

Declaration of Eric Quinnell

1. My name is Dr. Eric Quinnell. I am over 18 years of age, and I am competent to testify in this action. All of the facts stated herein are true and based on my personal knowledge. All scientific conclusions herein are made to a reasonable degree of scientific certainty in my fields of expertise.

2. I received a Bachelor of Science Degree in Engineering in May of 2004, a Master of Science in Circuit Design in May of 2006, and a Doctorate in Computer Arithmetic in May of 2007, all from The University of Texas at Austin.

3. I have extensive professional experience as an engineer designing and leading teams engaged in various aspects of circuit architecture and processing. In this capacity, I frequently engage in complex and sophisticated predictive mathematical modeling and statistical analysis. I am required to prepare reports and analysis on the same for presentations to executives and other decision makers. I make this declaration in my personal capacity.

Executive Summary

4. I was asked to analyze the results of the 2020 General Election in Wayne and Oakland Counties, Michigan to determine if there were any statistical anomalies in voting, and if so, to perform a predictive modeling analysis to analyze those anomalies.

5. When compared to the 2016 General Election Democrat to Republican voting ratio, the voting distribution gains for 2020 are well outside the 2016 ratio of a multiple of 1.24 for Wayne County (outside Detroit) and 1.19 for Oakland County. Specifically, for every one additional voter for President Donald J. Trump ("Trump") over the full total from the 2016 General Election in e.g. Oakland County, former Vice-President Joseph R. Biden ("Biden") gained 2.32 additional voters over the full total from 2016 in Wayne County (outside Detroit) and 2.54 additional voters over the full total from 2016 in Oakland County.

6. At a county or district level of analysis, statistical anomalies appear in even greater ratios. For example, in the township of Livonia, Wayne County, which was a majority Republican county in the 2016 General Election, showed Biden gain 3.2 new voters to every 1 new Trump voter. Biden also achieved 97% of all additional new votes above 2016 General Election total vote sum Livonia, as well as achieved 151% more new votes than all total new registrations in the township, which is a significant mathematical curiosity.

7. Such local mathematical anomalies are not seen in all townships of both Wayne and Oakland Counties, but rather only a select few.

8. I constructed a mathematical model that subtracted out local statistical anomalies and renormalized them according to their 2016 ratios, all while keeping pace with the additional turnout for Trump as a control. This allowed me to quantize a predicted number of anomalous votes per county, which are listed at the end of the Declaration. In all, I identified some 40,771 votes as statistically anomalous in Wayne County (outside Detroit), and some 46,125 votes in Oakland County.

Data Set Selection

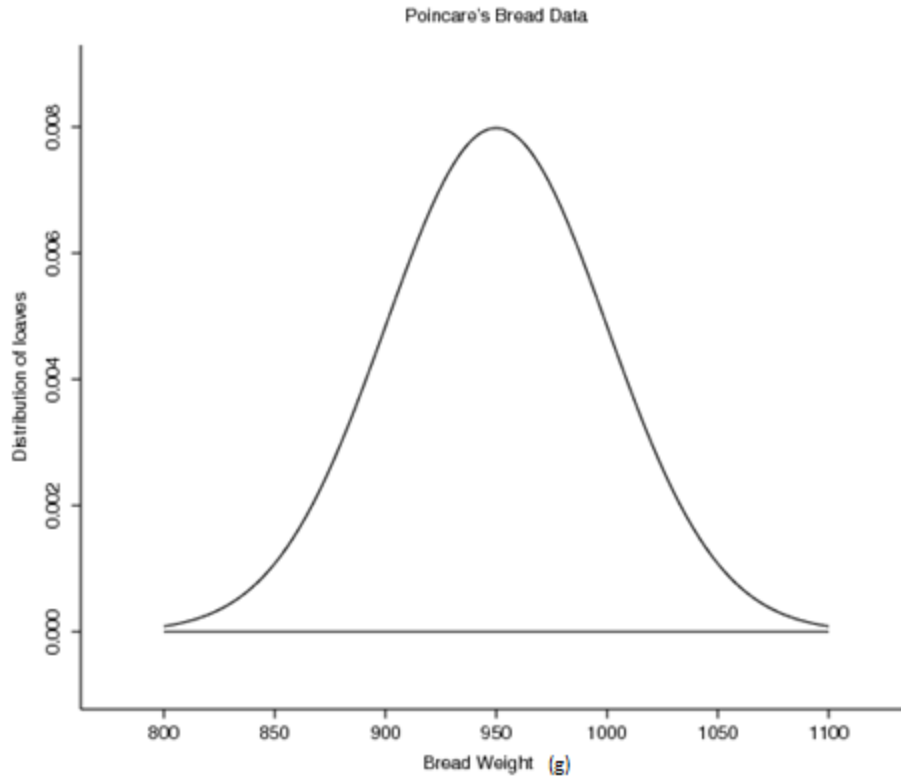
9. I retrieved publicly available data from the <https://www.waynecounty.com/elected/clerk/election-results.aspx> website containing the official Wayne County 2016 and 2020 General Election Results. I also retrieved the publicly available Oakland County 2020 General Election Results from <https://results.enr.clarityelections.com/MI/Oakland/105840/web.264614/#/summary> and the 2016 results from <https://www.oakgov.com/clerkrod/elections/Pages/past-election-results.aspx> websites as of November 24, 2020.

Basic Methodology

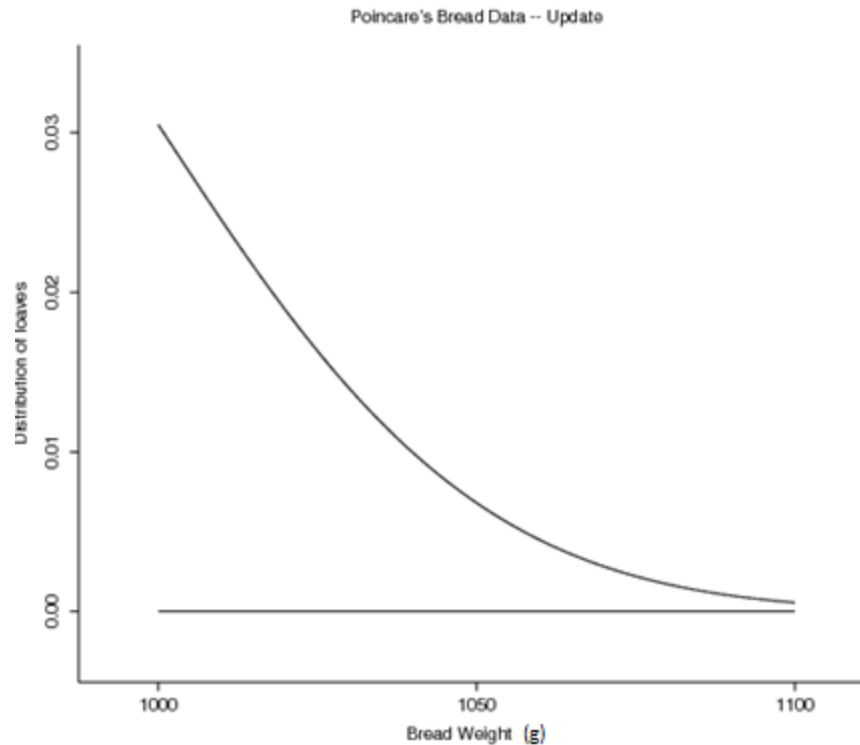
10. The anecdote of the 19th century French mathematician Henri Poincaré and a bread baker under his employ illustrate how one can use statistical inference to detect when agents are adjusting the data of the events under consideration. In particular, even if we only see part of behavior, we can often infer the rest.

11. Henri wished for a bakery he owned in Paris to produce bread that averaged 1kg in weight and provided capital accordingly to his baker. Every morning, the baker would bring bread to Henri, who, being a mathematician, would weigh the bread and record the weight in a log. After a year, Henri sued the baker for making bread consistently lighter than 1kg.

12. Henri's accusation was backed by the normal distribution of data (more commonly known as the "bell curve" or sometimes "Gaussian") of natural variation across a year of different bread. Henri said that the average (or "mean") of the weight of the bread was centered around 950g, and only weighing 1kg at a lower frequency. This means primitively that the weight of the bread he received was under the specified 1kg more than half the time.



13. The baker admitted his scheme, paid a fine, and was given a second chance to start being honest while working for Henri's bakery. The following year, the pattern repeated—the baker would bring bread to Henri, who would chart the weight. At the end of the year, Henri fired the baker for his continued scheme by showing him the plot of his newly logged bread-weight data.



14. The baker, caught again, asked how Henri managed to root out the scheme with this new graph, as it clearly says the bread was always at least 1kg. What Henri noticed is that when he plotted the frequencies of weights of the loaves, he did not see a distribution, but instead just a tail. This plot is indicative of the baker throwing away all data points less than 1kg. Henri told the baker that he inferred he didn't change his behavior, but merely always brought him the heaviest piece of bread in the day's batch.

15. Henri's correct observation of the statistical anomaly in this particular anecdote is an abuse of the "tail of the curve". In natural phenomena, nearly all repeated behaviors in nature have a universal variance—or a bell curve, albeit of different variants of shapes. History continues to show examples of such observable mathematical anomalies to the tail of a variance curve.

16. In addition to the mean¹ and the standard deviation², one can look at other statistics to get a sense of the shape of the

¹"Mean" is the average value of a dataset.

²"Standard Deviation" is the scale of fluctuations about the mean.

distribution. The next two are the skewness³ and the kurtosis⁴. These statistics are normalized by dividing by the standard deviation, so they are all of a comparable scale; the standard normal has a skewness of 0 and a kurtosis of 3. As we often expect our data to be close to a normal distribution, significant deviations from these values can indicate an event that is statistically anomalous.

Mathematical Signature of Differential Vote Gain Anomaly

17. To set a baseline of the variability of vote pattern changes from the 2016 General Election, I plot the natural distribution of gain/lost votes per specific precinct in a histogram plot for both Trump in Figure 1 and Biden in Figure 2 vote gains vs the 2016 General Election in the same areas. Oakland County is selected as a simpler example in the data shown:

³“Skew” or the “3rd moment” is the expected value of the cube of the fluctuations about the mean divided by the standard deviation. This tells us which side of the distribution has more mass.

⁴“Kurtosis” or the “4th moment” is the expected value of the fourth power of the fluctuations about the mean divided by the standard deviation, which informs us on how much of the tail is outside the main distribution.

**Trump Vote Gain over 2016
Distribution per precinct**

<i>MEAN</i>	70.79
<i>STDEV</i>	81.84
<i>Skew</i>	0.61
<i>Kurtosis</i>	11.67

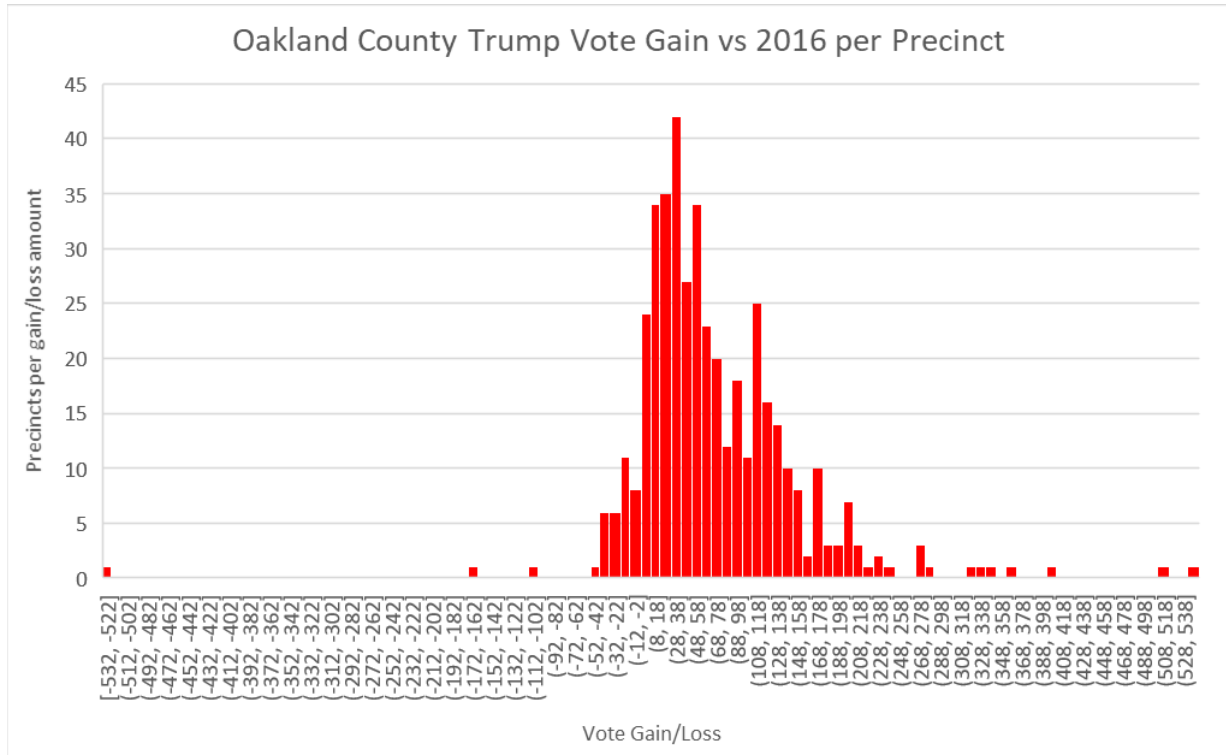


Figure 1. Trump Vote Gain Distribution vs 2016, Oakland County

**Biden Vote Gain over 2016
Distribution per precinct**

<i>MEAN</i>	179.83
<i>STDEV</i>	98.88
<i>Skew</i>	1.43
<i>Kurtosis</i>	10.43

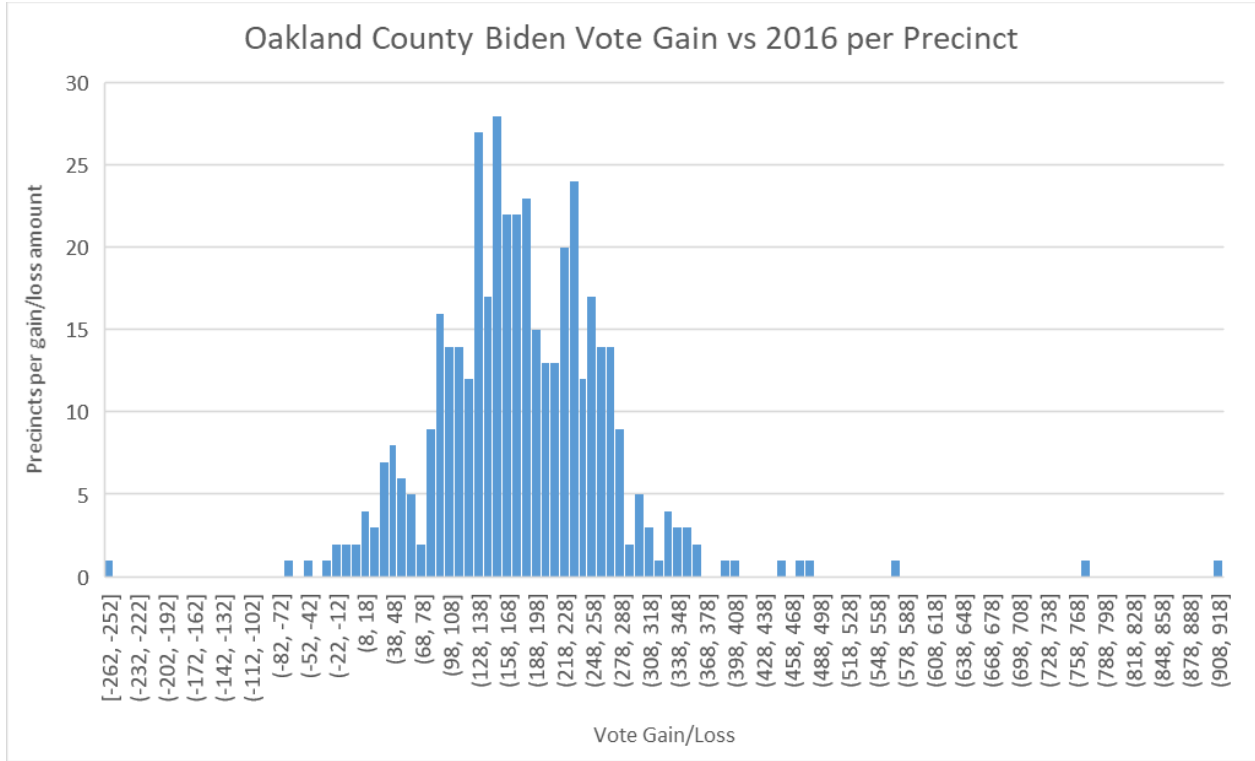


Figure 2. Biden Vote Gain Distribution vs 2016, Oakland County

18. Further, by calculating the gain in votes for both Trump and Biden over the respective 2016 total from the same districts, the Democratic/Republican ratio (D/R ratio or DEM/GOP ratio) of added votes gained for Biden over Trump was a 2.54x.

Gained Votes over 2016 Average per Precinct, Oakland County

<i>Trump</i>	70.79
<i>Biden</i>	179.83
<i>Diff</i>	109.04
<i>2020 DEM/GOP New Vote Gain Ratio</i>	2.54
<i>%</i>	72D / 28R
<i>2016 DEM/GOP Ratio</i>	1.19
<i>%</i>	54D / 46R

19. As an example of the anomalous vote gains above the norm, consider the township of Troy, broken into precincts. Nearly every single precinct first achieves the entire 2016 vote total for each party, but then a new population of votes skews excessively in favor of the Biden vote – resulting in a “new vote population” that is voting 82 D / 20 R ratio in a township that as recent as 2016 was almost evenly split at 51 D/ 49 R. Additionally, the votes gained by Biden well outpace even the new registrations in the township – gaining 109% of the new registered voters and 98% of the new votes above 2016.

2016						2020 Gain							
Precinct	Trump	Clinton	Total	Dem/Rep	% Dem	New Trump	New Biden	New Total	New Registered	Gain Dem/Rep	Dem % of New Registered	Dem % of New Votes	
Troy, Precinct 1	462	434	944	0.94	46%	40	226	230	199	5.65	114%	98%	
Troy, Precinct 2	805	792	1680	0.98	47%	53	231	217	189	4.36	122%	106%	
Troy, Precinct 3	791	572	1446	0.72	40%	137	270	343	337	1.97	80%	79%	
Troy, Precinct 4	974	998	2064	1.02	48%	48	350	341	273	7.29	128%	103%	
Troy, Precinct 5	683	453	1193	0.66	38%	18	120	104	72	6.67	167%	115%	
Troy, Precinct 6	204	177	402	0.87	44%	19	55	61	40	2.89	138%	90%	
Troy, Precinct 7	571	625	1251	1.09	50%	49	197	201	184	4.02	107%	98%	
Troy, Precinct 8	536	731	1337	1.36	55%	29	153	125	68	5.28	225%	122%	
Troy, Precinct 9	843	746	1683	0.88	44%	134	188	254	216	1.40	87%	74%	
Troy, Precinct 10	760	673	1518	0.89	44%	21	306	263	273	14.57	112%	116%	
Troy, Precinct 11	754	680	1496	0.90	45%	-12	183	123	87	-15.25	210%	149%	
Troy, Precinct 12	523	534	1103	1.02	48%	56	128	155	137	2.29	93%	83%	
Troy, Precinct 13	939	1037	2112	1.10	49%	37	312	251	217	8.43	144%	124%	
Troy, Precinct 14	763	679	1508	0.89	45%	50	244	249	270	4.88	90%	98%	
Troy, Precinct 15	695	687	1443	0.99	48%	2	288	254	200	144.00	144%	113%	
Troy, Precinct 16	549	599	1223	1.09	49%	60	197	205	224	3.28	88%	96%	
Troy, Precinct 17	746	830	1644	1.11	50%	-35	219	133	139	-6.26	158%	165%	
Troy, Precinct 18	618	529	1208	0.86	44%	-14	177	127	111	-12.64	159%	139%	
Troy, Precinct 19	595	531	1189	0.89	45%	-32	224	157	73	-7.00	307%	143%	
Troy, Precinct 20	812	766	1647	0.94	47%	24	267	246	198	11.13	135%	109%	
Troy, Precinct 21	486	536	1096	1.10	49%	67	194	214	213	2.90	91%	91%	
Troy, Precinct 22	838	1008	1941	1.20	52%	82	320	329	325	3.90	98%	97%	
Troy, Precinct 23	866	954	1908	1.10	50%	124	344	403	380	2.77	91%	85%	
Troy, Precinct 24	801	669	1554	0.84	43%	181	178	311	295	0.98	60%	57%	
Troy, Precinct 25	724	802	1604	1.11	50%	153	216	329	363	1.41	60%	66%	
Troy, Precinct 26	616	699	1421	1.13	49%	120	332	369	330	2.77	101%	90%	
Troy, Precinct 27	404	671	1131	1.66	59%	128	150	246	280	1.17	54%	61%	
Troy, Precinct 28	380	679	1109	1.79	61%	60	155	173	149	2.58	104%	90%	
Troy, Precinct 29	840	885	1848	1.05	48%	35	236	179	168	6.74	140%	132%	
Troy, Precinct 30	202	199	425	0.99	47%	-12	81	56	27	-6.75	300%	145%	
Troy, Precinct 31	319	238	590	0.75	40%	24	136	141	95	5.67	143%	96%	
Precinct	Trump	Clinton	Total	Dem/Rep	% Dem	New Trump	New Biden	New Total	New Registered	Gain Dem/Rep	Dem % of New Registered	Dem % of New Votes	
TOTAL	20099	20413	42718	1.02	48%	1646	6677	6789	6132	4.06	109%	98%	
			2016 Troy Dem/Rep	51D / 49R					2020 Troy Gain Dem/Rep	80D / 20R			

20. For completeness, I now list the similar observations for Wayne County, specifically in the townships outside Detroit. The D/R ratio of added votes gained for Biden over Trump in this area was a 2.32x.

Gained Votes over 2016 Average

**per Precinct, Wayne County
(outside Detroit)**

<i>Trump</i>	79.85
<i>Biden</i>	185.41
<i>Diff</i>	105.56
<i>2020 DEM/GOP New Vote Gain Ratio</i>	2.32
%	70D / 30R
<i>2016 DEM/GOP Ratio</i>	1.24
%	55D / 45R

21. As an example of the anomalous vote gains above the norm in Wayne County, consider the township of Livonia, broken into precincts. Nearly every single precinct first achieves the entire 2016 vote total for each party, but then a new population of votes skews excessively in favor of the Biden vote – resulting in a “new vote population” that is voting 76 D / 24 R ratio in a township that as recent as 2016 was Republican. Additionally, the votes gained by Biden well outpace even the new registrations in the township – gaining 151% of the new registered voters and 97% of the new votes above 2016.

2016						2020 Gain							
Precinct	Trump	Clinton	Total	Dem/Rep	% Dem	New Trump	New Biden	New Total	New Registered	Gain Dem/Rep	Dem % of New Registered	Dem % of New Votes	
													Livonia Pct 1A
Livonia Pct 1B	310	348	706	1.12	49%	51	106	137	94	2.08	113%	77%	
Livonia Pct 2A	630	634	1337	1.01	47%	58	214	230	158	3.69	135%	93%	
Livonia Pct 3A	467	492	1035	1.05	48%	64	125	132	105	1.95	119%	95%	
Livonia Pct 3B	854	722	1680	0.85	43%	87	183	214	132	2.10	139%	86%	
Livonia Pct 4A	1034	834	1961	0.81	43%	44	233	217	137	5.30	170%	107%	
Livonia Pct 7A	823	638	1514	0.78	42%	31	164	168	102	5.29	161%	98%	
Livonia Pct 8A	752	398	1212	0.53	33%	20	134	123	71	6.70	189%	109%	
Livonia Pct 8B	598	426	1082	0.71	39%	18	135	114	30	7.50	450%	118%	
Livonia Pct 9A	947	635	1651	0.67	38%	12	264	238	146	22.00	181%	111%	
Livonia Pct 10A	615	478	1168	0.78	41%	47	153	152	105	3.26	146%	101%	
Livonia Pct 11A	797	715	1625	0.90	44%	53	218	193	95	4.11	229%	113%	
Livonia Pct 12A	544	671	1293	1.23	52%	78	159	183	146	2.04	109%	87%	
Livonia Pct 13A	637	709	1426	1.11	50%	44	180	177	131	4.09	137%	102%	
Livonia Pct 14A	755	721	1582	0.95	46%	53	163	143	60	3.08	272%	114%	
Livonia Pct 15A	732	563	1361	0.77	41%	74	140	181	114	1.89	123%	77%	
Livonia Pct 16A	713	506	1294	0.71	39%	84	133	176	106	1.58	125%	76%	
Livonia Pct 16B	479	408	961	0.85	42%	46	85	83	44	1.85	193%	102%	
Livonia Pct 178	646	493	1219	0.76	40%	114	226	287	297	1.98	76%	79%	
Livonia Pct 17A	732	488	1284	0.67	38%	-61	136	42	-111	-2.23	-123%	324%	
Livonia Pct 18A	884	597	1552	0.68	38%	57	161	171	88	2.82	183%	94%	
Livonia Pct 19A	674	494	1244	0.73	40%	57	148	158	103	2.60	144%	94%	
Livonia Pct 19B	768	598	1472	0.78	41%	69	183	181	68	2.65	269%	101%	
Livonia Pct 20A	861	602	1555	0.70	39%	32	208	183	90	6.50	231%	114%	
Livonia Pct 21A	715	566	1369	0.79	41%	39	219	207	100	5.62	219%	106%	
Livonia Pct 22A	712	576	1396	0.81	41%	33	223	192	119	6.76	187%	116%	
Livonia Pct 22B	592	486	1142	0.82	43%	32	128	125	86	4.00	149%	102%	
Livonia Pct 238	508	325	876	0.64	37%	119	390	498	524	3.28	74%	78%	
Livonia Pct 23A	579	550	1199	0.95	46%	-31	-89	-164	-315	2.87	28%	54%	
Livonia Pct 24B	492	591	1149	1.20	51%	102	235	313	182	2.30	129%	75%	
Livonia Pct 24A	535	610	1215	1.14	50%	69	126	155	161	1.83	78%	81%	
Livonia Pct 25A	358	358	784	1.00	46%	24	122	105	107	5.08	114%	116%	
Livonia Pct 31A	654	561	1286	0.86	44%	69	197	224	152	2.86	130%	88%	
Livonia Pct 31B	600	520	1199	0.87	43%	45	193	190	172	4.29	112%	102%	
Livonia Pct 32A	739	537	1345	0.73	40%	73	148	178	115	2.03	129%	83%	
Livonia Pct 33A	850	680	1616	0.80	42%	86	225	257	136	2.62	165%	88%	
Livonia Pct 34A	683	746	1532	1.09	49%	83	257	280	158	3.10	163%	92%	
Livonia Pct 34B	651	591	1345	0.91	44%	48	215	197	126	4.48	171%	109%	
Livonia Pct 34C	539	487	1107	0.90	44%	25	187	154	119	7.48	157%	121%	
Livonia Pct 35A	517	468	1085	0.91	43%	67	130	121	65	1.94	200%	107%	
Livonia Pct 35B	350	343	753	0.98	46%	28	144	135	62	5.14	232%	107%	
Livonia Pct 35C	330	315	703	0.95	45%	45	121	121	70	2.69	173%	100%	
Livonia Pct 36A	407	462	944	1.14	49%	62	145	163	151	2.34	96%	89%	
Livonia Pct 36B	534	469	1079	0.88	43%	104	165	219	142	1.59	116%	75%	
Precinct	Trump	Clinton	Total	Dem/Rep	% Dem	New Trump	New Biden	New Total	New Registered	Gain Dem/Rep	Dem % of New Registered	Dem % of New Votes	
TOTAL	28247	24194	55896	0.86	43%	2373	7595	7863	5015	3.20	151%	97%	
			2016 Dem/Rep	46D / 54R					2020 Gain Dem/Rep	76D / 24 R			

Predictive Model to Identify Mathematically Anomalous Vote Totals

22. I constructed a reverse engineered predictive model to identify and correct where such anomalies existed at a precinct level by using the 2016 General Election D/R total ratio per precinct and comparing them to the same ratio in the same precinct in 2020. The Trump 2020 General Election vote gain distributions are used as a

control for the increase in turnout (generally) in both counties as applied to both campaigns. The model is not presuming a standard normal distribution, but rather one with a mean that increases according to the 2016 General Election D/R ratio within a reasonable variance.

23. To achieve this, I did not create a distribution model from scratch. Rather, I began with the actual Biden 2020 General Election vote distribution and corrected anomalies from the original, district by district, until the distribution targets were achieved.

24. The difference between the raw 2020 General Election data and the reverse-engineered predictive model follows for Oakland County.

The 2020 General Election Oakland County raw data results are below:

2020 Actual	Register	Voted	Biden	Trump	D/R
	1035172	771991	434148	325971	1.33
<i>Turnout</i>	75%		56%	42%	

The predicted model, holding turnout and 2016 General Election ratios consistent and correlated to the Trump baseline in the 2020 General Election for Oakland County, are below:

Total Predicted 2020	Register	Voted	Biden	Trump	D/R	Excess Votes
	1035172	750646	388023	325971	1.19	46,125
<i>turnout</i>	73%		52%	43%		

The difference between the 2020 General Election raw data and the predicted correction show exceedingly large vote block gains to only specific townships.

25. The difference between the raw 2020 General Election data and the reverse-engineered predictive model follows for Wayne County (outside Detroit).

The 2020 General Election Wayne County (outside Detroit) raw data results are below:

2020 Actual	Register	Voted	Biden	Trump	D/R
	900050	620483	356234	251664	1.42
<i>Turnout</i>	68.9%		57.4%	40.6%	

The predicted model, holding turnout and 2016 General Election ratios consistent and correlated to the Trump baseline in the 2020 General Election for Wayne County (outside Detroit), are below:

Total Predicted 2020	Register	Voted	Biden	Trump	D/R	Excess Votes
	900050	580056	315807	251664	1.25	40,771
<i>turnout</i>	64.4%		54.4%	43.4%		

Again, the difference between the 2020 General Election raw data and the predicted correction show exceedingly large vote block gains to only specific townships.

Full Predictive List of Biden Vote Gains Outside the Predicted Distribution in Wayne and Oakland Counties

26. While some counties hold their 2016 ratio gains well within the historical variance and match the model perfectly, other counties or super districts stand out. Specifically, first in Oakland County, ~266 precincts of ~434 precincts (with some precincts merged to average out redistricting) have a sum of ~46,125 votes in excess of the predicted model. These votes are statistically anomalous.

27. As an example, the top 6 set of townships in Oakland County significantly exceeding the predicted model are shown:

***Township* Excess Votes**

<i>Troy</i>	4781
<i>Royal Oak</i>	4152
<i>Novi</i>	3911
<i>Farmington Hills</i>	3598
<i>Rochester Hills</i>	3597
<i>Bloomfield</i>	2696

With the aforementioned township of Troy listed like this:

<i>Township</i>	Precinct	Excess Votes above Prediction
<i>Troy</i>		4781
	Troy, Precinct 1	188
	Troy, Precinct 2	179
	Troy, Precinct 3	171
	Troy, Precinct 4	301
	Troy, Precinct 5	108
	Troy, Precinct 6	39
	Troy, Precinct 7	143
	Troy, Precinct 8	113
	Troy, Precinct 9	0
	Troy, Precinct 10	287
	Troy, Precinct 11	194
	Troy, Precinct 12	71
	Troy, Precinct 13	271
	Troy, Precinct 14	200
	Troy, Precinct 15	286
	Troy, Precinct 16	132
	Troy, Precinct 17	258
	Troy, Precinct 18	189
	Troy, Precinct 19	253

Troy, Precinct 20	244
Troy, Precinct 21	120
Troy, Precinct 22	221
Troy, Precinct 23	207
Troy, Precinct 24	0
Troy, Precinct 25	0
Troy, Precinct 26	196
Troy, Precinct 27	0
Troy, Precinct 28	0
Troy, Precinct 29	199
Troy, Precinct 30	93
Troy, Precinct 31	118

28. Repeating for Wayne County (outside Detroit), ~266 precincts of ~434 precincts (with some precincts merged to average out redistricting) have a sum of ~46,125 votes in excess of the predicted model. These votes are statistically anomalous.

29. As an example, the top 6 set of townships in Wayne County (outside Detroit) significantly exceeding the predicted model are shown:

Township	Excess Votes
<i>Canton</i>	5735
<i>Livonia</i>	5428
<i>Redford</i>	4159
<i>Gr Pointe</i>	3052
<i>Taylor</i>	2891
<i>Westland</i>	2559

With the aforementioned township of Livonia listed like this:

<i>Township</i>	Precinct	Excess Votes above Prediction
<i>Livonia</i>		5428
	Livonia Pct 1A	120
	Livonia Pct 1B	49
	Livonia Pct 2A	156
	Livonia Pct 3A	58
	Livonia Pct 3B	109
	Livonia Pct 4A	198
	Livonia Pct 7A	140
	Livonia Pct 8A	123
	Livonia Pct 8B	122
	Livonia Pct 9A	256
	Livonia Pct 10A	116
	Livonia Pct 11A	170
	Livonia Pct 12A	63
	Livonia Pct 13A	131
	Livonia Pct 14A	112
	Livonia Pct 15A	83
	Livonia Pct 16A	73
	Livonia Pct 16B	46
	Livonia Pct 178	139
	Livonia Pct 17A	45
	Livonia Pct 18A	123
	Livonia Pct 19A	106
	Livonia Pct 19B	129
	Livonia Pct 20A	186
	Livonia Pct 21A	188
	Livonia Pct 22A	196
	Livonia Pct 22B	102
	Livonia Pct 238	314
	Livonia Pct 23A	60
	Livonia Pct 24B	112
	Livonia Pct 24A	47
	Livonia Pct 25A	98
	Livonia Pct 31A	138

	Livonia Pct 31B	154
	Livonia Pct 32A	95
	Livonia Pct 33A	156
	Livonia Pct 34A	166
	Livonia Pct 34B	171
	Livonia Pct 34C	164
	Livonia Pct 35A	69
	Livonia Pct 35B	117
	Livonia Pct 35C	78
	Livonia Pct 36A	75
	Livonia Pct 36B	74

I declare under the penalty of perjury that the foregoing is true and correct.

November 25, 2020

Eric Quinnell, Ph.D.