Coffee Shop, an Indicator of Gentrification and Crime
-- A Study of Neighborhood Gentrification in New York City, 2006 to 2017

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Introduction

The paper studies the relationships between gentrification and the counts of neighborhood crime(robbery) by measuring the growth and geographic spread of coffee shops.

Coffee shop as an indicator:
The annual counts of neighborhood coffee shops provide a measure of social economic development and changing consumption patterns that tap into central theoretical frames within the gentrification literature (Papachristos et al., 2011).

Analysis is presented in two stages
(1) **descriptive analysis** of the distribution of crime and coffee shops in New York City;
(2) **longitudinal analysis** of neighborhood levels of gentrification predicting crime.

PCA

Table 1. Principal Component Factor Analysis

	Factor Loading	Cronbach's Alpha
Panel A: Census Indicators with Coffee Shop Variable		
Neighborhood Change		0.899
Percentage of bachelor's degree	0.936	
Log of mean family income	0.991	
Percentage of population below 200% poverty line	-0.692	
Counts of Coffee Shops	0.626	
Racial Demographics Change		0.908
Percentage of White	-0.827	
Percentage of Black	0.95	
Panel B: Census Indicators without Coffee Shop Variable		
Neighborhood Change		
Percentage of bachelor's degree	0.818	0.902
Log of mean family income	1.099	
Percentage of population below 200% poverty line	-0.777	
Racial Demographics Change		
Percentage of White	-0.823	0.908
Percentage of Black	0.948	

Descriptive Analysis

Robbery Decrease from 2006 to 2017

Count 3 — 728

Percent with Bachelor Degree Change from 2006 to 2017

Percent -2.71 — 18.24

Coffee Shop Increase from 2006 to 2017

Count 10 — 243

Percent White Change from 2006 to 2017

Percent -15.75 — 13.37

Heterogeineity across years

FIG. 1. Maps of New York City depicting robbery, coffee shop and some census factors change from 2006 to 2017.

FIG. 2. Annual number of coffee shops, and robbery in New York City, 2006 to 2017 for 42 neighborhoods.

Longitudinal Analysis

1. Method and Model

Longitudinal Poisson regression models with neighborhood fixed effects are used as the models reveal that gentrification is a racialized process, in which the effect of gentrification on crime is different for White gentrifying neighborhoods than for Black gentrifying neighborhoods.

2. Model Comparison

Table 2 Fixed Effect Regression Results

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=================================================================
                                    Dependent variable:
                        -----------------------------------------
                                  Counts of Robbery
                           (1)       (2)       (3)       (4)       (5)
-----------------------------------------------------------------
Number of Coffee Shops   -0.554**  -0.395   -1.841***          -0.316
                         (0.245)   (0.242)  (0.147)            (0.232)

Percent with Bachelor   -1,849.302*** -1,544.773***         -1,666.873*** -1,606.393***
Degree                  (197.230)  (195.924)                (181.441)  (188.182)

Log Mean Family Income  -0.0002    -0.001**             -0.002***  -0.001**
                        (0.001)    (0.0005)             (0.0004)   (0.0005)

Percent of People 200%  -684.064** -1,263.789***        -1,175.694*** -997.741***
Below Poverty Line      (290.371)  (363.364)            (360.120)  (276.015)

Percent White                     -270.001    -156.784
                                  (239.952)  (230.190)

Percent Black                     1,106.425*** 1,215.295*** 1,272.058***
                                  (230.291)  (220.882)  (177.169)

Lagged Robbery                              -0.024
                                            (0.046)

-----------------------------------------------------------------
Observations             420       420       420       420       420
Total Sum of Squares:    3003600   3003600   3003600   3003600   3003600
Residual Sum of Squares: 1684500   1474900   2109900   1485400   1479900
R-Squared:               0.43919   0.50896   0.29756   0.50545   0.50729
Adj. R-Squared:          0.37172   0.44692   0.21722   0.44446   0.44653
-----------------------------------------------------------------
Note:                              *p<0.1; **p<0.05; ***p<0.01
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Wald test is used to find if explanatory variables in a model are significant.
The first model is selected as the final model.

3. Validation

1) R-square = **0.9641209**

compared to the R-squared estimated for the full (individual fixed effects) model, it is a pretty good estimate.
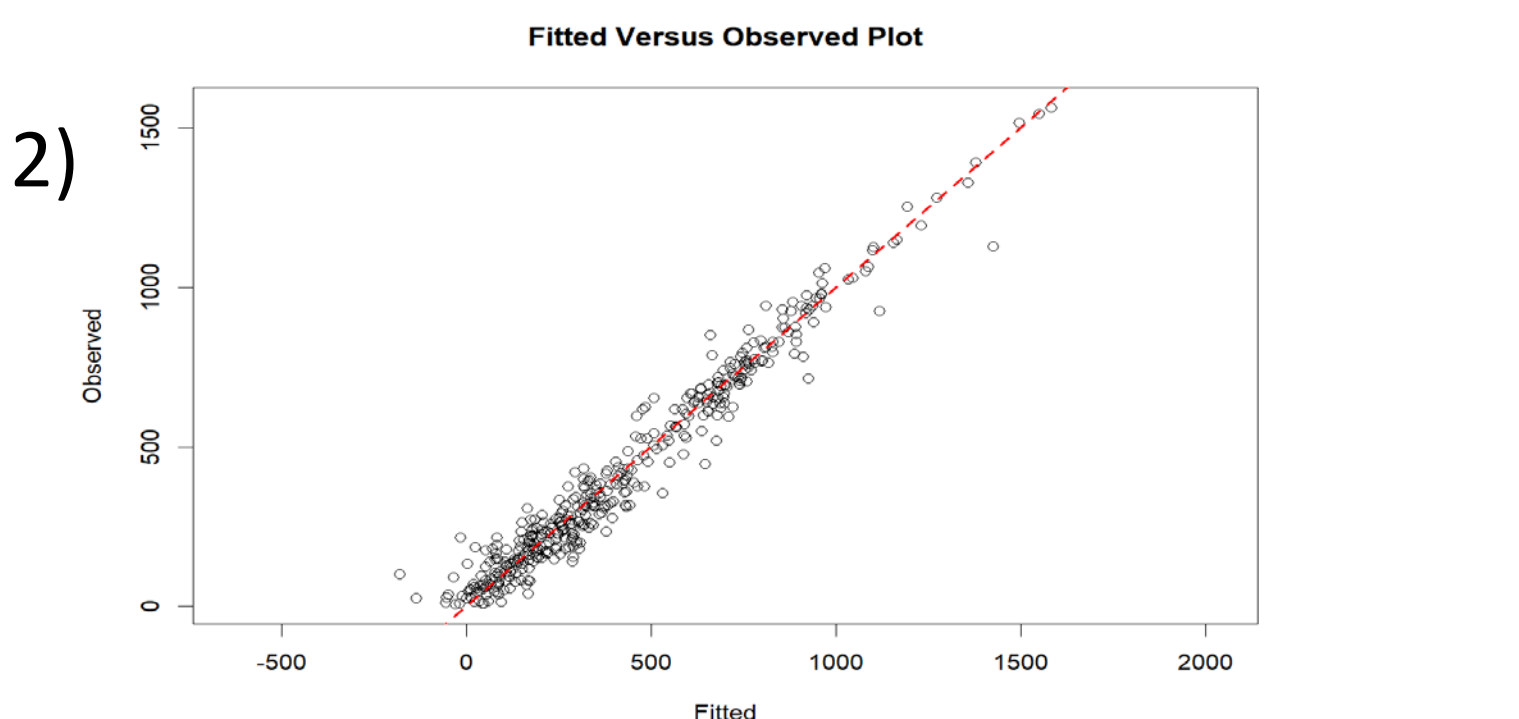
2)

FIG. 3. Fitted Value Compare with Observed Value
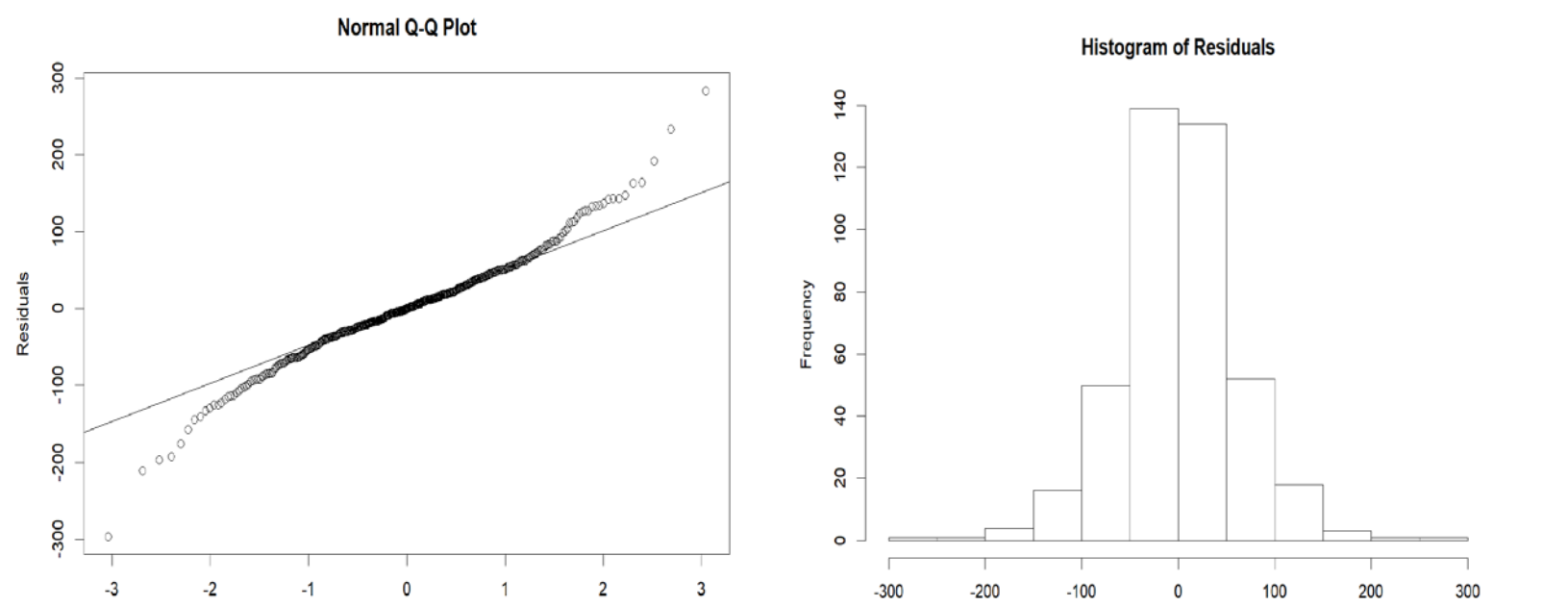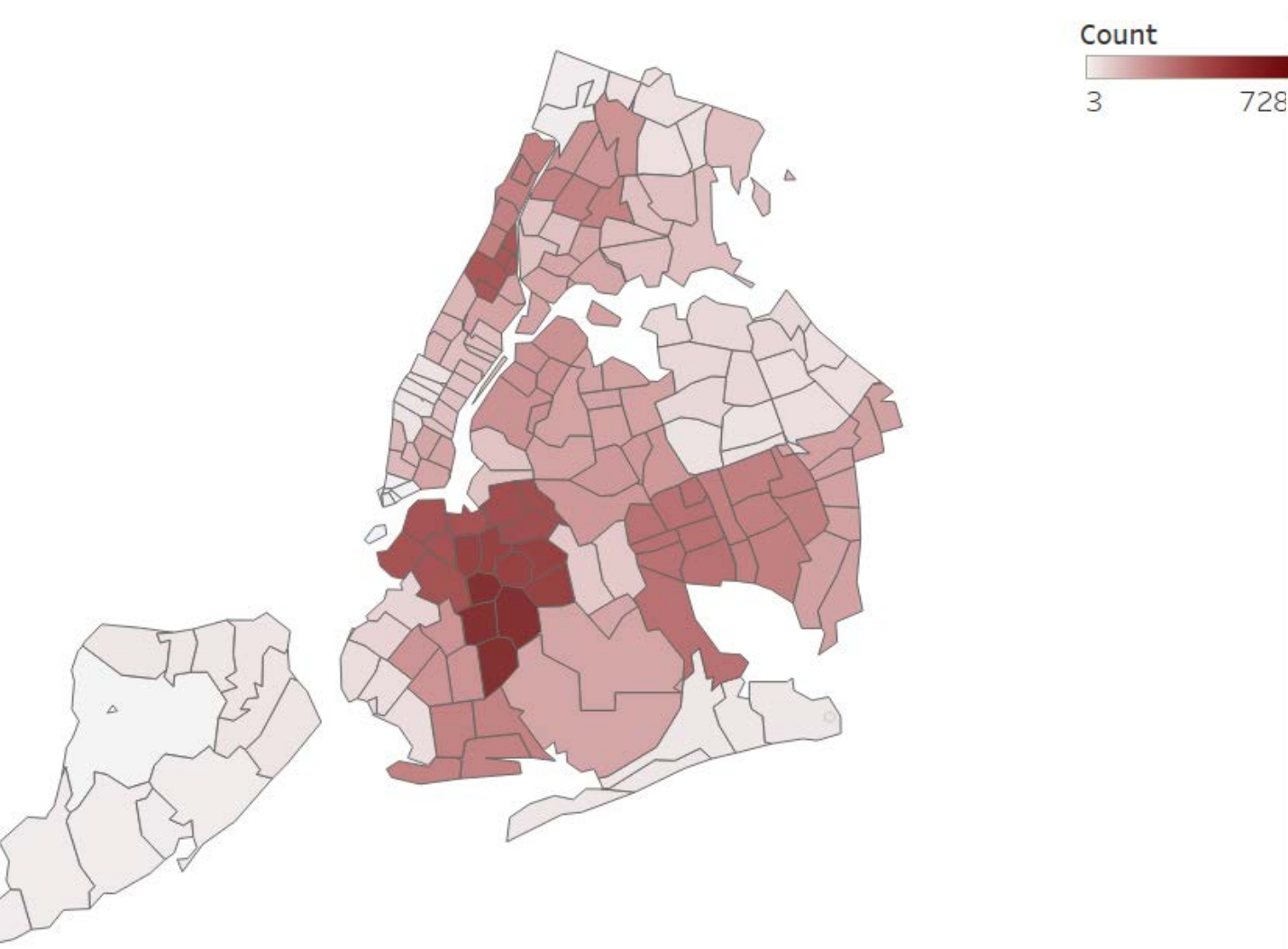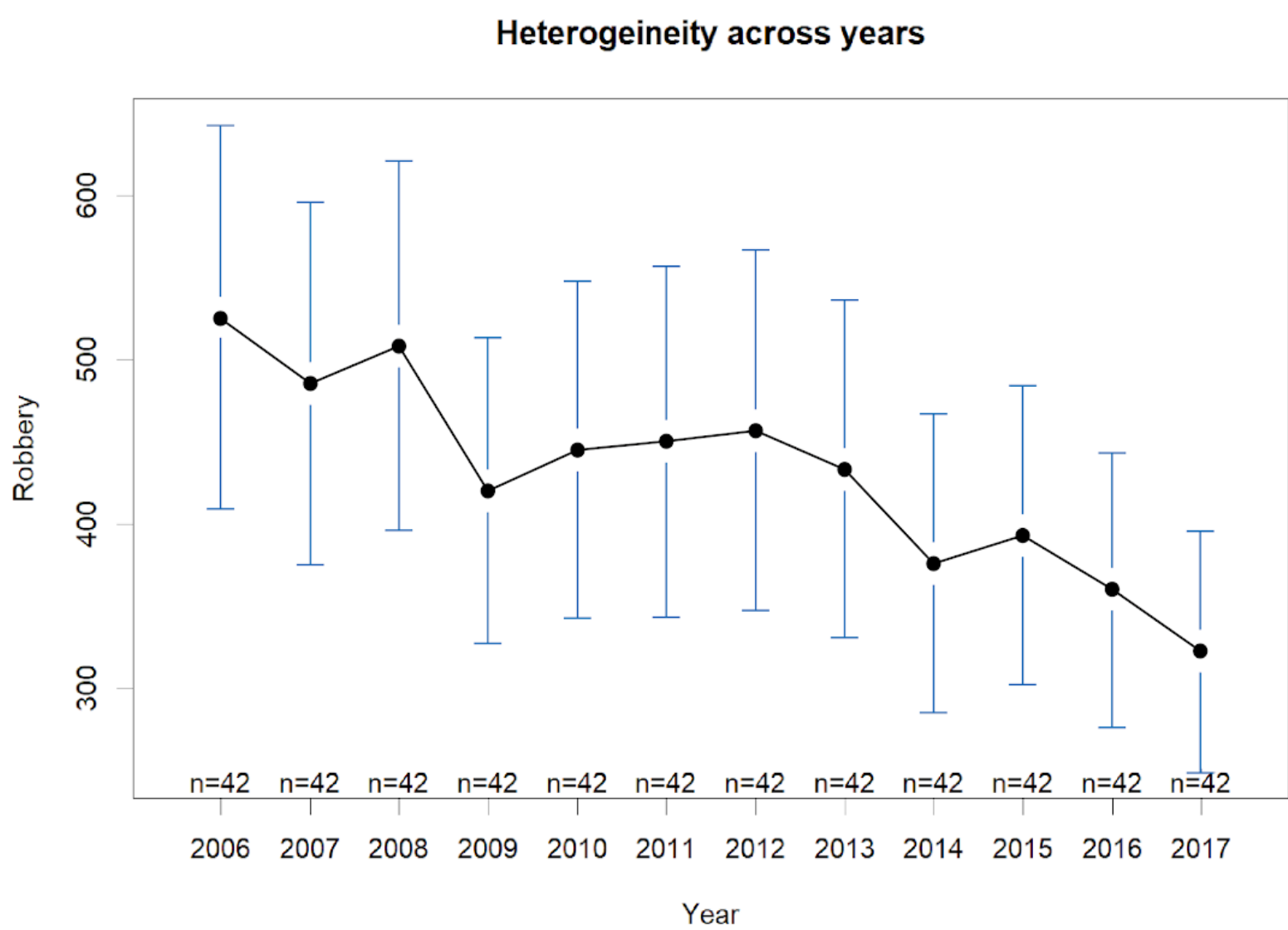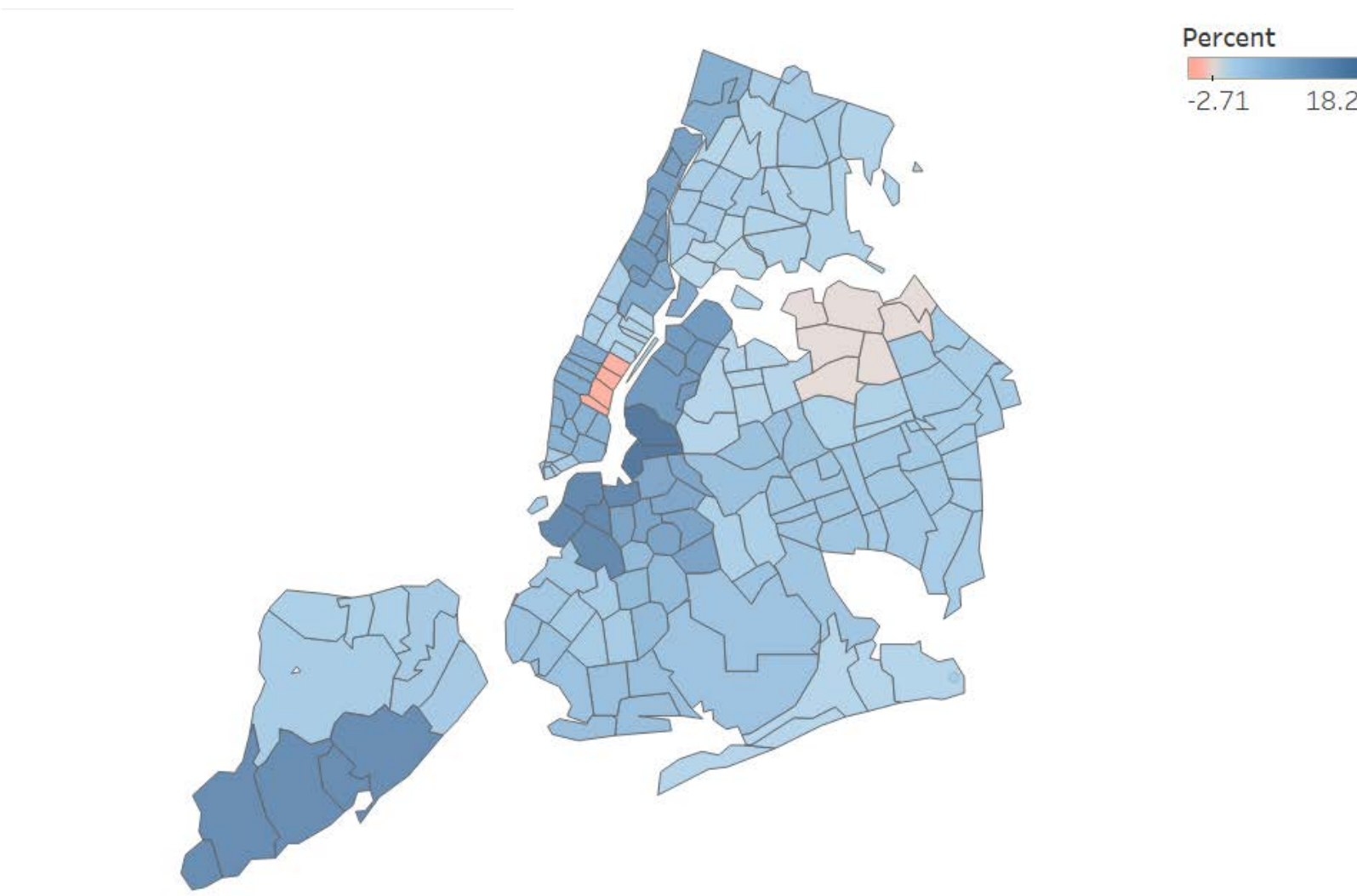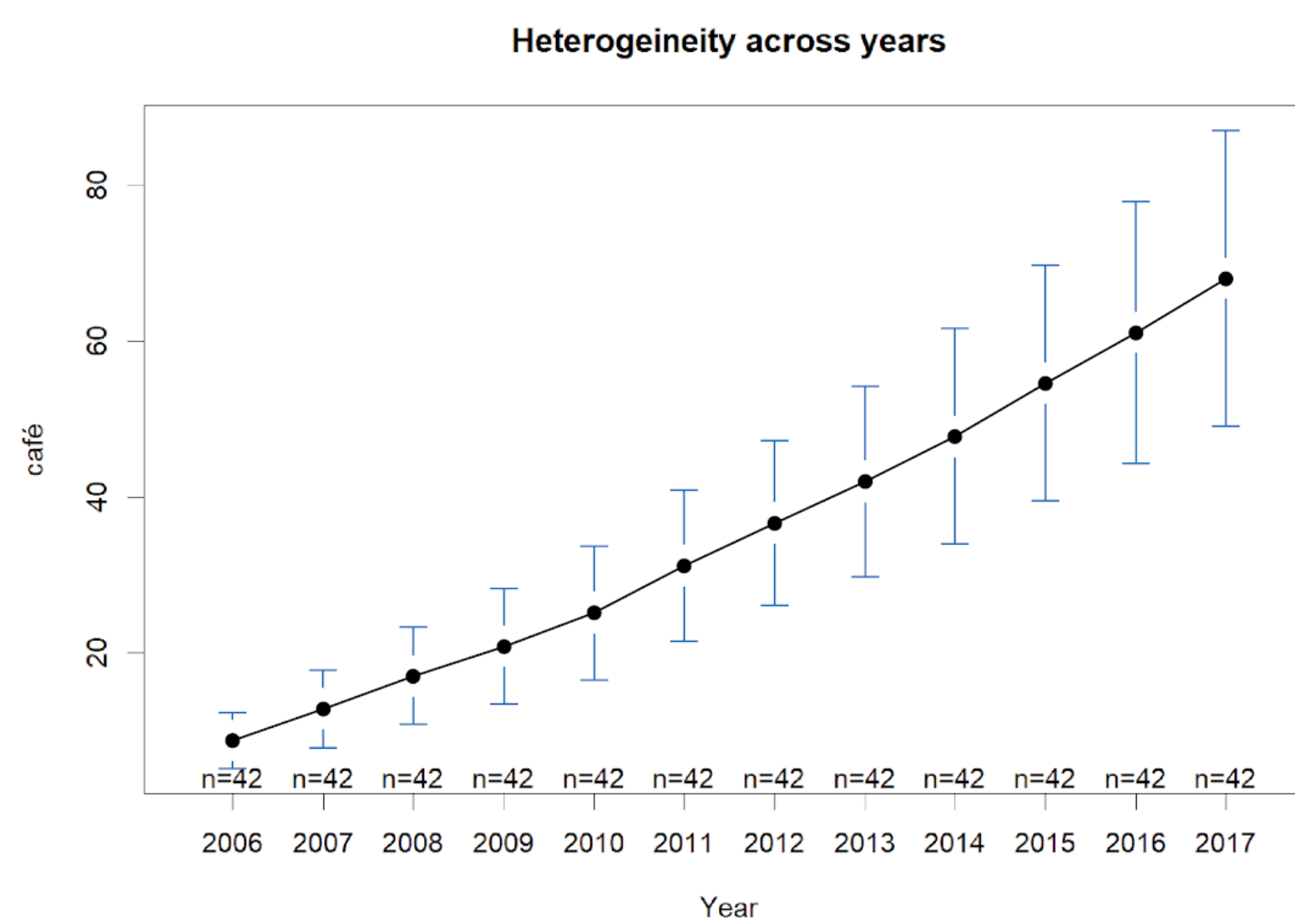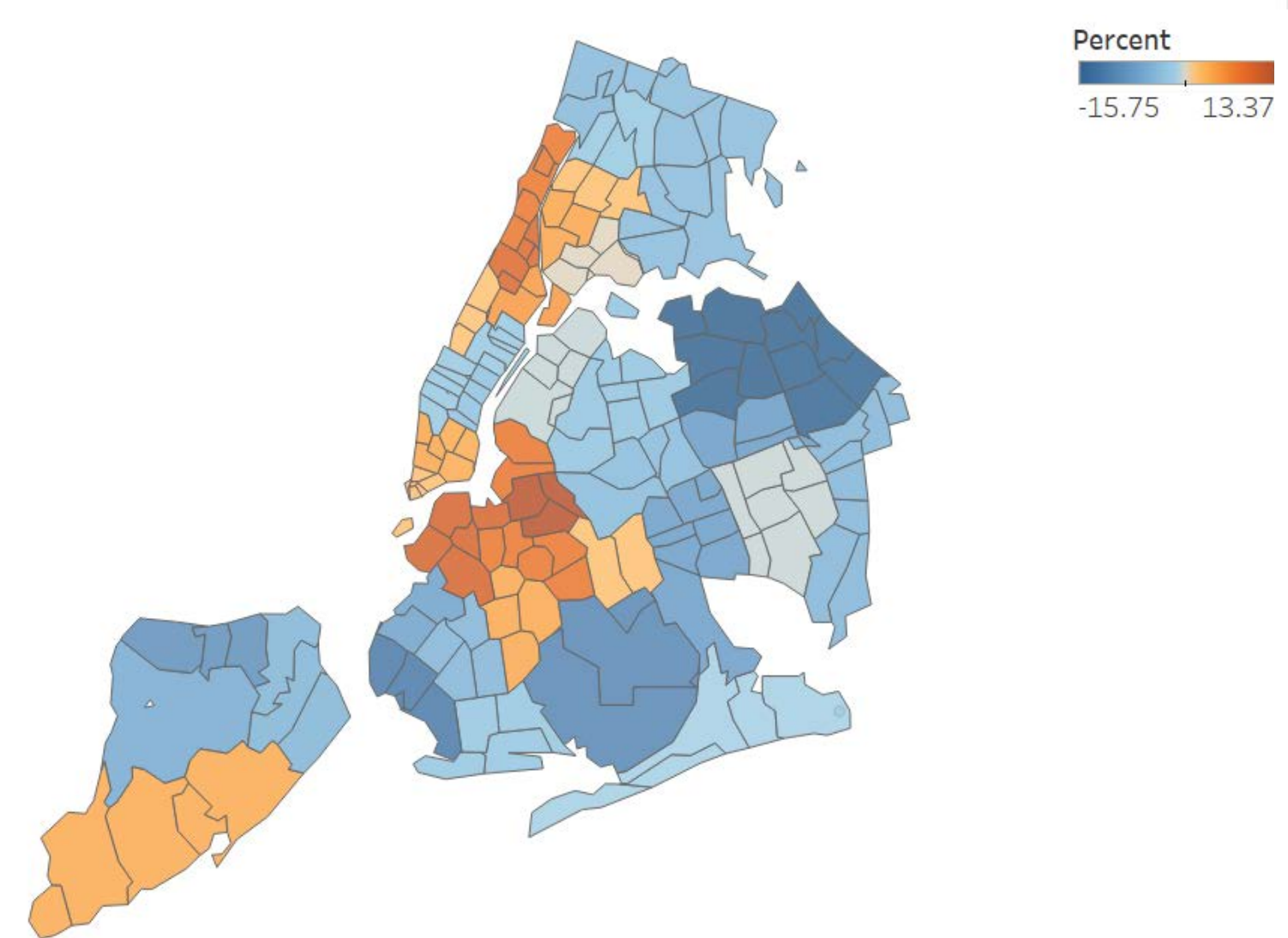
3) Normally Distributed Errors

FIG. 4. Normally Distributed Errors

Conclusions

Descriptive analysis confirms gentrification and crime are socially and spatially concentrated phenomena: the counts of robbery tend to be decrease much more in neighborhoods with higher percent of White residents, for example, Brooklyn in Figure 1. Gentrification as measured by coffee shops tends to be concentrated in areas with more people with higher-education degree.

Longitudinal models provide the most direct evidence regarding the research questions of this paper:
the greater the number of coffee shops in a neighborhood, the greater the neighborhood decline of robbery during the observation period. So far, the model has not been tested by cross validation, so we mainly focus on the association between robbery, the number of coffee shop and other census factors. Percent of black people, percent of people below 200% poverty line, percent of people with bachelor degree and number of coffee shops are all strongly related with the robbery.

As for limitations, this study only captures some but not all characteristics of gentrification, further study could include other source of data to identify gentrification processes.

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