CREATIVE SMALL BUSINESSES

AND THEIR ECONOMIC IMPACT ON

NEW YORK CITY'S NEIGHBORHOODS

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ABSTRACT

Richard Florida's idea on "creative class" in the year 2002 led many researchers from diverse disciplines to seek the value of "creativity." In his study, Florida argued that the creative class is a potential engine for metropolitan economic growth. This thesis is founded on this earlier concept and investigates the extent to which the growth of creative small businesses can impact the economic conditions of neighborhoods in New York City. Rather than assessing the issue from a metropolitan scale, however, this study zooms in and focuses on the neighborhood level in order to detect impacts at a micro-level. Through the mapping of creative small businesses (CSB) in New York City neighborhoods over time, this study found that there was a strong growth of creative small businesses in Brooklyn from 2000 to 2012. Decreases in unemployment rates and increases in median rent values were evaluated through mapping and statistical analyses to find that CSB might affect the decline of unemployment rates at the neighborhood boundary level. Also, median rent changes studied at the borough level showed an inverse relationship between creative small business growth and increase in rent values in Brooklyn, while the opposite was found for the Bronx and Queens. Since original property characteristics and rent values are much distinct in each borough and yield divergent results from the analysis, this thesis found that it is important to understand the relationship between CSB growth and rent values at the boroughs separately.

CONTENTS

1. BACKGROUND
1.1. Introduction - New York City and the Creative Industry

In 2013, the Bush Terminal at the waterfront of Sunset Park, Brooklyn met new owners, The Belvedere Capital and Jamestown. These private developers bought the underutilized buildings and decided to redevelop those buildings into places that could cater for an emerging innovation economy ("Industry City", 2017). With support from the current New York City's Mayor, this area was designated to be a place for traditional manufacturing, artisanal craft, and innovative technologies (Lee, 2017). This is one of the City's support plans for its creative industries, especially for fashion, film, and television. The Brooklyn borough president Eric Adams said in an interview that this investment in Sunset Park is an asset for Brooklyn's economic future ("State of the City", 2017).

While New York City's investment on creative industries has been limited because of their late start in this sector, the United Kingdom (U.K.) has considered creative industries as one of their key leverage industries. For instance, in 1997, the U.K. established the Department for Culture, Media and Sport (DCMS). The first outcomes of the department were the establishment of the Creative Industries Task Force and the publication of a report which mapped creative industries in the U.K. (British Council, 2010). Since then, the U.K. has consistently reported on the activity and performance of creative industries, as well as their evolution. In addition, the DCMS determined its own definition of creative industries, and codified the industries so that they would be easy to investigate. These efforts lead to creative industries becoming a vital sector to the U.K. economy (DCMS, 2008) and London having the largest creative workforce (Center for an Urban Future, 2005).

In a report called "Creative New York", the Center for Urban Future proclaimed the importance of the creative sector and emphasized that New York City's assets must not be

overlooked (2005). According to the report, New York City has the largest number of students who graduate in creative fields in the U.S. Taking these graduates as an asset, and considering how the U.K. converted such assets into a key part of their economy, New York City must acknowledge the emergence of creative industries and assess their economic value within the city. This thesis will assess creative areas in New York City's geography from 2000 to 2012, by analyzing aggregation of creative small businesses and their local impacts, which are measured through unemployment rates and median rent changes over time.

1.2. What Are Creative Industries

In the *Rise of the Creative Class*, Richard Florida (2002) argued that the "creative class" is a key factor of urban and regional growth. In his book, he explained the "creative class" as a new class that "include people in science and engineering, architecture and design, education, arts, music, and entertainment whose economic function is to create new ideas, new technology, and new creative content" (Florida, 2002, p.8). The assumption behind this argument is that cities that are highly occupied by creative class are more likely to have higher levels of entrepreneurship and attract creative businesses. He considered cities as places where the creative classes live, work, and most importantly, cluster together (Florida, 2002). However, the notion of 'creative class' has been criticized as being vague (Krätke, 2010).

While Florida (2002) concentrated on individual creative classes, this study will focus on issues relating to creative small businesses rather than creative individuals who live in cities. In other words, the approach taken in this study is used to explain a more direct relationship between creativity and economic growth without layers of assumptions about the spillover of creative human capital.

Considering that creative ideas could be manifested in every sector of industry, it is difficult to define specific industries as possible creative industries. This thesis adopts the definition and classification of creative industries from the U.K.'s DCMS. The current DCMS classification system has existed since 1998. The Classification has been substantial, maintained a positive reputation and allowed many countries to replicate the system (Creative skill set, 2013). The process, according to DCMS, consists of three stages.

> (1) It defines the broad industry groups with it considers to be 'creative',
> (2) These are mapped onto SIC codes and data is produced on the basis of these SIC codes; and
> (3) Further data on employment is added to capture those individuals working in creative occupation, but which are not working within creative industries. (Creative skill set, 2013, p.5)

From this classification process, The DCMS defines "creative industries" as "Those industries, which have their origin in individual creativity, skill and talent and have a potential for wealth and job creation though the generation and exploitation of intellectual property" (DCMS, 2011, p.6).

1.3. Small Businesses in New York City

In the U.S., small business is defined by the Small Business Administration (SBA) as companies with fewer than 500 employees. With SBA's definition, in 2016, small businesses in New York comprised more than half of all firms (SBA Office of Advocacy, 2016). Thus, rather than using the definition from SBA, this thesis utilizes the U.K.'s approved definition of small businesses which are businesses with fewer than 50 employees.

In New York City, the power of the small business sector is considerable. For example, 993,561 people were employed at business with 1-49 employees in 2013 (SBA Office of Advocacy, 2015). This means that approximately 12 percent of New York City's employees were working for small businesses at the time. Furthermore, in Manhattan, the number of people working for small businesses with fewer than 50 employees is approximately half a million. Although the employees may not necessarily be residents of Manhattan, I assume that there will be impacts of creative small businesses to the local residents.

In terms of the character of the small businesses, it is similar with the creative industry in that they both rapidly accommodate to the changing market by modifying and reconfiguring their businesses (Pratt, 2006). Because of the smaller size of those companies, it is possible for them to decide quickly to participate in the market with new, innovative ideas (Sponseller, 2015).

1.4. Historical Background

Between 2000 and 2012, the period of time for this study, the nation as well as NYC were facing a difficult time because of the economic recession that resulted from two national and global crises. First one occurred on September 11, 2001, when there was a terror attack in Lower Manhattan. Three months following the attack, New York City lost 143,000 jobs, a majority being in the finance, insurance and banking fields, which are the jobs that pay more real estate taxes, sales taxes and support the economy. And the subsequent effect of the loss of jobs in financial field manifested in all sectors of the economy in New York City. This incident demonstrated the vulnerability of New York City's economy that dependent on few of dominant sector. Furthermore, it indicated the need to keep and expand jobs in other industries (Polgreen, 2004).

Moreover, during 2007 and 2009, the U.S. economy underwent another recession: the subprime mortgage crisis. During this recession, which experienced the biggest bankruptcy in U.S. history, affected jobs in the financial and professional services the most. But Wylde (2009) also found the media, advertising, and entertainment sector as facing the biggest losses of jobs (Wylde, 2009).

Also, to understand the neighborhoods' characters, it is necessary to understand New York City's real estate market hot spot dynamics from 2000 to 2012. According to NYU Furman Center (2017), the South Bronx, North Brooklyn, North Manhattan, and West Queens underwent a 30 percent of increasing percent change in average rent from 1990 to 2014. Moreover, in the real estate market, Mott Haven, Hunts Points, and Port Morris in the South Bronx are considered as rising hot spots because of their proximity to Harlem in Manhattan, which is the center of redevelopment. In addition to neighborhoods in the South Bronx, Bushwick and South Brooklyn area including Sunset Park and Borough Park, as well as West Queens including Astoria and Long Island City, are regarded as the new rising spots for new development. (Small, 2016)

2. LITERATURE REVIEW

The objective of this literature review is to explore how previous studies about creative industries have defined the notion and to see how they examined the effects of creative industries to the urban environment, particularly economic conditions. Furthermore, this literature review will identify why studies about clustered creative small businesses is worthwhile from the perspective of urban planning.
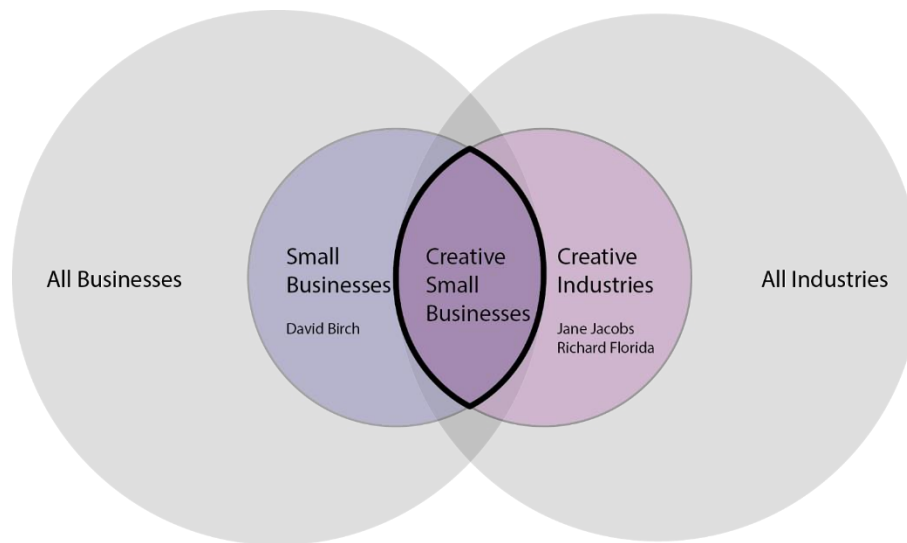
Figure 1. Creative Small Business

Defining the Creative Industries

Creativity is an outcome of human capital, which can, and has bloomed globally. For instance, urban theorist Jane Jacobs considered that, more than anywhere, cities are where innovations are made and knowledge spillover occurs (as cited Edward et al, 1991). Approximately 30 years later, Jacob wrote about human capital spillover in *Cities and the Wealth of Nations* (1984), Florida discussed the spillover of the "creative class" in *The Rise of the Creative Class (2002)*. He considered this creative class who creating ideas and new contents as an engine of regional economic growth (p.69). Because creativity is one of the factors that promote new firm formation, which result in economic growth. Similarly, Jacob also examined

how new things emerge in cities that bring the rapid growth of local economies. Although she did not mention the word "creative," she concluded that new businesses related to motion pictures and television – creative industries – are crucial in generating financial growth.

Meanwhile, many different terms related to the creative industries have been developed. "Creative economy", "cultural industries", and "creative industry" all indicate different phenomena. Although cultural industries and creative economy indicate the intersections with the idea of creative industries, it is important to note that creative industries is a broader concept.

> The term creative industries is applied to a much wider productive set, including goods and services produced by the cultural industries and those that depend on innovation, including many types of research and software development. (UNESCO, 2013, p.20)

Aside from the importance of understanding the definition of a creative industry, it is also critical to explain what are considered eligible to the industries for the analysis of this study. For that, the same foundation as sufficient preceding studies will be used in this thesis (Lee & Rodríguez-Pose, 2014; Piergiovanni, 2011; Mateos-Garcia & Bakhshi, 2016). The definition is derived from the preceding study on the classification from the DCMS, which, as noted above, established the definition of "creative industries" and allowed much research from the U.K. ("Nesta", 2017).

Power of Small Business

Small businesses also have been discussed as creating more jobs than larger firms (Neumark, Wall, & Zhang, 2011). And because of that, this study expected that creative small businesses would have more influence on neighborhoods than larger creative businesses. The importance of small businesses' role in job creation has long been discussed by David Birch

(1979). However, Birch's ideas were controversial because of the methodology he used. Critics

argued that the way Birch classified small size of companies is without the consideration of

fluctuation of companies' sizes. In other words, in his research, companies that were classified as

small, accidentally could fell into that category only at that time when he took on the research

(Neumark, Wall, & Zhang, 2011). In 2011, however, Neumark, Wall, and Zhang (2011) replicated

Birch's research using U.S. data, in order to measure whether small businesses create more jobs.

To resolve the contradicted methodology, the researchers used not only based year firm size, but

also the averaged firm size, which evened out the change of their sizes overtime. As a result,

their study results concurred with Birch's findings that smaller firms generating more jobs

(Landstrom, 1996; Neumark, Wall, & Zhang, 2011).

Clusters

Carreira et al (2014), in addition, revealed the importance of sectoral specialization of

small businesses or medium sized businesses for their growth compared to larger firms. While

clustering of industries generating economic growth is not a new concept (Porter, 2007), the idea

is further supported and developed in a recent report from JPMorgan Chase & Co. (2014). The

authors of the report indicated that developing each city's specific "targeted clusters" will be

more influential for the cities' economic growth. They also claimed that by developing strategies

on the targeted clusters, cities can have city-wide plans to foster those industries. Categorizing

industries as targeted clusters is executed based on the dominant industry's performance, or

contribution, in employment growth and small business growth. Among the dominant industries,

which showing the outperformed growth in employment and businesses are considered as the

targeted clusters. According to the report, New York metropolitan area's suggested targeted

clusters mostly fell into the criteria of creative industries (See the appendix B.) Albeit

JPMorgans's study focused on a much broader New York metropolitan area, it still provided some evidence for this study' focus, New York City.

Porter et al.(1998) defined clusters as "a critical mass of companies in a particular field in particular location, whether it is a country, a state or region, or even a city" (p.10). According to these researchers, clusters include not only a group of companies but also the suppliers and services that are related with the companies industries. The notion of clustering is defined by the U.K.'s National Endowment for Science, Technology and the Arts (NESTA) as well. According to a NESTA report

> We have used measures of geographic co-location (correlations between the location quotients for creative sub sectors at the TTWA1 level) to identify which sectors are similar to each other, considering measures of creative employment as well as creative business counts. (Mateos-Garcia, & Bakhshi, 2016, p.44)

Following NESTA's methodology, the count of creative businesses was used to determine the cluster.

Despite the numerous studies about the importance of the creative industries, small businesses, and clustering of businesses, there is a lack of study of the intersection of those conditions. Therefore, the impact of creative small businesses on neighborhoods and the locations of the business clusters in New York City will be the focus of this thesis.

While previous studies examined about creative industries' job creation (Florida, 2002; Piergiovanni, 2011), creative industries impact on neighborhoods real estate have been discussed (Indergaard, 2013; Grodach, Foster, & Murdoch, 2014). Some of the literature discussed cities' investments on particular creative industries' (especially related to art; including

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1 Travel to work area

museum, performance arts, films, music and design) role as part of neighborhoods' economic

development plans (Grodach, Foster, & Murdoch, 2014). For instance, in a study by Grodach,

Foster, and Murdoch (2014), the researchers explored whether placing those art-related

industries to benefit the neighborhoods resulted in revitalization or gentrification for

neighborhoods. Although the study concluded that the economic development plans do raise

property values, the link between art-related industries to revitalizing or gentrifying

neighborhoods couldn't be articulated. They argued that this is because different types of

industries generate different results (Grodach, Foster, & Murdoch, 2014).

3. METHODOLOGY

3.1. Data

Data observed in this research came from 2000 to 2012. The range from 2000 to 2012 is considered a sufficient period for examining changes, since it covers a time frame before Richard Florida's definition of "creative class" to ten years after, when creative industries began to receive more attention.

The business listing dataset is constructed with information including company name, location, number of employees, and type of industry. In terms of type of industries, Standard Industrial Classification (SIC) code and North American Industry Classification System (NAICS) are used to label the industries in the dataset. Amongst the many codes within the dataset, this study utilized "Primary NAICS code" because it was the only code consistently addressed business data from 2000 to 2012.

In order to compare socio-economic changes from 2000 to 2012 within census tract boundaries, the 2000 data had to be converted into 2010 census tracts, since the boundaries shape are changed. Thus, this thesis utilized, LTDB data from Brown University, which weighs and interpolates census data before 2010 to fit into 2010 census tract. In other words, they weighed data in previous census tract boundaries based on the population, share of area allocated to new tract, share of land area allocated to new tract, an interpolation of all area, and an interpolation of land area. (Logan, Stults, & Xu, 2016)

Table 1. Data Description

	Variable	Type	Explanation	Source
Independent	%SB	continuous	Percent change of Small Businesses	U.S. Businesses Database 2000, 2012
	%CSB	continuous	Change in percent of Creative Small Businesses	U.S. Businesses Database 2000, 2012
	SB	continuous	Change in number of Small Businesses	U.S. Businesses Database 2000, 2012
	CSB	continuous	Change in number of Creative Small Businesses	U.S. Businesses Database 2000, 2012
	CSB/SB	continuous	Change in ratio of census tract's Creative Small Business Ratio over Small Businesses	U.S. Businesses Database 2000, 2012
	%Bachelor's degree	continuous	Percent change of population with Bachelor's degree and more	LTDB data ACS 2012
	%Population	continuous	Percent change of population	LTDB data ACS 2012
Dependent	Unemployment rate	continuous	Change in percent of unemployed civilian labor force	LTDB data ACS 2012
	Median Rent	continuous	Change in median contract rent	LTDB data ACS 2012
	%Median Rent	continuous	Change in percent of median contract rent	LTDB data ACS 2012
Shapefile	NTA boundary		Neighborhood Tabulation Areas	NYC City Planning
	Census Tract boundary		Census Tract in 2010	NYC City Planning

3.2. Definition

3.2.1. What are creative industries

According to DCMS, industries related to advertising, architecture, arts, publishing,

software and media are considered creative industries (See Appendix A). Based on the U.K.

DCMS classification, equivalent industries were selected from NAICS industry classification codes. Since *Creative Economy Employment in the U.S., Canada, and the U.K.,* a report published by NESTA, already developed a thorough converting process, this study used their crosswalk codes that converted from the U.K.'s code to NAICS code (Nathan, Kemeny, & Spencer, 2016).

3.2.2. What are small businesses

The U.S. Small Business Administration Office of Advocacy (SBA) describes a small business as an independent business having fewer than 500 employees. In New York, according to SBA's definition, small businesses comprise approximately 51% of all businesses. Consequently, the number of businesses that fall into this classification is more than sufficient for this thesis research expected to look into.

A research by Neumark et al. assessed small businesses job creation in U.S. and found that the firms that have less than 50 employees in average tend to have a higher rate of job creation (Neumark, Wall, & Zhang, 2011, p.21). From this previous study, this thesis also assumes that firms of size smaller than 50 employees will not only generate more jobs, but also have equivalent power in leveraging the neighborhoods' economy.

In addition, European definition of "small business" also defined the firms that have fewer than 50 employees as "small business". Its classification of firm sizes is: sole proprietor (whether firm is a sole trader), microfirm (1-9 employees), small firm (10-49 employees), medium firm (50-249 employees). From this categorization, this research defines "small business" as those firms that have fewer than 50 employees (Lee, N., & Rodríguez-Pose, A., 2014).

3.3. Mapping the Creative Small Businesses

First, the number of creative small business is analyzed at census tract boundary level in order to investigate where specifically the creative small businesses aggregated. However, the calculated number of creative small business in census tract boundaries will also be evaluated in the Neighborhood Tabulation Area (NTA) level of boundary because it could help in comprehending the diverse conditions that led to changes in the number of creative businesses. For example, in the East Brooklyn, the waterfront areas have more creative small business than inside of the neighborhood, however it is easy to understand the overall trend as the 'prosperity of creative small business in Sunset Park or Greenpoint'.

Moreover, change in ratio of creative small business to small business during 2000 to 2012 will be investigated in the level of NTA boundaries. Considering the whole number of small businesses in neighborhood will illustrate which neighborhood has more proportion of creative small business within the neighborhoods' commercial character.

Also, unemployment rates change and median rent change will be displayed in the NTA boundaries. Comparison between the neighborhoods' that had growth of creative small business proportion and the neighborhoods that experienced changes in unemployment rates and median rent will render the broad idea of which neighborhoods experienced the impact of growth in creative small businesses.

3.4. Multivariate Regression

Because of the limitation in maps that can only demonstrate a broader concept of the relationship between the growth of creative small business and unemployment rates or median rent, this study also employs regression models. These models will explore the statistical

relationships between growth of creative small business and neighborhoods' economic conditions. The regressions were taken in two different levels of boundary; the NTA boundary level and the census tract boundary level. Because the initial research question is about the impact on neighborhoods in New York City, examining NTA boundary levels is expected to provide answer of research question. Also, to consider the differences of character of the five boroughs regression for each boroughs are also analyzed. For example, in terms of the business density, Manhattan will be the outlier compared to the rest of the boroughs. For this regression, census tract level's data is used to have enough size of observations.

3.4.1 Independent Variables

This research particularly focuses on creative small business. The growth and decline of creative small businesses were measured according to the change in number and change in percentage. Small businesses are measured in the same way as creative businesses. Also, the proportion of creative small businesses to small businesses was measured. The proportion of creative small business to small business is used in a study by Piergiovanni et al. (2011). In this study, that examined the link between creative industries and regional economic growth, Piergiovanni et al. used shares of creative firms and compared them to all firms except ones in agriculture industries. However, in this thesis, the denominator of the ratio will not be all non-agricultural firms, but all small businesses.

The percent change in bachelor's degree and population are included as control variables in order to consider other variables that might affect to the dependent variable. In a human capital view of economic development, higher educational attainment plays a key role in economic growth (Hilten, 2015). Furthermore, rental prices are expected to increase when the

neighborhoods have a population influx since it causes higher demands. In a broader concept, the impact of population increase to economic growth was examined in Wassmer and Boarnet (2001) and according to their findings, it is likely that population growth in a citywide area bring the benefit in terms of new jobs, income, tax revenue, and raise property values (Wassmer et al., 2001).

3.4.2 Dependent Variables

The dependent variables are the unemployment rate change and median contract rent change in raw numbers and in percentages.

Decrease of unemployment rate means the increase of employment rate. When neighborhoods experience an increase of employment rate, the neighborhood will have more income and tax revenue. However, in order to connect the neighborhoods' condition with the number of employers, this study assumed that employees lived in the same neighborhood. Nevertheless, given that census tracts have very narrow area coverage, this study extended its boundaries form one tract to several tracts, typically 8 or 9, which are adjacent to the central tract.

To explain the change of the neighborhoods' real estate values, median contract rents from each census tracts were utilized. While median contract rents were data was available at a census tract level, it was not at the NTA level. But since this study ran regressions at the NTA level, I used a methodology, where all census tracts' median rents were averaged to get a mean contract rent of the NTA boundaries. In computing the averaged value for NTA boundaries, the equation below was used, then the resulting numbers were assessed against the real estate market on a micro-level. By looking at the averaged median rather than the absolute median, this

methodology consequently eliminated the risk of overlooking the range of rent values. For instance, even within the same neighborhood boundary, certain census tracts or even properties have higher rent than others. Therefore, to get a comprehensive understanding of the neighborhood's real estate market, it was important to consider those higher market values.

$$Averaged\ Median\ Contract\ Rent = \frac{minimum + 2median + maximum}{4}$$

3.4.3. Regression Model

Multivariate regressions are employed to assess the impact of creative small businesses on a neighborhoods' unemployment rates and percent change in median contract rent. The rent changes were calculated in 2012 adjusted inflation.

To see the impact of percent change and absolute number of CSB changes, regressions are done in two different ways. Percent change model includes percent change of CSB, percent change of SB, the proportion change of CSB to SB, and the control variables as independent variables. On the other hand, absolute number change model includes the absolute number of CSB change and absolute number of SB change instead of their percent changes. Given that absolute number changes and percent changes are highly correlated, this model analyzed these two values separately in order to avoid collinearity issues.

$$Y_x = \alpha + \beta_1(\% \ change \ in \ CSB) + \beta_2(\% \ change \ in \ SB) + \beta_3\left(change \ in \frac{CSB}{SB}\right)$$
$$+ \beta_4(\% \ change \ in \ bachelor \ degree) + \beta_5(\% \ change \ in \ population) + e$$

$$Y_x = \alpha + \beta_1(change \ in \ CSB) + \beta_2(change \ in \ SB) + \beta_3\left(change \ in \frac{CSB}{SB}\right)$$
$$+ \beta_4(\% \ change \ in \ bachelor \ degree) + \beta_5(\% \ change \ in \ population) + e$$

$Y_1 = unemployment \ rates \ change$
$Y_2 = \% \ change \ in \ median \ contract \ rent$

3.4.4. Hypothesis

From the regression models, I expected to see a negative relationship between the changes of creative small businesses and unemployment. Furthermore, in terms of median rent, a positive correlation between median rent change and the creative small businesses growth was expected.

3.5. Limitation of the Methodology

The sufficient number of small businesses in New York City in 2000 is not included in the data because some businesses were omitted due to lack of geo-coordinates. (U.S. Businesses Database, 2000). Data in 2000, particularly, had higher inaccuracy compared to the rest of the dataset. Although data was sorted by each borough according to address information, many addresses did not match with their listed latitude and longitude. For example, the geocoded coordinates on a map were completely different from the address information of the business. In spite of such incomparable data, only the data for those that have matching addresses (at the borough level) and coordinates were used. Consequently, the number of creative small business and small business that are used for regression could be smaller than the actual number of creative small business and small business. This also could result in a larger difference of the change between 2000 and 2012 data.

Moreover, the median contract rent in LTDB (converted data based on SF 2000) and ACS 2012 do not specify values higher than $2000; instead, such values are displayed as "2000 +". In those cases, the values were replaced as $2,001. Consequently, some census tracts have a median contract rent value higher than $2,000, for which the actual change is not clear.

At the census tract level, the percent change of small business or creative small business are not calculated for a few census tracts because they did not have either of small business or creative small business in 2000 or 2012. This problem particularly appeared in creative small business than small business. To mitigate the loss of those tracts' data, raw number change of SB and CSB were conducted separately.

More than anything, since this study conducted in micro level, it assumed that the residents work in the surrounding neighborhood boundaries or census tract boundaries. However, the unemployment rates need larger scale of area to analyze the impact of employment rate that generate more tax revenue or general income have inherent shortcoming in the methodology. In fact, solely Manhattan borough has more than half of its residents (84 percent) who work in their home borough (New York State Office of the State Comptroller, 2004). However, in the case the unemployment rate significantly be affected by growth of creative small businesses, it will be worthwhile to know where the relationship is most sever, and to call more research on the subject. Since it could indicate that the neighborhood likely replaced residents with employed people. Thus, it could be interpreted in both ways namely, that the original residents received a real benefit from the growth of the creative small businesses or that such business signal gentrification displaces original residents.

In general, in spite of the research question, which initially asked whether there is impact generated by creative small businesses growth, it was difficult to draw a direct causal correlation from regression result.

4. FINDINGS and DISCUSSION

4.1. Changes of Creative Small Businesses in NYC

Table 2. Number of Small Business and Creative Small Business 2000-2012

Manhattan	2000	2004	2006	2008	2010	2012
SB	126,478	96,650	173,778	188,440	160,465	167,827
CSB	18,248	13,187	22,346	25,019	20,543	21,035
CSB/SB	14.4%	13.6%	12.8%	13.3%	12.8%	12.5%

Bronx	2000	2004	2006	2008	2010	2012
SB	20,846	24,693	32,028	32,902	30,410	32,757
CSB	792	1,069	1,431	1,442	1,375	1,521
CSB/SB	3.8%	4.3%	4.5%	4.4%	4.5%	4.6%

Brooklyn	2000	2004	2006	2008	2010	2012
SB	59,643	61,074	65,675	77,736	74,817	74,281
CSB	3,257	3,474	3,728	4,833	4,724	4,791
CSB/SB	5.5%	5.7%	5.7%	6.2%	6.3%	6.4%

Queens	2000	2004	2006	2008	2010	2012
SB	51,271	54,418	63,514	68,152	63,074	60,450
CSB	3,228	3,313	3,906	4,315	4,058	3,864
CSB/SB	6.3%	6.1%	6.1%	6.3%	6.4%	6.4%

Staten Island	2000	2004	2006	2008	2010	2012
SB	11,556	11,530	13,099	14,142	13,306	14,101
CSB	788	757	850	920	900	941
CSB/SB	6.8%	6.5%	6.5%	6.5%	6.8%	6.7%

According to the addresses of small businesses (SB) and creative small businesses (CSB), the number of each borough's CSBs, SBs, and the ratio of CSBs to SBs (CSB/SB) is investigated. The number of both SBs and CSBs decreased between 2000 and 2004, as well as between 2008 and 2010. Considering that these periods include the September 11 attacks in Lower Manhattan and the 2008 subprime mortgage crisis, these decreases are understood as the effects of those international and national crises in New York City.
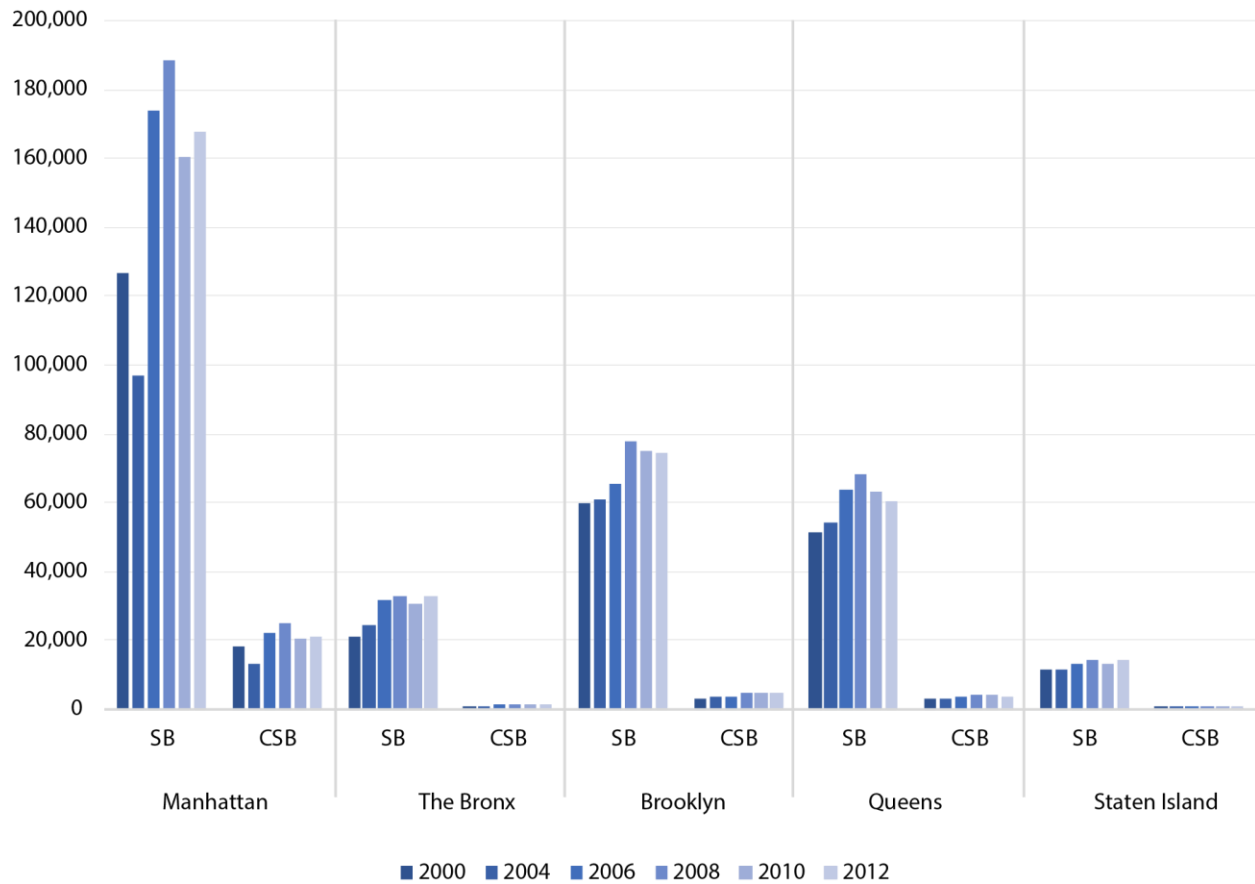
Figure 2. Number of SB and CSB in Graphs

After the terrorist attack on the World Trade Center, many business owners temporarily closed their businesses and could not come back to the market (Brooks, 2011). This tragic event caused a noticeable decline in the number of SBs and CSBs in Manhattan, and the 2008 global economic recession similarly shrank most businesses in all of the boroughs. According to the Small Business Administration's report, the financial crisis should have affected small businesses negatively more than it would larger companies because of the decline of bank lending (Cole, 2012). These changes in the number of businesses showed how such crises could affect the growth and recession of SBs and CSBs.

The proportion of CSBs to SBs shows that while Manhattan has a decreasing proportion of creative industries among small businesses, the Bronx and Brooklyn experienced an increase

in their proportion. Meanwhile, Queens and Staten Island had almost kept the same proportion from 2000 to 2012.

4.2. Mapping Creative Small Businesses in NYC

Figures 3 and 4 display the number of CSBs in New York City in 2000, 2004, 2008, and 2012. These maps illustrate the number of CSBs per census tract. While many neighborhoods showed changes in CSB numbers over twelve years, the highlighted neighborhoods indicate a constant growth of CSBs in those neighborhoods.

In the Bronx, the Southern neighborhoods (Hunts Points and Mott Haven-Port Morris) that are closer to Manhattan, the number of CSBs increased. In Manhattan, while there weren't noticeable trends of agglomeration, Soho (SoHo-TriBeCa-Civic Center-Little Italy) did have an increase of CSBs from 2000 to 2012. Brooklyn, on the other hand, showed several spots that indicated steady growth of CSBs. For example, there was a clear increase of CSBs from Greenpoint to Sunset Park, and the neighborhoods around East Williamsburg. In Queens, neighborhoods located near North Brooklyn, Hunters Point-Sunnyside-West Maspeth, experienced an increase in the number of CSBs.

Number of CSB

- 0 - 15
- 16 - 30
- 31 - 70
- 71 - 150
- 151 - 250
- 251 - 350
- more than 350

2000

2004

1 Hunts Point
2 Mott Haven-Port Morris
3 SoHo-TriBeCa-Civic Center
        -Little Italy
4 Hunters Point-Sunnyside-West Maspeth
5 Greenpoint
6 North Side-South Side
7 East Williamsburg
8 Carroll Gardens-Columbia Street
        -Red Hook
9 Sunset Park West

0   5 Miles

N
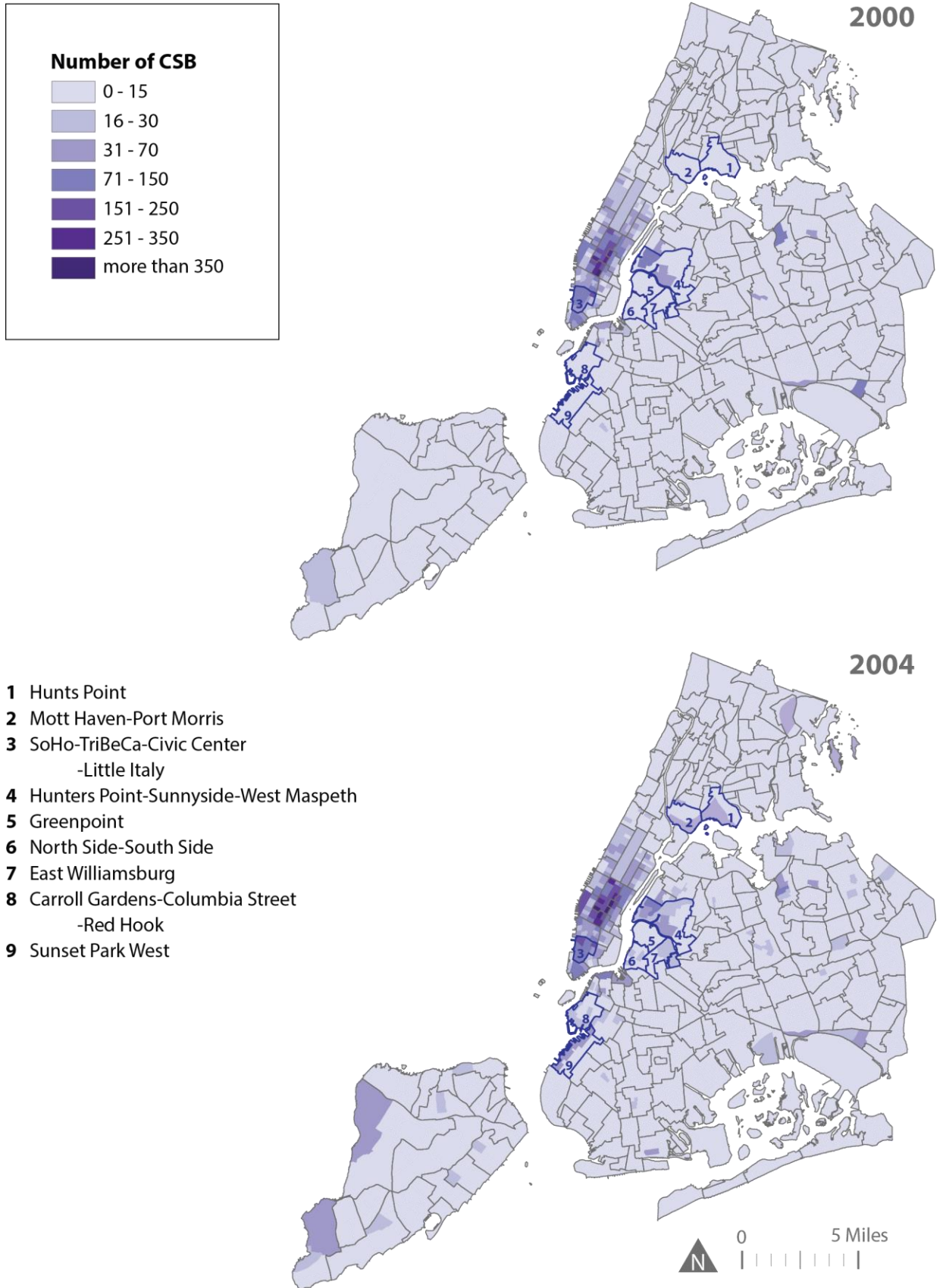
Figure 3. Number of Creative Small business in 2000, 2004

Number of CSB

0 - 15
16 - 30
31 - 70
71 - 150
151 - 250
251 - 350
more than 350

2008

2012

1 Hunts Point
2 Mott Haven-Port Morris
3 SoHo-TriBeCa-Civic Center
         -Little Italy
4 Hunters Point-Sunnyside-West Maspeth
5 Greenpoint
6 North Side-South Side
7 East Williamsburg
8 Carroll Gardens-Columbia Street
         -Red Hook
9 Sunset Park West

0   5 Miles

N
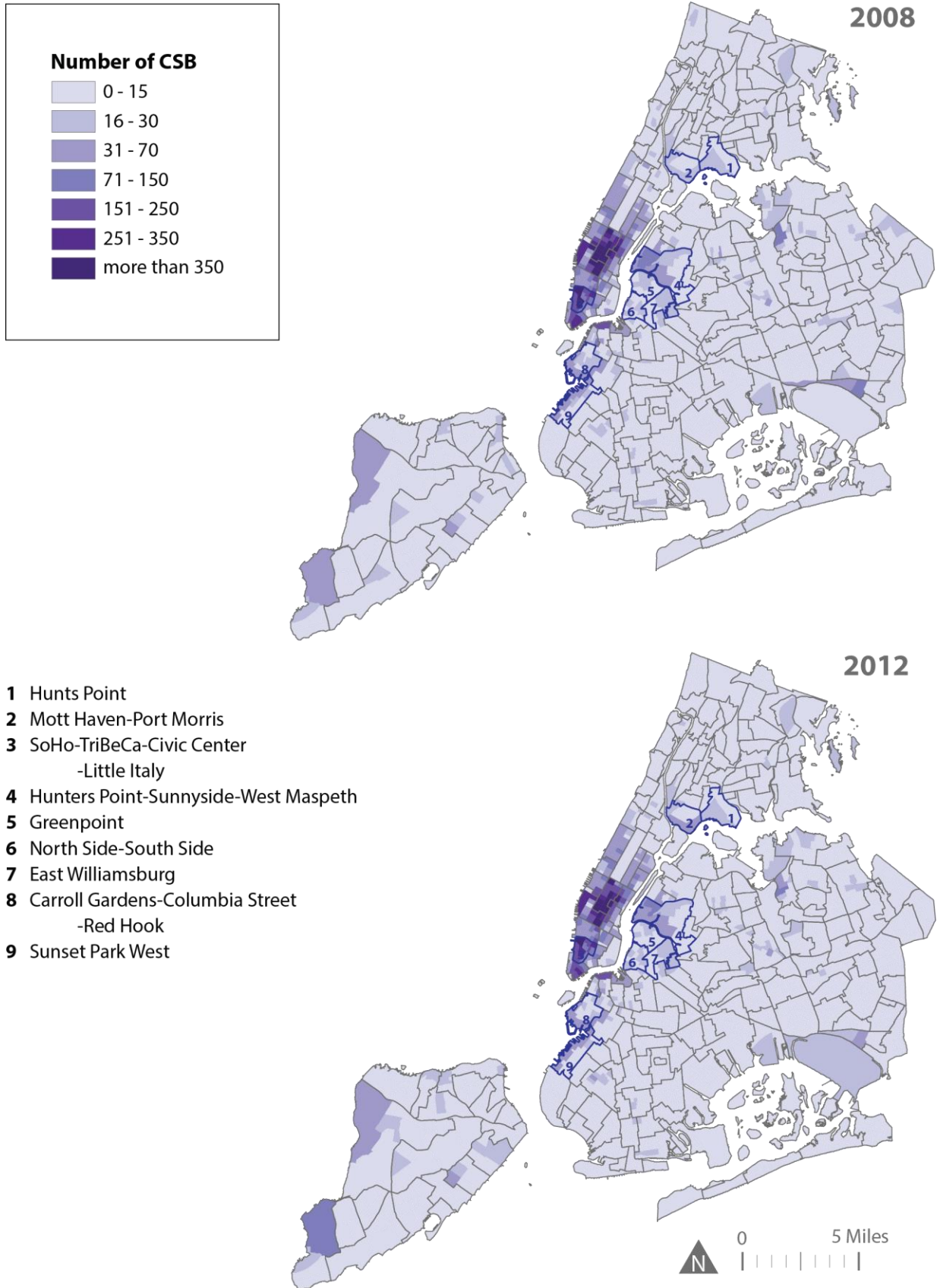
Figure 4. Number of Creative Small Business in 2008, 2012

Change of CSB/SB

- lower than -3%
- -3% - -2%
- -2% - -1%
- -1% - 0
- 0 - 1%
- 1% - 2%
- 2% - 3%
- higher than 3%
- Parks

1 Midtown-Midtown South
2 Battery Park City-Lower Manhattan
3 Greenpoint
4 DUMBO-Vinegar Hill-
    DowntownBrooklyn-Boerum Hill
5 Ocean Hill
6 Baisley Park
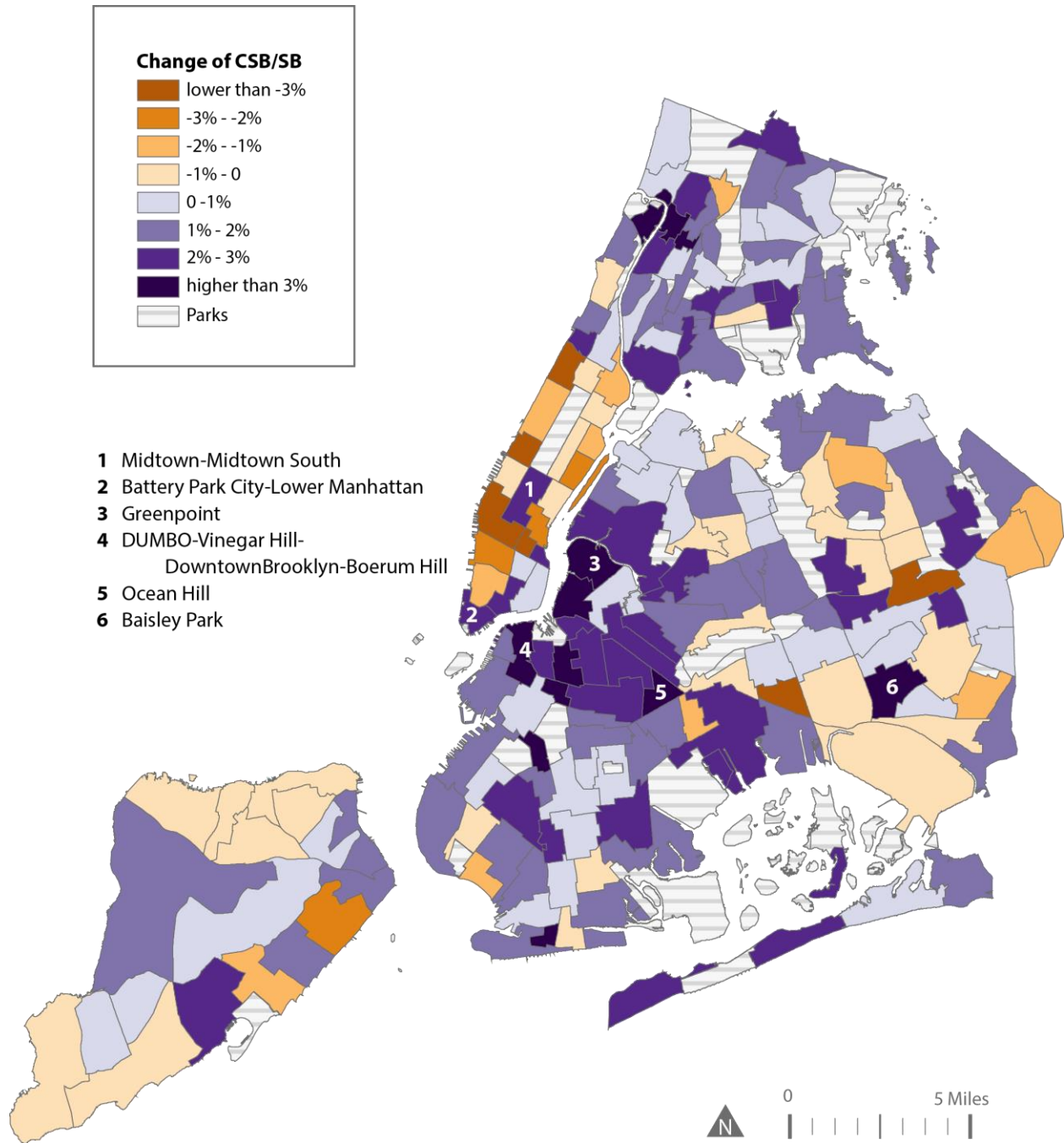
Figure 5. Change of Creative Small Business to Small Business Ratio 2000-2012

Figure 5 illustrates the increase and decrease of the proportion of CSBs to SBs at the

NTA boundary level. In Manhattan, except for the traditional commercial districts – Midtown

(Midtown-Midtown South) and Lower Manhattan (Battery Park City-Lower Manhattan) – most

of the neighborhoods experienced a decrease in the CSBs' proportion. By contrast, in Brooklyn,

the waterfront neighborhoods from Greenpoint to DUMBO (DUMBO-Vinegar Hill-Downtown

Brooklyn-Boerum Hill) and most North Brooklyn neighborhoods, including Ocean Hill, showed

a clear increase in the CSB/SB ratio. Also, the South Bronx and Bronx areas close to Inwood

showed a general increase. In Queens, the Westside of Queens's neighborhoods that are close to

North Brooklyn showed ratio increases. There are also several neighborhoods scattered

throughout the city that showed a CSB/SB proportion growth higher than 2 percent over the

study period. However, these may not be painting an accurate picture regarding the actual

number of CSBs in those areas. For example, Baisley Park in Queens (Neighborhood 6 on Figure

5) has very little small businesses and any new creative small business would lead to a high

increase in the CSB/SB ratio. This is something to consider when analyzing and discussing

findings that are based on percentage changes, rather than absolute figures: a large change in

CSB growth does not necessarily translate to a large impact on a neighborhood.

Figure 6 shows increasing and decreasing unemployment rates in New York City from

2000 to 2012. While most neighborhoods underwent a decrease in their unemployment rates,

several neighborhoods illustrated strong tendencies toward a decline in their unemployment

rates. In the South Bronx, upper Manhattan, and inner neighborhoods around of Ocean Hill, a

clear pattern of decline in unemployment rates can be seen. Neighborhoods in the South Bronx

and Brooklyn that showed declining unemployment rates matched those with growing CSB

numbers and CSB/SB ratios, previously seen on Figures 3, 4, and 5. This leads us to think that

there could be a relationship between the growth of creative small business and the decrease in

unemployment rate in an area.

Change of UNEMP

- lower than -15%
- -15% - -12%
- -12% - -9%
- -9% - -6%
- -3% -0
- 0%- 3%
- 3% - 6%
- higher than 6%
- Parks

1   Mott Haven-Port Morris
2   East Harlem North
3   Ocean Hill

0   5 Miles

N
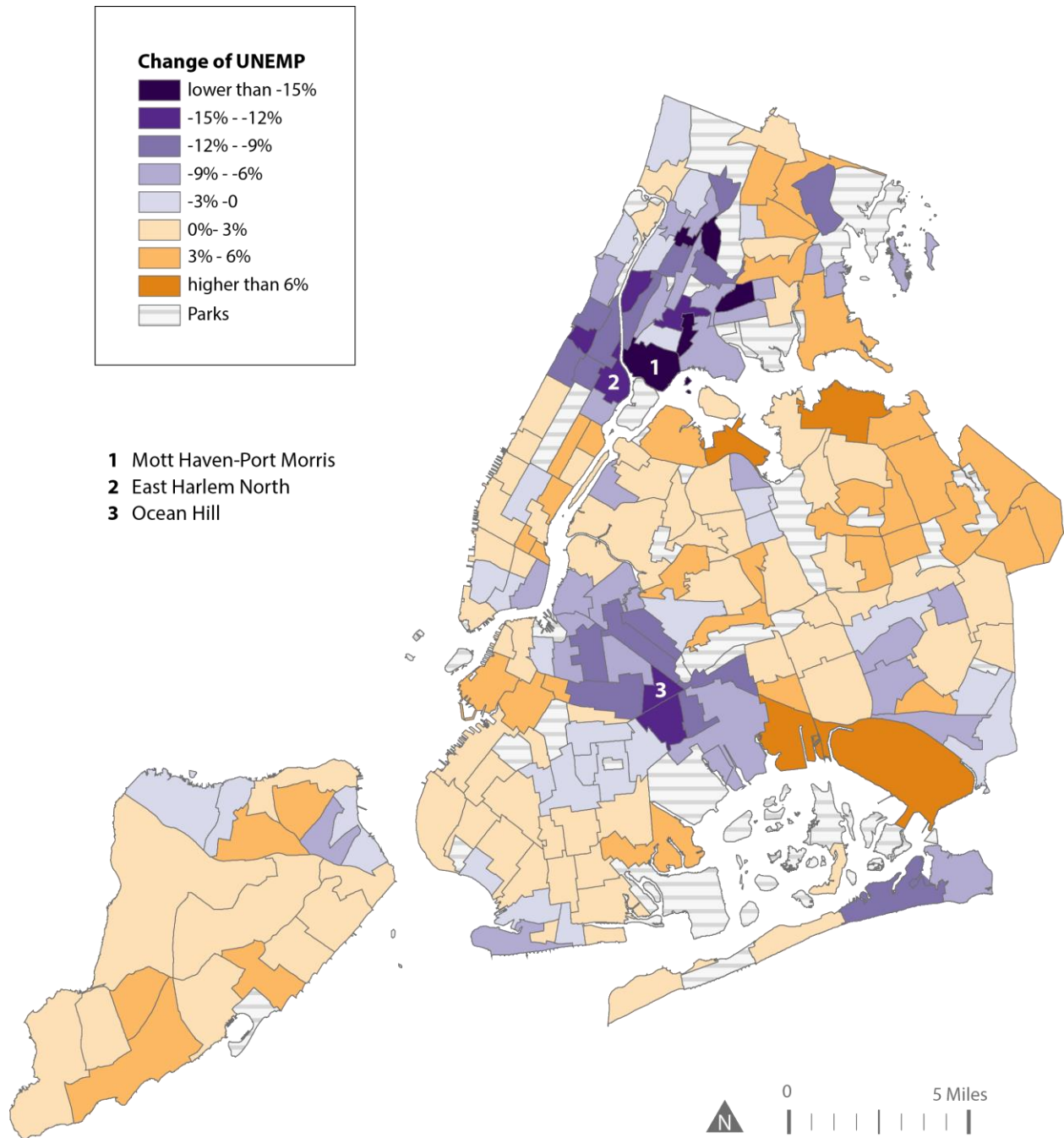
Figure 6. Change of Unemployment Rate 2000-2012

Change of MRent

- lower than - $284
- -$284 - 0
- 0 - $50
- $50 - $100
- $100 - $200
- $200 - $250
- $250 - $400
- higher than $400
- Parks

*2012 inflation-adjusted

1 East Village
2 Greenpoint
3 East Williamsburg
4 Brooklyn Heights-Cobble Hill
5 Carroll Gardens-Columbia Street
-RedHook
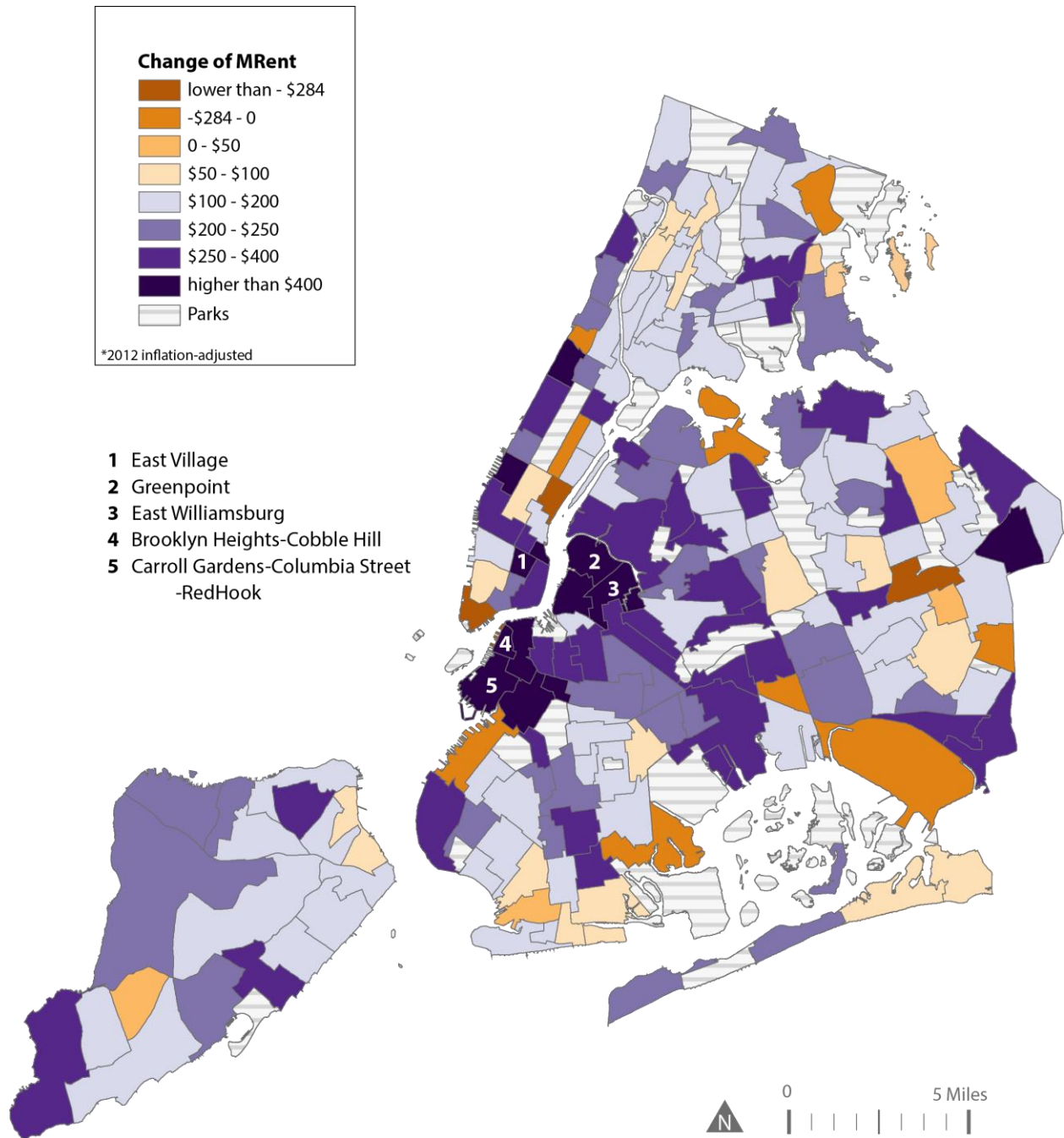
Figure 7. Change in Value of Median Contract Rent 2000-2012

Figure 7 and Figure 8 indicate different parameters of median contract rents. Figure 7

indicates the difference in rent values, while Figure 8 considers the percent change from 2000 to

2012.

Change of %MRent

lower than -15%

-15% - 0

0 - 10%

10% - 20%

20% - 30%

30% - 40%

40% - 50%

higher than 50%

Parks

*2012 inflation-adjusted

1 East Williamsburg
2 Bushwick South
3 DUMBO-Vinegar Hill-
   Downtown Brooklyn- Boerum Hill

0   5 Miles
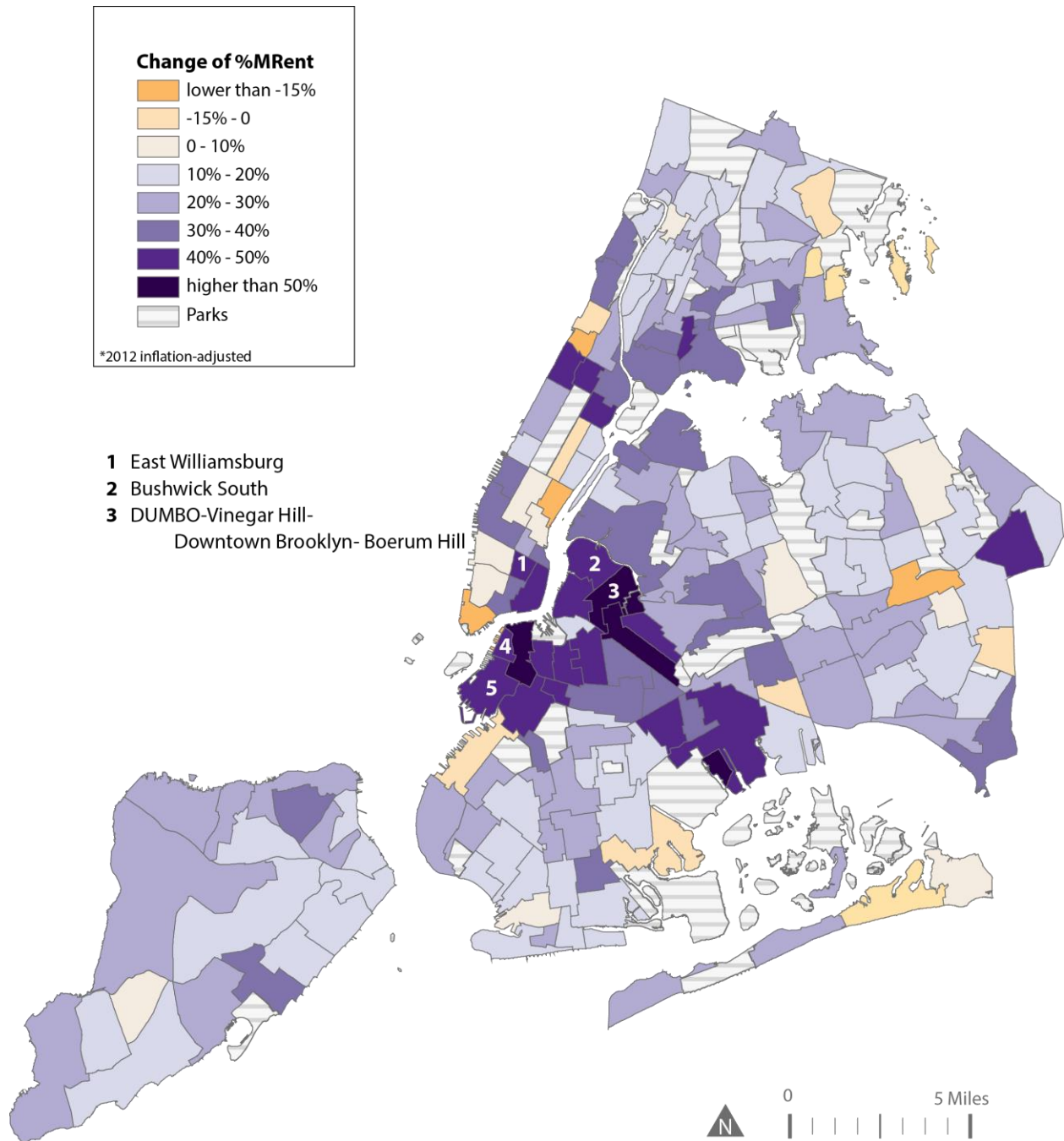
Figure 8. Change in Percent of Median Contract Rent 2000-2012

While in Figure 7, the Brooklyn waterfront areas' increase of rent were noticeable, in

Figure 8, East Williamsburg, Bushwick South, and DUMBO neighborhoods underwent a severe

increase of rent compared to their 2000 rent values. Those three neighborhoods experienced

more than a 50 percent increase. However, the rest of North Brooklyn and the waterfront areas

also had a more than 30 percent rent increase. In Figure 5 and Figure 8, the correlation between the growth of CSBs and the raise of rent area is detected. It is difficult to conclude, though, that this surge of rent is solely driven by CSB growth. Since the rezoning plan in 2005, the Department of City Planning (DCP) approved changes to waterfront areas in Brooklyn from low-density, waterfront, manufacturing usage to high density residential (DCP, 2005). Consequently, the neighborhoods in Brooklyn became a hotspot for development.

4.3. Regression Results

4.2.1. NTA (Neighborhood Tabulation Areas) Boundary Level

Change in Unemployment Rates

In both percentage change and absolute number change models, the proportion of CSBs to SBs had an inverse relationship with unemployment rates. These inverse relationships showed a statistical significance at the 99 percent confidence level. The coefficients were -.6 for the percentage change model, and -.7 for the absolute change model. This means that a one percent increase in the SCB/SB ratio can be seen with a .6 or .7 decrease in unemployment rate.

Change in Percent of Median Contract Rent

The changes, both by percentage and absolute value, of CSBs do not demonstrate any significant relationship with percent changes of median contract rent. Yet, the ratio of CSBs over the total SBs change had a positive relationship with median rents with a p-value of 0.226. This result indicates that when a neighborhood has more creative industries in proportion to all small businesses in that neighborhood, the rent goes up by 0.9%, with an approximately 80 percent level of confidence.

Table 3. 2000 - 2012 Regression at the NTA Boundary Level

Dependent	Independent	Coefficient	Std. Error	
Unemployment Rate	%CSB	-.0022	.0019	
	%SB	-.0545	.0073	***
	CSB/SB	-.6139	.2046	***
	%BAmore	.0455	.0480	
	%Pop	-.0051	.0091	
	Adj R-square	0.3343		
	CSB	.0045	.0046	
	SB	-.0006	.0007	
	CSB/SB	-.7346	.2102	***
	%BAmore	.0888	.0566	*
	%Pop	-.0142	.0109	
	Adj R-square	0.0503		
%Averaged Median Contract Rent	%CSB	-.0024	.0073	
	%SB	.0935	.0279	***
	CSB/SB	.9440	.7777	
	%BAmore	1.0553	.1827	***
	%Pop	-.0317	.0348	
	Adj R-square	0.1972		
	CSB	.0159	.0150	
	SB	-.0041	.0023	*
	CSB/SB	.3096	.6779	
	%BAmore	1.048	.1825	***
	%Pop	-.0089	.0353	
	Adj R-square	0.1752		

*p<0.1, **p<.05, ***p<.01

4.2.2. Census Tract Level

Manhattan

In Manhattan, the changes in number and proportion changes of CSBs do not explain the unemployment rate change. Although, the absolute value model suggests that when a census tract has one more creative small business, it is likely to see a .3% decrease in unemployment rate. That regression model only has a .7 of R-square. In other words, only 7 percent of

unemployment rate variances are explained by the changes in this regression model's

independent variables.

Furthermore, in the median contract rent regression, none of the CSB-related variables

had a statistical significance at the 90% confidence level. Yet, in the percent change model, and

with an 80 percent confidence level, the proportion of CSB/SB had a 1.05 coefficient with the

percent change of median rent (p-value 0.18). This means that when the amount of CSBs in a

census tract in Manhattan increases by one percent, it is likely the census tract's median rent will

increase by 1 percent, as well. However, in Manhattan, it is difficult to interpret that the increase

in median rent have a correlation with growth of CSBs. Because, according to the Figure 5 and 8,

they displayed a different appearance. In those maps (Figure 5 and 8) while median rent was

increased in most of neighborhoods, most of those neighborhoods not experienced an increase in

CSBs to SBs.

The Bronx

In the Bronx, independent variables do not explained any statistical relationship with the

unemployment rates. Also, both of unemployment rates and median rents regression results had

low R-square values. Although the regression for median rent change had a low R-square, the

results show a statistical relationship between the proportion of CSBs over SBs and percent

changes in median rent. This means that the Bronx neighborhoods that have an increased

proportion of creative industries in small businesses will have .8 percent of raised median rents.

Table 4. Summary Table of Regression from Each Boroughs

Dependent	Independent	Manhattan	Bronx	Brooklyn	Queens	Staten Island
Δ Average of Unemployment Rate	Δ%CSB	.0014(.0033)	.0027(.0026)	-.0025(.0008)***	-.0011(.0013)	-.0011(.0024)
	Δ%SB	-.0077(.0046)*	-.0071(.0044)	-.0070(.0025)***	-.0002(.0012)	.0004(.0053)
	ΔCSB/SB	-.1038(.1214)	-.1921(.1213)	.0614(.0402)	-.0081(.0579)	-.0283(.0852)
	Δ%BAmore	-.1106(.0376)***	.0333(.0815)	-.0312(.0129)**	.0394(.0241)	.0653(.0367)*
	Δ%Pop	-.0057(.0019)***	-.0347(.0215)	-.0164(.0041)***	-.0043(.0136)	-.2289(.0660)***
	Adj R-square	0.2844	-	0.0800	-	0.2831
	ΔCSB	-.0260(.0095)***	.0235 (.1071)	.0211(.0276)	-.0000(.0475)	-.0568(.0494)
	ΔSB	.0039(.0016)**	-.0043(.0049)	-.0027(.0037)	-.0019(.0046)	.0057(.0042)
	ΔCSB/SB	.0439(.0767)	-.0878(.0520)*	-.0626(.0287)**	-.0354(.0235)	-.0000(.0428)
	Δ%BAmore	-.1181(.0345)***	.0304(.0532)	-.0035(.0129)	.0212(.0161)	.0111(.0190)
	Δ%Pop	-.0050(.0019)***	-.0162(.0113)	-.0181(.0047)***	.0090(.0068)	-.1740(.0380)***
	Adj R-square	0.0731	-	0.0231	0.0018	0.1890
Δ% Median Contract Rent	Δ%CSB	-.0218(.0215)	-.0042(.0087)	-.0022(.0063)	-.0063(.0082)	.0083(.0276)
	Δ%SB	.0467(.0296)	.0138(.0147)	.0338(.0184)*	.0021(.0245)	.0213(.0608)
	ΔCSB/SB	1.0459(.7847)	.8187(.3992)**	-.1844(.2910)	.9831(.3337)***	1.6629(.9646)*
	Δ%BAmore	1.6647(.2399)***	.0261(.2682)	1.189(.0936)***	.6816(.1722)***	-.3942(.4163)
	Δ%Pop	.2310 (.0127)***	.2004(.0709)***	.1548(.0302)***	.2665(.0910)***	.1161(.7484)
	Adj R-square	0.5907	0.0329	0.2835	0.1156	0.0743
	ΔCSB	-.0165 (.0608)	-.0906(.4014)	-.2932(.1774)*	.5631(.3567)	-.3197(.6227)
	ΔSB	-.0081 (.0104)	.0246(.0187)	.0325(.0238)	-.0264(.0354)	.0405(.0532)
	ΔCSB/SB	.3022 (.4966)	.3634(.1973)*	-.1983(.1853)	-.1989(.1814)	.8822(.5395)
	Δ%BAmore	1.6014(.2210)***	.0166(.2070)	1.132 (.0835)***	1.0781(.1413)***	-.0606(.2398)
	Δ%Pop	.2299 (.0123)***	.1869(.0440)***	.1761(.0306)***	.2515(.0555)***	.7488(.4791)
	Adj R-square	0.5883	0.0467	0.2522	0.1275	0.0148

*p < 0.1 , **p < .05 , ***p < .01

Brooklyn

In the percent change model, there is a statistical significance between the percent change of CSBs and change of unemployment rates. However, the result cannot be interpreted as there being a significant relationship due to the low coefficient (-.0025) between the increase of CSBs number and decrease of unemployment rates. The absolute number change model also indicates a negative relationship between the growth of proportion of CSBs to SBs and unemployment rates.

Unlike the hypothesis that change in CSBs will have a positive correlation with median rent changes, in Brooklyn, coefficients show inverse results. In both, an increase in the number of CSBs and ratio of CSBs to SBs had negative coefficients to percent change in median rent. In other words, an increase of CSBs in Brooklyn correlated with a decrease in median rent. This differing result from the hypothesis could be explained by CSB owners who choose neighborhoods that are more affordable than Brooklyn's neighborhoods.

Queens

Queens' regression result for unemployment rates had critically low R-squares, this makes any interpretation of the result unreliable. This also suggests that, in Queens, CSB, SB, higher educational attainment rate, or the population change are not the important variables for determining the change in its unemployment rate.

In a regression for median rent, the proportion of CSB/SB had a statistical relationship with the change of median rent. This is detected in the percent change model, that the portion of CSBs to SBs had .98 coefficient with 99 percent of confidence level. In other words, in Queens, as CSB/SB grow by 1 percent, the median contract rent is likely to increase by approximately 1 percent as well.

Staten Island

Although there was a statistically significant relationship between population change and unemployment change in Staten Island, it is difficult to determine a correlation between creative industries' change and unemployment rate change. The median rent positively correlates with CSB/SB changes with 90 percent confidence level in the percent change model. However, the changes of CSB/SB could only explain 7.4 percent of the variances of median rent percent change.

5. CONCLUSION

In this study, the relationship between CSBs growth and the unemployment rate as well as median rent in New York City was investigated. In a citywide regression analysis, the proportion of CSBs to SBs indicated a significant statistical relationship with the decrease of unemployment rate. Yet, as mentioned in the methodology chapter, because this research was conducted on a micro level, it was difficult to interpret the impact of employment rates on the neighborhoods in terms of tax revenue or incomes. Nevertheless, there was a clear change in the socio-economic character of the neighborhoods.

In terms of changes in the rent values, the percent changes regression illustrates that when there is a one percent increase in the CSB/SB ratio, there will be a one percent increase of average median rent. However, this result was not statistically significant (lower than 90 percent of confidence level).

At the borough level, all five boroughs had different results. Brooklyn is currently considered the most favorable place for creative small businesses (as shown in Figure 5); the borough indicated a statistically significant relationship between creative small business growth and the decline of unemployment rates. Manhattan also showed a negative relationship between creative small businesses and unemployment rates, with a 99% confidence level. For the Bronx, in the absolute value change model, the relationship between the proportion of CSB/SB and unemployment rates was statistically significant, with a 90 percent level of confidence. However, because of the critically low R-square, this study did not interpret this phenomenon as significant.

The regression of changes in the percent of median contract rent did not indicate a one direction relationship between creative small business growth and rent increases. While the

Bronx and Queens indicated positive relationships between the rent change and creative small business growth, Brooklyn experienced a negative relationship. The difference between boroughs may be due to the original condition of the rent values. Considering the fact that neighborhoods with lower residential rent values tend to have lower property value overall, such neighborhoods with lower property values could attract creative industries to the area. Consequently, these creative firms might generate an increase in the average rent. However, in the long run, increased rents may cause the neighborhoods to be less affordable, which might also lead to the loss of creative small businesses (Center for Urban Future, 2015).

Moreover, the maps on Figures 3, 4, and 5 show a constant growth of creative small businesses in many neighborhoods of Brooklyn. This is significant because numerous previous studies have indicated the importance of clustering of creative industries and the reasons that contribute to the agglomeration. A report from the New York State Office of the State Comptroller (2004) gave credit to a nonprofit entity, The Green Point Manufacturing and Design Center (GMDC), for generating these clusters in Brooklyn by building a center for small manufacturing businesses that provided affordable spaces for them. This is important since it indicates that one nonprofit's support can contribute to a lot of businesses, create a center of specific industries, and make an environment for small businesses to share their experiences and benefit from one another's services (New York State Office of the State Comptroller, 2004). As mentioned in the background chapter, Industry City in Sunset Park is designated to be renovated as a space for creative industries. In Figures 3 and 4, Sunset Park is highlighted as the neighborhood that has a growing number of creative small business. For this project, the support from the City is expected to achieve more prosperity of creative industries in the neighborhoods.

As mentioned before, this study recommends further research on the aftermaths of Industry City's redevelopment. However, to complement the further research, adjustment of code system is required. This thesis sorted creative industries based on the codes that were indicated in *Creative Economy Employment in the US, Canada and the U.K.* (NESTA, 2016). In the report, it highlighted the difficulties in crosswalk process DCMS classification to NAICS industry code. The author indicated the existence of "fuzzy crosswalk" resulted from the lack of consistency from one code to another (Nathan, Kemeny, & Spencer, 2016). According to the UNESCO report (2013), there are several different classification systems to distinguish cultural and creative industries. This study chose the DCMS model; however, five more classifications are noted, including the UNESCO Institute for Statistical Model and the Americans for the Arts Model. For future studies, it is important to know which code system is most influential in identifying the creative industries and illustrating these "creative industries". Lastly, this study only analyzed the impact of creative industries. But in order to understand the expected growth of creative industries, it would be helpful to discuss more specific industries.

For instance, because of the emergence of co-working offices in New York City, the opening of small businesses has become less difficult. These shared offices provide more opportunities for start-up companies because they provide ways for companies to spend less on the cost of opening a business while also lending a place for networking and promoting competition and collaboration. As offices, studios and venues for artist are increasingly being shared, these clusters of creative industries can potentially solve problems related to costs. Yet, this is a concern because in New York City, the inexpensive neighborhoods that are favorable for creative entrepreneurs to work may soon become "out of reach" real estate market (Center for Urban Future, 2015). Thus, it is critical to acknowledge the benefits creative businesses can

bring to individual neighborhoods, not to mention NYC, and consolidate support mechanisms in place that can protect and encourage these industries.

In general, according to the findings (Table 2), number of creative small business grew from 2000 to 2012. Even though there were two shrinks which were affected by two national wide crises, number of creative small businesses rebounded (except for Queens). This general growth of creative small business (Table 2) indicates that creative small business have capacity to being key industries for New York City's economy. While the biggest New York City's support on creative industries is expected with the huge investment to the Industry City, according to the 2015 "Small Business First" plan, it is expected that there will be more opportunities for new small businesses in New York City. The plan will help small business owners and those who are willing to open new businesses by reducing regulatory burdens that hinder opening and running small businesses ("Small", 2015). If this plan successfully reduces barriers for small businesses, subsequently the creative small business growth is expected as well. As previous studies have noted, New York City clearly has potential to be the a center of creativity, however this study emphasized that it is necessary to understand what the ideal context for growth is, as well as what the chances of creative industries' growth is (Pratt, 2006; Indergaard, 2013; JPMorgan Chase & CO, 2014; Center of Urban Future, 2015).

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APPENDIX

APPENDIX A. U.K. DCMS Classification for Creative Industries

Creative Industries	Industries included in this category
Advertising	Advertising agencies; Media representation
Architecture	Architecture activities; Specialized design activities
Art and antiques market	Retail sale in commercial art galleries; Retail sale of antique, including antique books, in store
Crafts	
Design	Specialized design activities
Designer fashion	Clothing manufacturing
Video, film, and photography	Reproduction of video recording; photographic activities; motion picture and video production activities; motion picture, video, and TV post production activities; motion picture projection activities
Music and the visual and performing arts	Sound recording and music publishing activities; Reproduction of sound recording; Performing arts; Support activities to performing arts; Artistic creation; Operation of arts facilities; Motion picture, television and other theatrical casting
Publishing	Printing of newspapers; Pre-press and pre-media services; Book publishing; Publishing of newspapers; Publishing of journals and periodicals; Other publishing activities; News agency activities
Software, electronic publishing	Reproduction of computer media; publishing of software; other software consultancy and supply
Digital and entertainment media	Publishing of computer games; Ready-made interactive leisure and entertainment software development
Radio and television	Radio broadcasting; Television programming and broadcasting activities; TV program production activities; Motion picture, video and TV post production activities; TV program distribution activities

Source: creative skill set (2013)

APPENDIX B. Dominant Clusters
Dominant Clusters that outperformed metro employment growth (2003 - 2011)

Cluster Employment Growth	
Education and Knowledge Creation	16%
Marketing, Design, and Publishing	11%
Performing Arts	4%

Dominant Clusters that outperformed metro small business growth (2003 - 2011)

Cluster Small Business Growth	
Communications Equipment and Service	17%
Education and Knowledge Creation	25%
Music and Sound Recording	4%
Performing Arts	6%
Video Production and Distribution	5%

Source: JPMorgan Chase & Co., (2016)

APPENDIX C. NAICS CODEs for Creative Industries Selection

NAICS CODE	DESCRIPTION
327910	Abrasive Product Manufacturing
327991	Cut Stone and Stone Product Manufacturing
327992	Ground or Treated Mineral and Earth Manufacturing
327993	Mineral Wool Manufacturing
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing
339910	Jewelry and Silverware Manufacturing
339920	Sporting and Athletic Goods Manufacturing
339930	Doll, Toy, and Game Manufacturing
339940	Office Supplies (except Paper) Manufacturing
339950	Sign Manufacturing
339991	Gasket, Packing, and Sealing Device Manufacturing
339992	Musical Instrument Manufacturing
339993	Fastener, Button, Needle, and Pin Manufacturing
339994	Broom, Brush, and Mop Manufacturing
339995	Burial Casket Manufacturing
339999	All Other Miscellaneous Manufacturing
511110	Newspaper Publishers
511120	Periodical Publishers
511130	Book Publishers
511140	Directory and Mailing List Publishers
511191	Greeting Card Publishers
511199	All Other Publishers
511210	Software Publishers
512110	Motion Picture and Video Production
512120	Motion Picture and Video Distribution
512131	Motion Picture Theaters (except Drive-Ins)
512132	Drive-In Motion Picture Theaters

512191	Teleproduction and Other Postproduction Services
512199	Other Motion Picture and Video Industries
512210	Record Production
512220	Integrated Record Production/Distribution
512230	Music Publishers
512240	Sound Recording Studios
512290	Other Sound Recording Industries
515111	Radio Networks
515112	Radio Stations
515120	Television Broadcasting
515210	Cable and Other Subscription Programming
518210	Data Processing, Hosting, and Related Services
519110	News Syndicates
519120	Libraries and Archives
519130	Internet Publishing and Broadcasting and Web Search Portals
541310	Architectural Services
541320	Landscape Architectural Services
541330	Engineering Services
541340	Drafting Services
541350	Building Inspection Services
541360	Geophysical Surveying and Mapping Services
541370	Surveying and Mapping (except Geophysical) Services
541380	Testing Laboratories
541410	Interior Design Services
541420	Industrial Design Services
541430	Graphic Design Services
541490	Other Specialized Design Services
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services
541611	Administrative Management and General Management Consulting Services
541612	Human Resources Consulting Services
541613	Marketing Consulting Services
541614	Process, Physical Distribution, and Logistics Consulting Services
541618	Other Management Consulting Services
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
541810	Advertising Agencies
541820	Public Relations Agencies
541830	Media Buying Agencies
541840	Media Representatives
541850	Outdoor Advertising
541860	Direct Mail Advertising
541870	Advertising Material Distribution Services
541890	Other Services Related to Advertising
541910	Marketing Research and Public Opinion Polling
541921	Photography Studios, Portrait
541922	Commercial Photography
541930	Translation and Interpretation Services
541990	All Other Professional, Scientific, and Technical Services

611610	Fine Arts Schools
611620	Sports and Recreation Instruction
611630	Language Schools
611691	Exam Preparation and Tutoring
611692	Automobile Driving Schools
611699	All Other Miscellaneous Schools and Instruction
611710	Educational Support Services
711110	Theater Companies and Dinner Theaters
711120	Dance Companies
711130	Musical Groups and Artists
711190	Other Performing Arts Companies
711211	Sports Teams and Clubs
711212	Racetracks
711219	Other Spectator Sports
711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities
711320	_____without Facilities Agents and Managers for Artists, Athletes, Entertainers,
711410	and Other Public Figures
711510	Independent Artists, Writers, and Performers
712110	Museums
712120	Historical Sites
712130	Zoos and Botanical Gardens
712190	Nature Parks and Other Similar Institutions
812910	Pet Care (except Veterinary) Services
812921	Photofinishing Laboratories (except One-Hour)
812922	One-Hour Photofinishing
812930	Parking Lots and Garages
812990	All Other Peral Services

This is not included in selection of creative industries, even the larger category was eligible according to the Nathan et al.'s study.