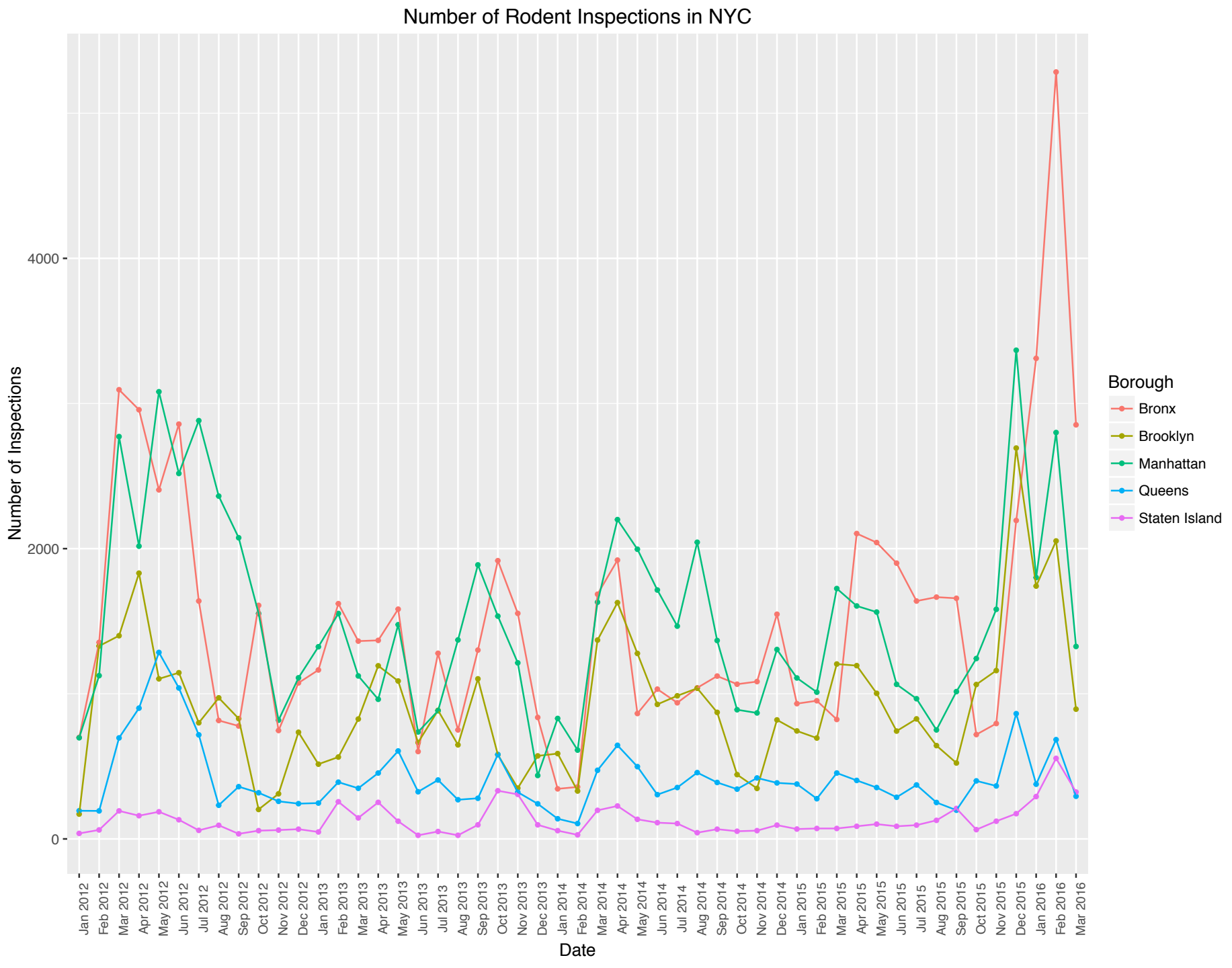
ANALYTICS & THE DIGITAL ECONOMY: HW1

VINIT SHAH

PART 1A


Number of Rodent Inspections in NYC
Number of Inspections
4000
2000
0
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Apr 2013
May 2013
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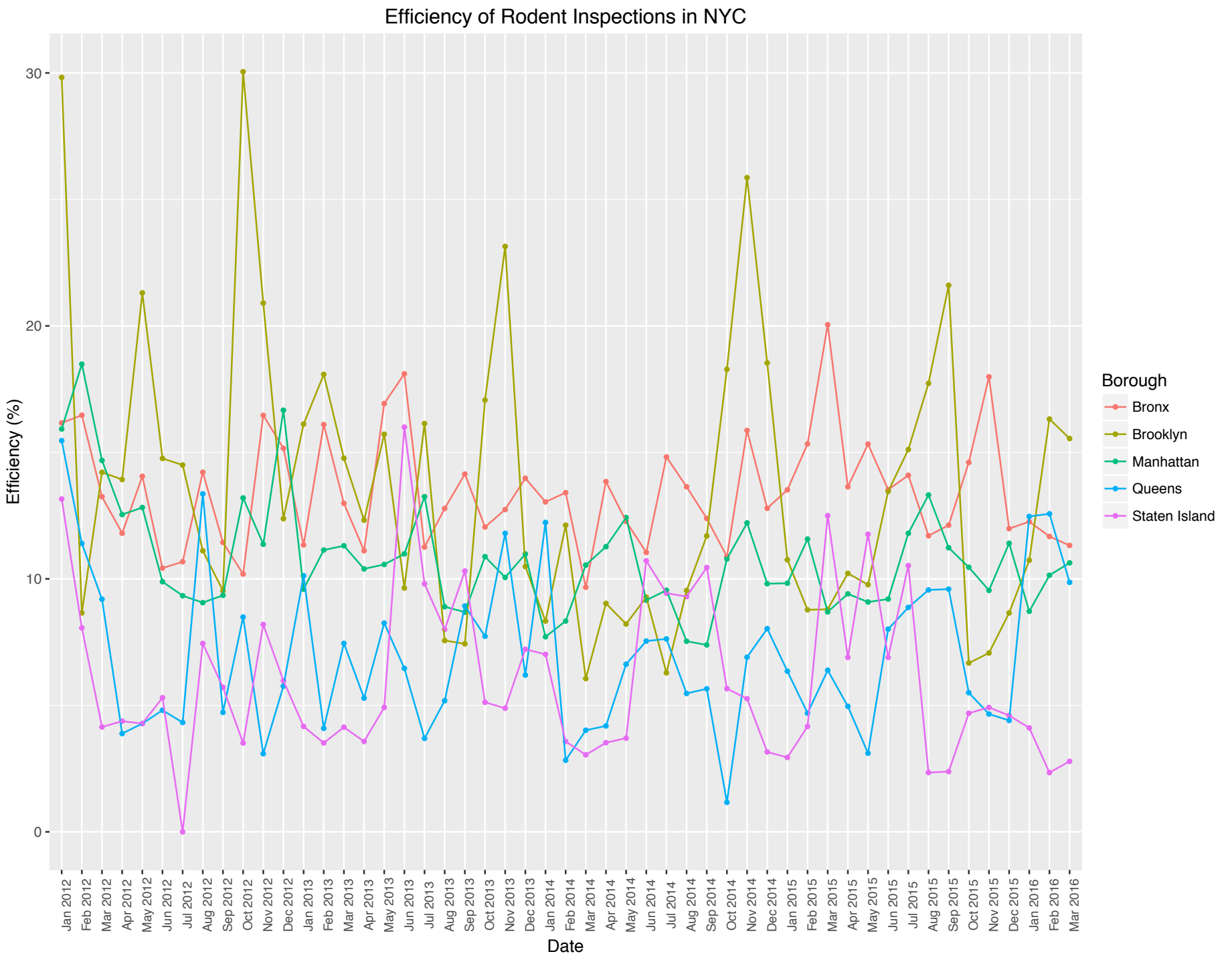
Jan 2015
Feb 2015
Mar 2015
Apr 2015
May 2015
Jun 2015
Jul 2015
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Date
Borough
Bronx
Brooklyn
Manhattan
Queens
Staten Island

PART 1B


Efficiency of Rodent Inspections in NYC
Efficiency (%)
30
20
10
0
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
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Dec 2015
Jan 2016
Feb 2016
Mar 2016
Date
Borough
Bronx
Brooklyn
Manhattan
Queens
Staten Island

PART 1C

	ZipCode	Result	Num. Active Rat Signs
257	10457	Active Rat Signs	2377
258	10458	Active Rat Signs	2340
256	10456	Active Rat Signs	1656
268	10468	Active Rat Signs	1489
304	11221	Active Rat Signs	1325
252	10452	Active Rat Signs	1268
253	10453	Active Rat Signs	1238
319	11237	Active Rat Signs	1179
267	10467	Active Rat Signs	1051
197	10009	Active Rat Signs	864

PART 2A

Pre-Sandy

ZipCode	Result	Num. Active Rat Signs Pre-Sandy
10457	Active Rat Signs	596
10456	Active Rat Signs	563
10458	Active Rat Signs	469
11221	Active Rat Signs	360
10453	Active Rat Signs	336
10009	Active Rat Signs	300
10468	Active Rat Signs	299
10002	Active Rat Signs	292
11237	Active Rat Signs	285
10031	Active Rat Signs	281
10472	Active Rat Signs	275
10029	Active Rat Signs	250
10032	Active Rat Signs	249
10459	Active Rat Signs	238
10013	Active Rat Signs	237
11206	Active Rat Signs	236
11217	Active Rat Signs	229
10452	Active Rat Signs	225
11211	Active Rat Signs	223
11238	Active Rat Signs	221

During-Sandy

ZipCode	Result	Num. Active Rat Signs During Sandy
10025	Rodent	14
11237	Rodent	12
10456	Rodent	11
10458	Rodent	11
10027	Rodent	10
11207	Rodent	10
11208	Rodent	9
11216	Rodent	9
11235	Rodent	9
10016	Rodent	8
10467	Rodent	7
11221	Rodent	7
11222	Rodent	7
11226	Rodent	7
10452	Rodent	6
10466	Rodent	6
10013	Rodent	5
10024	Rodent	5
10032	Rodent	5
10453	Rodent	5

Post-Sandy

ZipCode	Result	Num. Active Rat Signs Post-Sandy
10457	Active Rat Signs	1257
10458	Active Rat Signs	1203
10456	Active Rat Signs	883
10452	Active Rat Signs	809
10468	Active Rat Signs	724
10453	Active Rat Signs	654
11237	Active Rat Signs	602
11221	Active Rat Signs	590
10009	Active Rat Signs	582
10467	Active Rat Signs	479
10002	Active Rat Signs	445
10029	Active Rat Signs	433
11206	Active Rat Signs	417
10025	Active Rat Signs	402
11216	Active Rat Signs	390
10460	Active Rat Signs	388
10027	Active Rat Signs	364
10033	Active Rat Signs	364
10032	Active Rat Signs	321
10459	Active Rat Signs	312

PART 2B

- Hurricane Sandy has had a significant impact on the rat population. As you can see from the charts on the previous slide, the number of rat sightings post Sandy is almost double that of prior to Sandy.
- Additionally, in terms of displacement, the top 3 in the pre Sandy and the post Sandy list are the same. Thus the rat population hasn't been displaced significantly.
- There is a slight change in the top 20 list when it comes to rat sightings during Sandy. There's a few coastal regions which breakthrough to the top (10025).

PART 3

```
Call:
glm(formula = RatViolation ~ Month + Year + Efficiency, family = binomial,
    data = foo_restfin)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-0.4947  -0.4677  -0.4443  -0.4192   2.2793

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -9.4858009 29.5821351  -0.321 0.748468
Month2      -0.0614450  0.0255358  -2.406 0.016118 *
Month3      -0.1281905  0.0259905  -4.932 8.13e-07 ***
Month4      -0.1648209  0.0271900  -6.062 1.35e-09 ***
Month5      -0.1892264  0.0274164  -6.902 5.13e-12 ***
Month6      -0.0923267  0.0277900  -3.322 0.000893 ***
Month7       0.0326829  0.0276336   1.183 0.236919
Month8       0.0975510  0.0272943   3.574 0.000352 ***
Month9       0.1259630  0.0267799   4.704 2.56e-06 ***
Month10      0.1518391  0.0263876   5.754 8.71e-09 ***
Month11      0.1598644  0.0282302   5.663 1.49e-08 ***
Month12      0.0848802  0.0269177   3.153 0.001614 **
Year2011     7.2834882 29.5832475   0.246 0.805525
Year2012     7.2076371 29.5821371   0.244 0.807503
Year2013     7.1763126 29.5821308   0.243 0.808323
Year2014     7.2871566 29.5821304   0.246 0.805422
Year2015     7.2839545 29.5821300   0.246 0.805506
Year2016     7.2881379 29.5821355   0.246 0.805396
Efficiency  -0.0002146  0.0002112  -1.016 0.309649
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 261904  on 412922  degrees of freedom
Residual deviance: 261319  on 412904  degrees of freedom
  (56422 observations deleted due to missingness)
AIC: 261357

Number of Fisher Scoring iterations: 8
```

PART 3

- The Months seem to be significant predictors with P-values which are extremely close to 0. Other than July, all months are significant predictors of Rat Violations. Years are not good predictors.
- This regression model supports: An alternative argument is that a lower rat inspection hit rate in homes can indicate that many people are *seeing* rats, but inspectors are not finding them in homes, which suggests that they may be nesting at local establishments (especially restaurants because they are attracted to food).
- The finding above is so because, there isn't a strong correlation between Active Rat Sightings or Efficiency in my model, and Rat Violations.

THANK YOU!