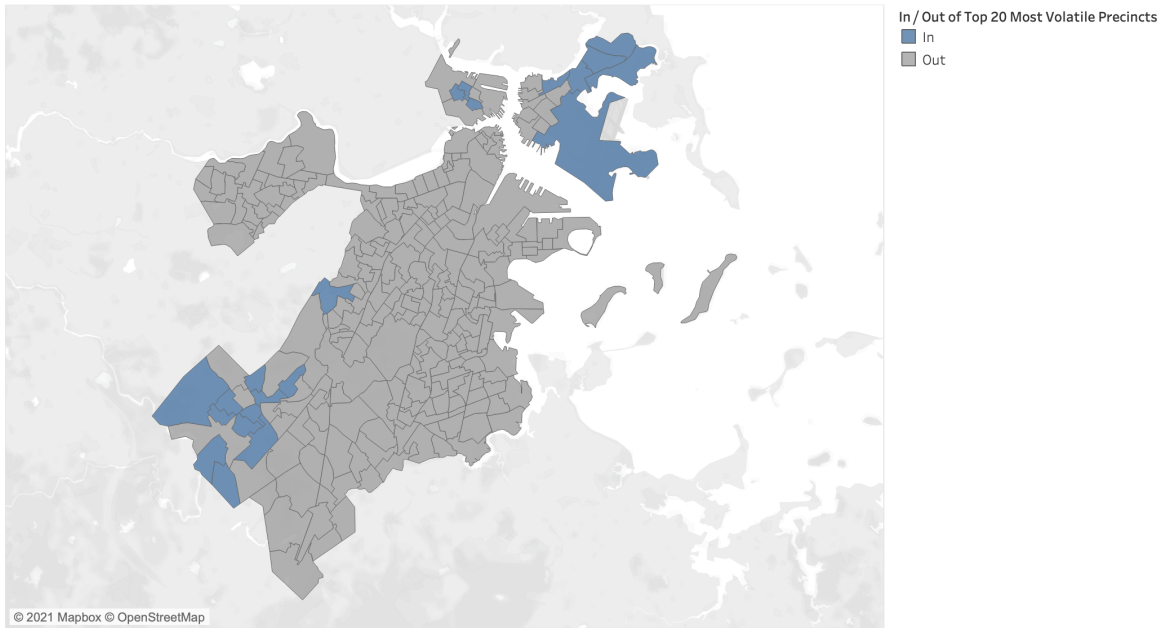| WP	Black Percentage	Hispanic Percentage	Asian Percentage
112	1.8	26.0	2.7
114	2.6	17.7	4.5
111	2.9	33.9	3.2
2013	2.0	3.0	5.9
113	8.6	41.9	3.8
2017	2.9	3.6	4.4
2019	1.1	3.9	5.4
101	3.2	29.3	2.9
2012	1.4	2.2	2.9
2014	2.0	3.1	3.9
2011	2.7	4.3	4.9
2007	3.8	5.8	2.6
206	1.8	4.1	7.1
203	0.4	1.6	1.5
1903	4.7	5.0	5.0
109	3.0	58.3	2.0
2015	7.8	7.5	9.1
2010	4.8	8.2	6.4
205	0.4	1.1	1.4
2001	4.2	6.1	2.9
2016	4.3	6.2	8.1

Now, we do a demographic breakdown of each of these precincts, finding the following:
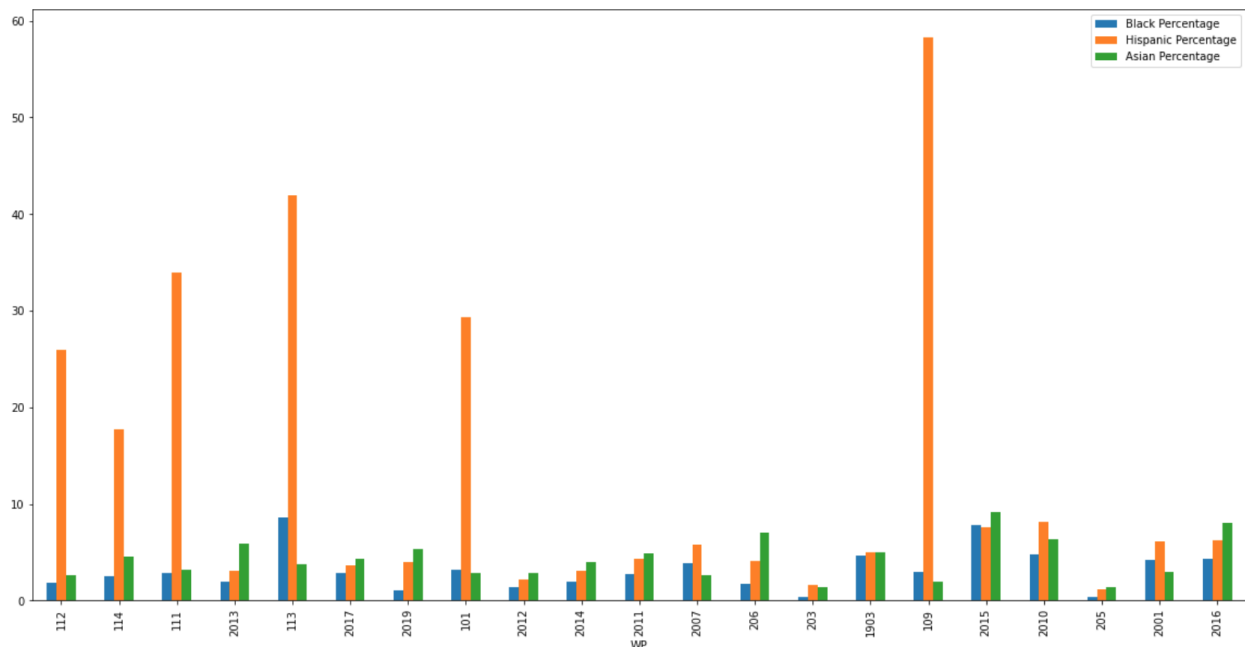
This chart seems to indicate that the most "volatile" precincts in terms of voter turnout are either not dense in minority populations or have a significant Hispanic population. As we can see, a total of 6 precincts with a significant Hispanic population are in the Top 20 of this list.
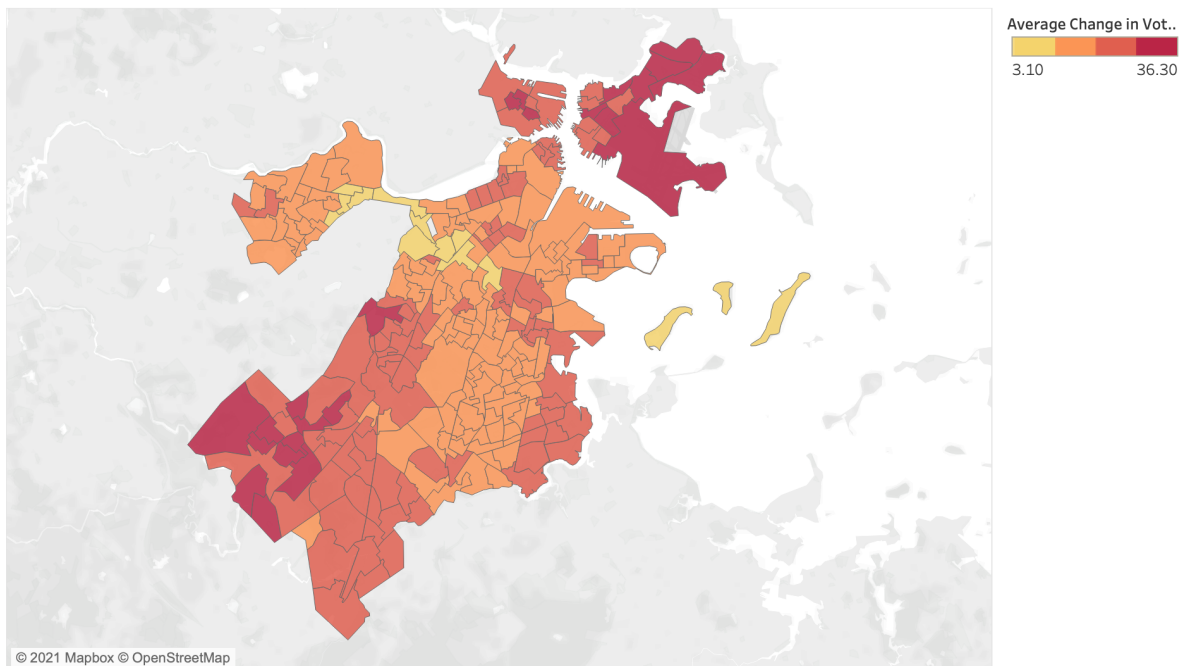
And viewing these precincts on a Boston map, we again see the concentration of precincts in East Boston as well as a concentration in West Roxbury:

Top 20 Most Volatile Precincts in terms of Voter Turnout

Map based on Longitude (generated) and Latitude (generated). Color shows details about In / Out of Top 20 Most Volatile Precincts. Details are shown for Ward Preci.

Additionally, we can use a heat map to visualize which districts experience the most volatility across city council elections:

Volatility Heat Map: Average Change in Voter Turnout in City Council Elections from 2011 to 2017

Map based on Longitude (generated) and Latitude (generated). Color shows sum of Avg Change. Details are shown for Ward Preci.

Part 2: Changes in Share of Voter Turnout

We now analyze which precincts experienced the greatest average change in *share of voter turnout* over time. That is, we are analyzing what percentage of the total votes cast for this particular election is from each precinct, and then analyzing the precincts which experienced the greatest change.

Metric: For each precinct, we calculate the percent share of votes: [Number of Ballots Cast in Precinct X]/[Total Ballots Cast in CC Election YYYY] * 100.

First, we find the top 20 precincts with the greatest average change in share of voters across each election. Note that these top 20 could be experiencing either significant negative or positive change.

Looking at the raw data:

WP	Share of Voters 2011	Share of Voters 2013	Share of Voters 2015	Share of Voters 2017	AvgChange
1612	1.20712	0.64750	0.96486	0.64263	0.39974
307	0.88745	0.98822	0.62943	1.12690	0.31901
1714	0.42305	0.33577	0.76557	0.44468	0.27932
1704	0.66479	0.58388	0.95499	0.58646	0.27352
1310	1.11010	0.69274	0.89580	0.70799	0.26941
1609	1.10533	0.67860	0.82871	0.61685	0.26290
113	0.43259	0.65104	0.34727	0.58646	0.25380
509	0.26401	0.50613	0.22691	0.41430	0.23624
306	0.43259	0.78181	0.56037	0.67485	0.22838
501	1.44886	1.14656	0.98064	1.16556	0.21771
1801	0.45168	0.49906	0.83266	0.56253	0.21704
701	0.72523	0.46230	0.66889	0.49440	0.21467
1820	0.71886	0.75707	1.03392	0.70523	0.21458
308	1.31209	0.94298	1.04970	1.20239	0.20951
609	0.77612	0.51744	0.66889	0.45573	0.20776
202	0.51052	0.67012	0.51104	0.80558	0.20441
507	0.31490	0.53228	0.29992	0.45021	0.20001
1912	0.47871	0.40080	0.67481	0.42903	0.19923
1709	0.37216	0.31456	0.58602	0.31763	0.19915
703	1.00673	0.66022	0.76163	0.61593	0.19787
1703	0.44372	0.45947	0.75965	0.49532	0.19342

From the raw data, we can see that some of the top 20 precincts that experienced the greatest average change had a significant decrease in the share of voters (Example: WP 1612), while others like WP 509 saw significant dips up and down across election year.

Visualizing, on a bar chart, the percent share of voters of each of these top 20 precincts:
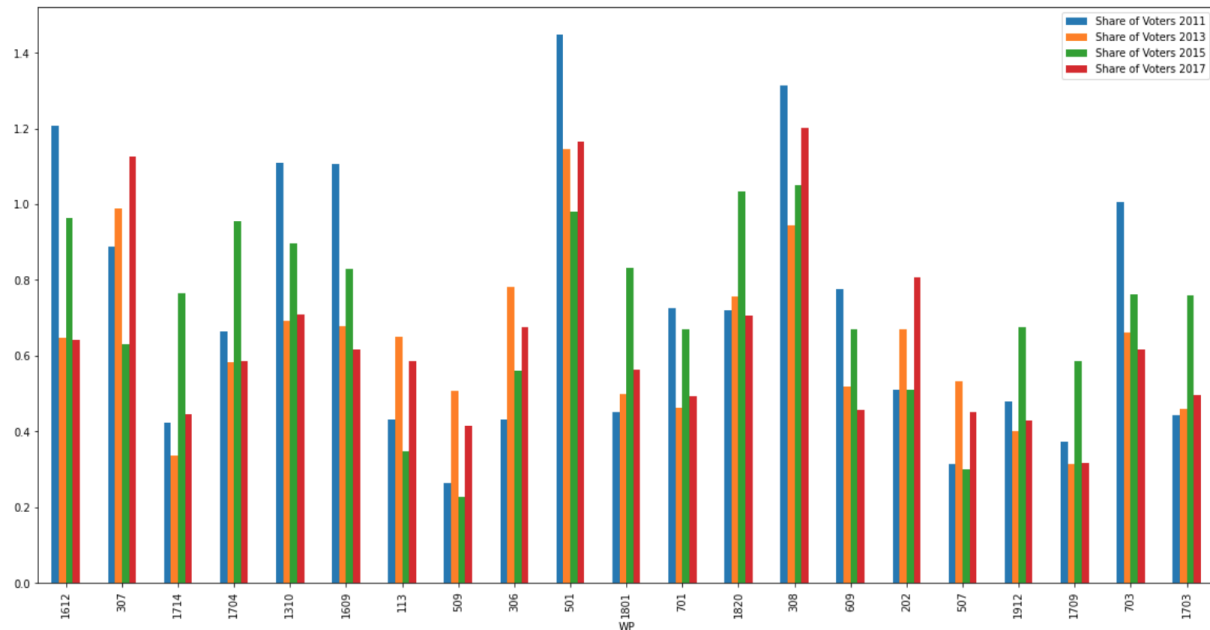

We can clearly see that the voter turnout has changed dramatically across each election in each of these precincts.

Listing the demographic breakdown of these precincts:

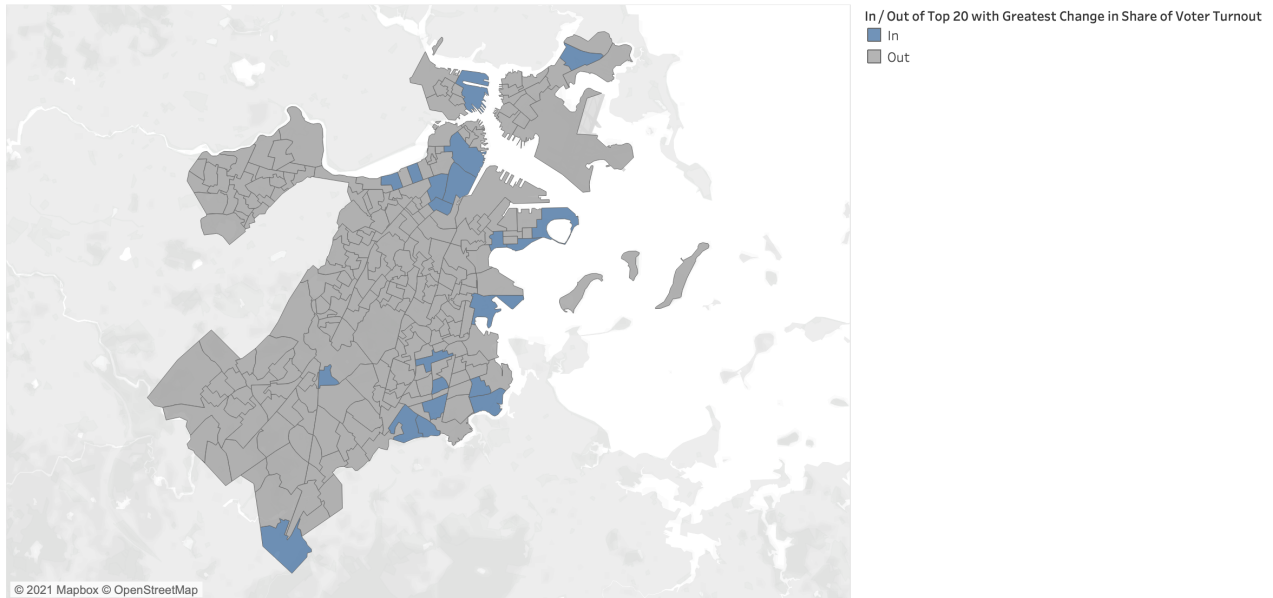| WP	Black Percentage	Hispanic Percentage	Asian Percentage
1612	3.6	1.2	1.2
307	5.9	6.6	15.9
1714	58.1	7.5	5.0
1704	58.7	6.9	7.6
1310	6.3	4.9	11.2
1609	3.3	2.7	3.1
113	8.6	41.9	3.8
509	2.2	6.4	12.5
306	4.6	5.3	8.5
501	4.6	4.5	29.7
1801	77.6	15.0	1.2
701	0.1	0.9	0.9
1820	22.7	11.1	1.8
308	4.8	4.9	46.0
609	1.1	1.1	0.1
202	9.9	14.5	16.2
507	2.1	4.8	6.7
1912	20.9	18.7	1.7
1709	44.9	9.4	5.3
703	0.7	2.3	1.5
1703	69.3	13.7	2.0

Now, visualizing the demographic breakdown of each of these precincts:
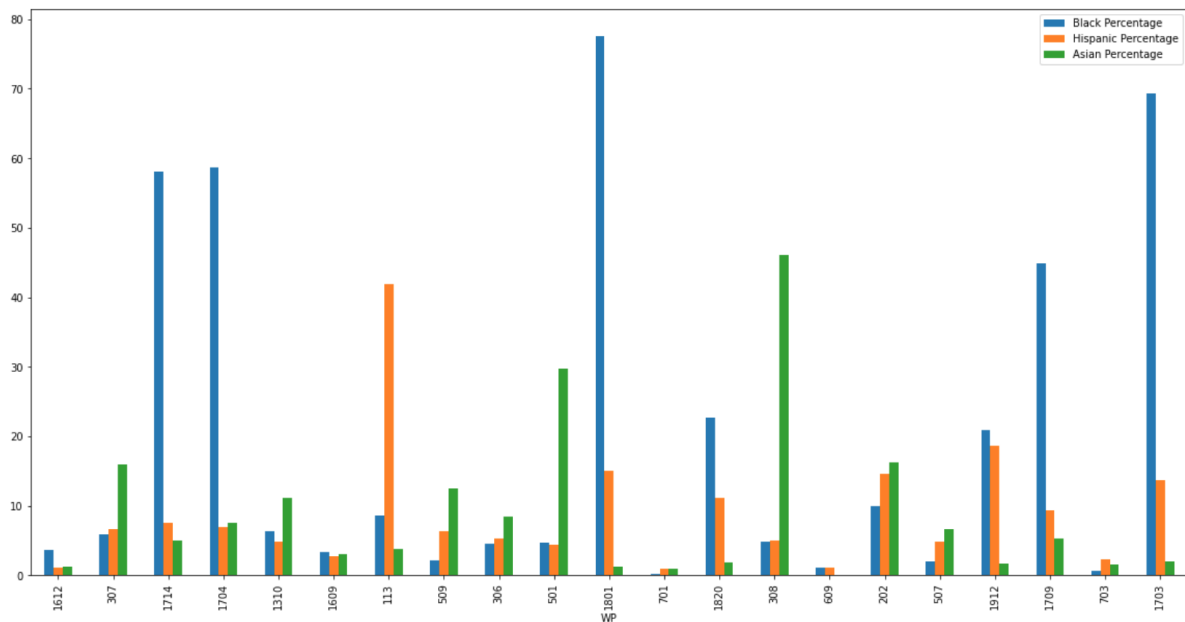
Here, we see the demographic breakdown of those districts which experienced the greatest AVERAGE change in share of total percentage of votes for each city council eleection. Here, we see that precints with a significant Black population seem to experience a significant average change.

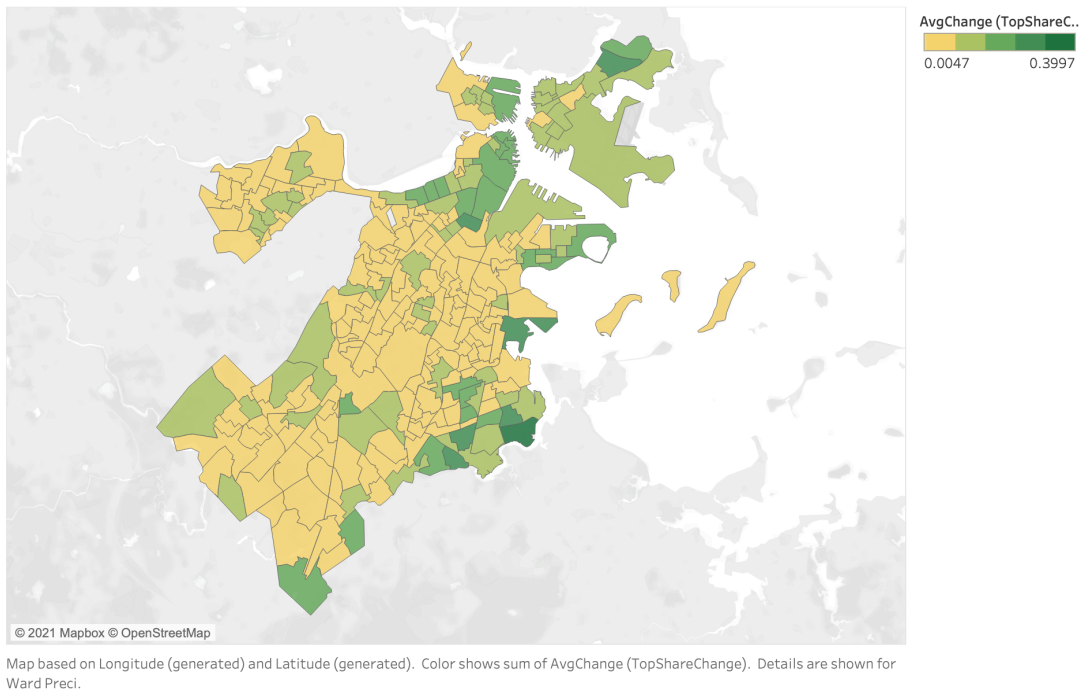Visualizing on a map the geographic distribution of each of these precincts:

Top 20 Precincts with the Greatest Change in Share of Voter Turnout

Map based on Longitude (generated) and Latitude (generated). Color shows details about In / Out of Top 20 with Greatest Change in Share of Voter Turnout. Details are shown for Ward Preci.

Here, we see that these precincts are a bit more scattered across Boston, but there is a slight concentration in Ward 17, an area of Dorchester. From our previous analysis, we also found that these same districts have a high Black population.

Viewing this information on a heat map:

Change in Share of Voters Heat Map

Map based on Longitude (generated) and Latitude (generated). Color shows sum of AvgChange (TopShareChange). Details are shown for Ward Preci.

Here, the greens indicated those districts which have experienced a measurable change in share of total voter turnout. As we can observe, a lot of the intense green is concentrated in the Dorchester neighborhoods, as well as near downtown Boston, Seaport, and East Boston.

Some visual Analysis on Tableau Charts:
Compared percentage based off of Race, and their voting pattern (were they in unison or not)

Some Analysis on City Council Data 2013-2019:

Black: The 20-25 districts of/near 1803 were districts that were high in black percentage, more than 80% (bottom center of boston), for city council data, from 2013 to 2017, they almost nearly voted in unison with other districts. However in 2019, each district's majority winner votes went 50% 25% 25% to different candidates.

Asian: In 2013, the percentage of asians was disperse but when it came to 2015 to 2019, we saw that only districts of 0506 and 0208 were asian percentages, most of the map was empty. (no voting?) These two districts selected a different candidate every year. (not in unison)

Hispanic: In 2013 to 2015, Hispanic dense district votes went to 2-3 candidates, but in 2017,2019, 80%+ hispanic percentage districts were almost in unison. Over the years from 2013-2019, dense hispanic percentage didn't really change, but 80%+ hispanic percentage districts got denser/darker in color.

White: In 2013, the white percentage was disperse throughout the map. However, in 2015-2019 the white percentage from the center of the map disappeared but then went towards the borders of boston. Around 35 Districts around district 2101, and around 2017. Voting-wise 80%+ white percentage districts were split every year, with the most unison-like year being in 2017

Unison means voting for the same candidate - only look at City Council At-Large