The Geographical Distribution of Urban Public Services: A Case Study of Sanitation and Police Spending in New York City

Honors Thesis, Submitted to the Oberlin College Department of Economics

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Abstract: Gentrification is an increasingly documented phenomenon on the urban political landscape, renewed capital and human investment in previously disinvested urban areas. Examining at the geographic distribution of the urban public services of sanitation and police expenditure, I run a fixed-effects regression using indicators of gentrification, and political visibility. I find no significant results for either of these models, but find instead find zoning characteristics, and Business Improvement Districts (BIDs) the statistically significant variables of interest in the regressions.

Gentrification, though widely acknowledged as a phenomenon on the modern urban landscape, is a notoriously difficult topic to study due to its erratic, piecemeal, and idiosyncratic nature. Though not exclusively harmful, the influx of higher educated, and higher income residents into an underdeveloped and disinvested neighborhood near a city center does have negative consequences for the existing residents (Kennedy 2001), in the form of displacement (Freeman 2009), community erosion (Kennedy 2001), and class and racially based tension and conflict (Lineberry 1974, Mladenka 1989, Kennedy 2001).

I would like to thank my Advisor, Ron Cheung, for his answering my many questions, providing perspective and advice, and reassuring me regarding my topic and direction. I am also indebted to Rachel Meltzer of The New School, who physically collected and compiled the early years sanitation and police expenditure data, prior to its availability online.

Today's urban resident relies on and benefits substantially from publicly provided goods and services. Public transportation, policing, street sweeping, garbage removal, street and sidewalk repair fire protection; public services are an inextricable part of the urban experience. The provision of these services is handled by central governing, planning and executing boards, and dispersed through local hubs, with directives and reports passed up and down through a bureaucratic structure. These centrally decided directives and policies enacting each service may be influenced by: political pressures - from the electorate and public opinion, economic pressures - from business interests and competition with other cities for residents, and inertia - from the institutional structures and traditions already in place.

In a substantial Supreme Court case *Hawkins v. Town of Shaw 1971,* racially motivated inequitable resource distribution was found unconstitutional. However, challenging inequitable distribution is complicated by the difficulty to properly measure the implemented level of the public service. The work of Lineberry (1974) is acknowledged to address the measurement of public services, with respect to different levels of output equity (clean streets) even based on similar levels of input equity (expenditure on street cleaning). The discrepancy in experience between the two measures highlights the frictions in implementing public services. While the lived experience of the public service may be substantially different between input and output, the onus of this discrepancy was ruled to not lie with the municipal government. According to *Beal v. Lindsay (1972)* and *Burner v. Washington (1975)*: though output equity may be different, the municipal government is only feasibly responsible for input equity.

There has been a dearth of recent literature on distribution of urban resources, especially longitudinally, and none using the framework of gentrification. This deserves attention, as

gentrification is highly impactful for certain communities, often ones that are already marginalized - the non-white urban poor. In a recent study (Heynes 2007) looking at the distribution of canopy coverage produced by an urban forestry project in Milwaukee, Wisconsin, the researchers found inequitable distribution of canopy coverage, corresponding with poverty and non-white majority neighborhoods. Additionally, in a study on policing, David Thatcher (2010) found poor and heavily non-white jurisdictions to employ fewer officers per crime than white and average-income jurisdictions.

Much of the literature surrounding gentrification looks at the outcomes stemming from the demographic shift of neighborhoods, focusing on displacement (Freeman 2005, 2009), mortgage lending (Wyly 1996), and retail service breakdown (Meltzer 2008). However, these studies look at the economic and social impact of the market forces that gentrification itself is a part, not at the municipal interaction with gentrification. Separately, there has been significant research on the distribution of urban public services, usually based on racial and class characteristics, though results are mixed and inconclusive. Much of the early research (Lineberry 1977; Mladenka 1980; Jones 1980) found "unpatterned inequality" as the norm, where decision rules of bureaucrats were more responsible than political visibility and influence. These studies have been criticized for their definitions of equity, and their methodology - particularly the use of cross-sectional, rather than longitudinal, data - a criticism that invoked Mladenka (1989) to revise his study and recognize class based discrimination.

Examining specifically sanitation and police expenditure, I hope to address the following question: In which ways does a municipal government change its behavior towards a neighborhood that undergoes gentrification? How is the distribution of public services affected by changes in resident characteristics?

There are several approaches to highlight gentrification, and nearly all emphasize income, homeownership, and education (Kennedy 2001; Freeman 2005; Wyly 1996), specifically in urban areas. Kennedy (2001) used a non-concrete but satisfying definition, identifying gentrification as "the process by which higher income households displace lower income residents of a neighborhood, changing the essential character and flavor of that neighborhood" (Kennedy 2001, 6). Freeman (2009) offered a more concrete, but also broad stroke, and used neighborhoods below the 40th percentile of income, that were in the bottom 40th percentile of private investment over the past 20 years, and saw a percentage increase in educational attainment that was greater than the rest of the metropolitan area. Wyly and Hammel (1996, 1999) used a more rigorous and satisfying approach, identifying gentrifying neighborhoods through archival research, field work, and census data analysis, based on a definition centering on income shifts and housing market mechanisms - new construction and resident succession or displacement. Many of areas that have experienced gentrification and redevelopment had previously seen disinvestment following the white flight of the 1950s-1970s. Many of these areas had been afflicted by the unconstitutional practice of redlining, leading to the perpetuation of poverty, held back in part by the inability to gain receive returns on the investment of a home, maintaining a high rate of renters.

To examine my driving focus, I look at the returns to indicators of gentrification, and political visibility variables for all neighborhoods in the city, as well as for neighborhoods that appear to experience substantive changes in resident characteristics suggestive of gentrification. I offer a marginal view of shifting resident characteristics, of year by year shifts in allocation with respect to changes in population, as opposed to a discrete approach used by many (Wyly 1996, Freeman 2005, 2009), to examine the returns of degrees of gentrification. This stages of gentrification aspect is important to recognize, as there are often 'urban pioneers', such as artists,

or gay and lesbian communities, who move into under- or dis-invested urban areas, who are later themselves replaced by middle and upper income households after the neighborhood has begun to change.

Theory

The impetus for this study came from a series of anecdotal articles speaking to the changes in the experience of residents in neighborhoods, noticing changes in municipal response to areas that were experiencing gentrification[1]. These anecdotes mentioned primarily increased police presence and increased sanitation activity. It is possible that these are part of a city-wide policy measures - such as acting on the 'broken window hypothesis' attempting to punish mundane offences to preempt major offences, or new general trend in sanitation - new policies or new equipment that is more cost-effective. To properly examine differences in service provision towards social groups with different characteristics, we need to observe a change in the service provision in a given area over time, varying with the changes in the social groups to account for inherent differences among community areas.

Additionally, understanding the city as an entrepreneurial agent, as the neoliberalization of urban politics and policies has made common (Wyly 2005), we see it may actively promote gentrification to improve a neighborhood's characteristics. By making a neighborhood attractive to individuals with high human capital, it can increase the cultural and economic capital. The city may be actively promoting gentrification, creating tax incentives for businesses and improving public resources to make an area more attractive to individuals that the city wants to bring in, and implicitly pushing out those seen as undesirable. This type of redevelopment often comes as the area specific Business Improvement District (Meltzer 2012), a public/private partnership where

[1] Ex. Spike Lee's rant [http://www.cnn.com/2014/02/26/us/new-york-spike-lee-gentrification/]

local stakeholders make collective contributions to maintain, develop and improve a commercial district. These areas, condoned by the city for commercial urban redevelopment - often as gentrification, can be seen as intentionally treated differently, and other areas, that see fewer or no BIDs see non-explicitly intentional municipal reaction. If there is a municipal reaction to the demographics of a community undergoing gentrification, outside of the effect conferred by a BID, controlling for BIDs should demonstrate this effect.

If the city spends more to serve residents with higher human capital, there should be a positive relationship between indicators of gentrification and in public expenditure. There is also the possibility that the city responds to political pressures - that is, voters, and voting expenditure. Regarding policing, if the city is more accountable to a gentrifying population, and this population demands more protection, demonstrated through 911 calls, then there should be a positive relationship between expenditure and characteristics of gentrification.

To model these hypotheses, I created two primary models - one for the gentrification hypothesis and one for political economy, and two more for police expenditure, with further specifications and findings included in the discussion. The first model looks at trends in spending on sanitation services in each community district in New York City, based on the three best documented indicators (Kennedy 2001; Freeman 2005; Wyly & Hammel 1996, 1999) - decreasing poverty, increasing homeownership, and increasing education level.

If gentrification prompts changes in public service distribution, then these three variables, and their interaction terms, should be significant. To test this, I run regressions on panel data, using Per-capita sanitation spending in each Community District (CD, representing neighborhoods), on a fixed effects regression. [2]

[2] I regress on the contemporary year, despite the FY calendar by which expenditure variables operate, as the reported sanitation expenditure is of the "Current Modified Budget" which reflects the budget actually spent, as opposed to initially apportioned.

$$PCSanitationbudget_{x,t} = B_0 + B_1 homeownershiprate_{x,t} + B_2 povertyrate_{x,t} + B_3 percentagebachelorsdegree_{x,t} + B_4 homeownership_{x,t} * povertyrate_{x,t} + B_7 commercialzoning_{x,t} + B_8 manufacturingzoning_{x,t} + B_9 timetrend_{x,t} + B_{10} log(population)_{x,t} + B_{11} BusinessImprovmentDistricts_{x,t} + CD1 + CD2 ... + CD59 + Year1 + Year2 +... Year\text{-}n + e_{x,t-1} \quad (1)$$

$$PCSanitationbudget_{x,t-1} = B_0 + B_1 Votingrate_{x,t} + B_2 log(campaigncontributions)_{x,t} + B_3 + B_4 commercialzoning_{x,t} + B_5 manufacturingzoning_{x,t} + B_6 timetrend + B_7 logPopulation + B_8 BusinessImprovmentDistricts_{x,t} + CD1 + CD2 ... + CD59 + Year1 + Year2 +... Year\text{-}n + e_{x,t} \quad (2)$$

In the sanitation regressions, I control for land use (ie. zoning), the logarithm of population, and a time trend. There should be economies of scale based on population, and the year control should pull out time trends in both the dependent and independent variables, zoning to reflect inherent differences in sanitation of differently zoned lots, and BIDs to control for business improvement district specific effects. In addition, in supplemental regressions on police spending, I use both models above. The fixed effects of the community districts should account for the inbuilt, time-invariant characteristics of a given sanitation district - smaller streets, high traffic volume, high density, etc... and the year fixed effects should account for the city wide changes year by year, such as new union contracts, or gas price increases.

In order to attempt to restrict my observations to areas that experiencing significant change indicative gentrification, I also include a 10 district model (Appendix I, bolded districts) of those areas that were in the bottom third in at least two of the three indicators, and experienced an increase relative in percentile in all three of these indicators between 1990 and 2012.

Data

For the data on demographic characteristics, I primarily used statistics provided by Furman Center, based on decennial census data, and the American Community Survey. The units of analysis in these sections are the 55 Public Use Microdata Areas (PUMAs), which are made to approximate community district boundaries (*figure 1*)**.** For voting data, I used the 64 Assembly Districts from the New York State and New York City Board of Elections (the smallest voting area), for voter registration and voter turnout, respectively. I also found campaign contribution data based by zip-code, provided by the Center for Responsive Politics[3]. For statistics on crime I used police precinct data aggregated by the Furman Center, and using GIS weighted them to the community district level. For statistics on zoning, the Furman Center generated data from the Real Property Assessment Database. For Business Improvement District (BID) data, I compiled the total block-faces in a given district that are part of a BID, by the year that the BID was ratified.

For the dependent variables, my unit of analysis is the Community District (CD) - 59 unchanging neighborhood areas drawn by the city government along community/neighborhood lines, used for local service distribution and community representation. Police expenditure is reported at the precinct level, but I used GIS to aggregate expenditure to the CD level. The Office of Management and Budget posts yearly expenditure data on sanitation services and police spending, by community district and police precinct, respectively.

The data is not necessarily in corresponding years, or geographic areas, so *table 1* highlights the transformations necessary to create a workable data set.

[3] *Center for Responsive Politics* (www.opensecrets.com)

Variable(s)	Years	Temporal Transformation	Geographic area	Geographic transformation
Homeownership, Poverty Rate, Bachelor's degrees, population	1990, 2000, 2005 - 2010, 2012	Year 1990 applied to 1992	PUMA	None
Campaign Contributions	1994, 1996, 1998 … 2014	step wise transformation in non-election years	Zip-Code	Area weighted sum in GIS to Community District
Voter turnout	2002, 2004, … 2012	step wise transformation for between election years	Assembly District	Area weighted sum in GIS to Community District
Voter Registration	2002 - 2013	none	Assembly District	Area weighted sum in GIS to Community District
Zoning characteristics	2001 - 2012	none	Community district	None
Police expenditure	1992 - 1998, 2001, 2005 - 2012	None	Police Precinct	Area weighted sum to Community District, Staten Island dropped due to non-reporting
Violent crime and property crime	1992 - 2007	None	Police Precinct	Area weighted sum in GIS to Community District
Sanitation expenditure & employment	1992-2013	None	Community District	None

Table 1

	Model A	Model B	Model C	Model D	Model B'	Model C’
R^2	0.4721	0.4729	.4665	0.4139	.3423	.3262
observations	354	354	354	649	60	60
Logpop	-20.44*** (1.41)	-20.412*** (1.466)	-20.0*** (1.37)	-34.4*** (1.466)	-8.51 (6.03)	-9.71** (2.36)
bidblocks	-0.0009 (0.004)	-0.00108 (0.003)	-0.0014 (0.0032)	-0.0031 (0.0045)	0.106+ (0.056)	.102* (.049)
Home	0.028 (0.039)	0.0954 (0.059)		-0.017 (0.094)	0.091 (1.2)	
Pov	-0.00077 (0.024)	-0.00075 (0.13)		-0.052 (0.11)	-0.488 (0.610)	
Bach	-0.0197 (0.031)	0.0386 (0.077)		-.221+ (.124)	-0.581 (0.78)	
Commercial zoned	-0.369* (0.182)	-0.369+ (0.198)	-0.309+ (0.18)	-0.527*** (0.103)	-0.97 (0.925)	-.627 (.553)
Manufacturing zoned	-0.101 (0.161)	-0.101 (0.168)	-0.0906 (0.155)	-0.053 (0.048)	-0.242 (0.308)	-.012 (.38)
Pov*home		-.00037 (0048)			0.008 (0.32)	
Pov*bach		.00127 (.004)			0.0302 (0.027)	
Home*bach		.0004 (.0014)			0.0211 (0.686)	
Home*bach*pov		-.00003 (.0001)			-0.0012 (0.0015)	
Ballots / population			1.833+ (1.097)			2.13 (3.45)
Log(contributions)			-0.262 (0.74)			.988 (1.35)
_cons	266.1*** (17.6)	265.67*** (19.6)	-262.8*** (17.5)	438.67*** (19.6)	126.7+ (69.2)	115.5** (31.4)
F-stat	49.31	38.71	52.05	22.65		

Table 2.

*+ denotes p<.10 level; * denotes significance at p<.05 level, ** denotes significance at the p<.01 level, *** denotes significance at the p<.001 level.*

Results:

All of the models in Table 2 have per-capita sanitation spending as the dependent variable. Models A through C are run on the entire sample using only direct observations (years 2005-2010). Model D uses imputed values for the entire population in years 2001-2005. Models with the prime (') suffix indicate the restricted population of 'indicative of gentrification' neighborhood areas (as indicated in the appendix).

Taken all together, it appears that demographic statistics indicative of gentrification do not have an effect on per-capita sanitation spending. Only in one case does any indicator of gentrification approach significance (at the 10% level), and in the opposite direction as the gentrification hypothesis posits. Additionally, in Model C, the basic Political Economy model, the amount of ballots cast / population is positive and significant at the 10% level.

Zoning characteristics, however, may be relevant, as across specifications A-D, Commercial zoning is negative and significant at the 10% level or above in all models, and significant at the 99.9% level in the imputed zoning model, where neither variable is in fact imputed. Additionally, the logarithm of population appears significant across nearly every model, confirming the logic of economies of scale. Blocks that are included in Business Improvement Districts, may also experience increased sanitation spending, at least when the sample is restricted to 'indicative of gentrification' districts.

Variable	Model F	Model G	Model H	Model F'	Model G'	Model H'
R^2	0.5628	0.5717	.5262	.8910	.9252	.8209
observations	270	223	270	50	40	50
Logpop	-143.60*** (21.96)	-146.1*** (32.86)	-151.2*** (24.05)	-147.8** (35.5)	-138.26** (40.0)	-177.84* (34.7)
Bidblocks	0.26* (0.12)	.235* (.115)	0.285* (0.121	.008 (.072)	.055 (.072)	-.05 (.07)
Home	0.90 (0.69)	-.024 (.79)		-3.1 (2.63)	-2.19 (3.55)	
Pov	0.0862 (1.01)	-1.01 (1.14)		-1.87 (1.88)	-1.74 (2.38)	
Bach	2.17+ (1.30)	.852 (1.07)		2.42 (2.99)	4.03 (3.17)	
Commercial zone	1.38 (1.69)	1.35 (2.24)	.104 (1.6)	4.7+ (2.4)	14.84 (9.75)	2.04 (1.24)
Manufacturing zone	2.095* (0.95)	1.98* (.92)	1.39* (.67)	.23 (.92)	6.99 (6.47)	.513 (.506)
Pov*home	.023 (.023	.039 (.033)		.167 (.094)	.177 (.111)	
Pov*bach	-.023 (.044)	.016 (.045)		-.014 (.09)	-.03 (.11)	
Home*bach	-.040 (.026)	-.0148 (.024)		-.028 (.14)	-.072 (.16)	
Home*bach*pov	-.00085 (.0009)	-.0015 (.0012)		-.002 (.004)	-.0027 (.0056)	
Ballots / population			1.42 (1.2)			-6.72 (22.62)
Log(contributions)			1.61 (3.88)			6.2 (6.7)
Police(x,t-1)		.249+ (.13)			-.36* (.15)	
_cons	1706.7*** (240.87)	1755.16** (55.25)	1839.7*** (273.5)	1869.8*** (383.8)	1621.5* (529.0)	2122.7*** (350.9)
F-stat	38.71	13.97	15.05			

Table 3.

*+ denotes p<.10 level; * denotes significance at p<.05 level, ** denotes significance at the p<.01 level, *** denotes significance at the p<.001 level.*
Note: These regressions all exclude the three CDs in Staten Island, as there police expenditure was not reported for one of the precincts.

Model F, G and H were run on the entire set of Community Districts over the years 2006 - 2010, and again (') indicates a restricted set of 'indicative of gentrification' districts. This secondary regression, of per capita police expenditure on both the gentrification and explicit political economy models returns similarly inconclusive results - all of the variables of interest lie statistically insignificant. However, blocks zoned as manufacturing, as well as the quantity of Business Improvement District blocks both return as significant for the full population regressions.

Discussion:

Before turning to a final discussion of my results, I would like to address some legitimate concerns of this project, primarily limited by data structures.

Some issues in my approach lie in the nature of gentrification, and the incongruency of my data and approach to capture gentrification. First, gentrification occurs on a block by block basis, slowly transforming neighborhoods on a year by year basis. My unit of analysis - the Community District - is much larger than the scope that gentrification could substantially shift the neighborhood averages over the 5-6 year period under study, especially when using yearly increments. Other researchers (Wyly 1996, Freeman 2005) use dichotomous approaches, and label neighborhoods as 'gentrified' or not, using longer time periods. This project hoped to observe changes on a year by year basis, but the years available limited the applicability of this approach. Additionally, as the gentrification indicators relied on survey results, the measurement error likely present to some degree will temper on any potentially true relationship, biasing the estimator towards zero (dulled even further due to the use of fixed effects).

Though the variables of interest come up as insignificant over the period studied, the effects of zoning characteristics and quantity of Business Improvement Districts do seem to have a relationship with public expenditure on sanitation and policing. Commercial zoning sees decreases in sanitation expenditure - a 1% increase in lots zoned as Commercial see between a $0.0037 and $0.0057 decrease in per capita sanitation expenditure (generally about .02-.03% less). This suggests a relationship between Commercially zoned areas and the city systematically distributing less per capita sanitation expenditure, as commercial zoning corresponds with a decrease in residential zoning, which would raise per-capita sanitation, holding total expenditure fixed. Additionally, this inverse relationship may be in part due to commercially zoned areas (retailers, restaurants, businesses, etc.) contracting private companies to address sanitation problems - hauling out waste, cleaning the streets, plowing snow. In the police expenditure regressions, increases in manufacturing zoning appears to be positively related to per-capita expenditure, with a 1% increase in manufacturing predicting a $0.014 - $0.02 (~.035%) increase in the per-capita police expenditure. This could again be due to the shift away from residential zoning, (population as the denominator in per-capita spending), but the population variable should control for this effect. Another explanation may be the security employed by capital intensive manufacturing projects, where security officers may call the police more frequently, thus requiring increased expenditure.

Business Improvement Districts remain interesting, and leave some potential for the underlying logic of the paper's initial hypotheses intact, that is, BIDs increase the relative value of an area for a municipal government, which thus rewards it with increased resources. However, though they pop up as significant or near significant in various specifications across models, endogeneity (in particular reverse causation) is an especially strong concern with BIDs. Regardless, the mechanism by which Manufacturing zoned areas may see increased policing

may also apply to BIDs, with private security contacting police, causing an increase in perceived need. Meltzer (2010) looks at this relationship between BIDs providing public services, and municipally provided public services, finds evidence for no effect between presence of BIDs, and municipal policing or sanitation expenditure, both with and without instrumenting for BID.

Conclusion:

This project sought to examine yearly changes in the geographic distribution of urban public services, both sanitation and policing, by political accountability and by gentrification. Overall, the results of the gentrification and voter accountability variables are insignificant in my study. However, zoning characteristics do, and Business Improvement Districts may have a relationship with these measures of public service distribution. This suggests that 'decision rules' based on zoning characteristics are the primary determinant of public services. That the city government is aware of minute yearly shifts in population characteristics is unlikely, so zoning changes and BID ratification, and the related changes in the perceived needs of the area, are more influential in determining apportionment.

Unfortunately, the tangles of endogeneity, as well as the imprecise data, plague this project. The blight of endogeneity, both in the reverse causation between the dependent and various independent variables, and the measurement error apparent in survey research, compromises these regressions causal interpretations. However, the precise correlations are clear, further research may illuminate the mechanisms within these relationships.

In further research on this topic, I believe a dichotomous approach, supported by a yearly approach would be able to better capture the both the process and end results of gentrification. Additionally, a 2SLS approach would be ideal to dispel concerns of simultaneity (that plague my project), though a strong IV would be needed to properly identify gentrification. I believe public

service distribution is much less 'frictionless' than is commonly taken in economics research, and a political economy models could identify aspects of a city's objective function. Though the measures of public service distribution continue to be relatively blunt, with input and outcome obscured by significant frictions, the increase in data metrics and municipal transparency (such as NYC Open Data) seems to counter this fact, and this data may be fertile for substantive analyses now or in the near future.

Appendix:

Descriptive Statistics	Overall				Gent subgroup			
Variable	Mean	std	min	max	Mean	std	min	max
homeownership rate	30.16	20.9	2.8	85.7	12.82	5.56	3.07	26.13
poverty rate	20.62	9.04	2.23	52.19	33.8	6.16	22.16	46.65
bachelors degree rate	28.52	13.34	3.36	80.98	21.23	12.04	5.23	45.64
BID	38.99	103.56	0	773	23.55	39.89	0	316
PCsan	19.17	5.59	7.99	45.3	16.14	4.09	7.99	27.63
PCpol	65.24	44.48	17	316.16	72.96	17.11	45.99	123.23
PCballots	0.25	0.16	0.05	0.92	0.27	0.17	0.09	0.88
Logcont	12.26	1.88	7.77	18.05	11.58	1.98	7.77	15.23
Commercial	8.96	14.14	0.39	85.6	6.85	8.11	0.48	31.54
Manufacturing	13.52	15.91	0	73.63	12.44	14.09	0.81	54.79
Residential	77.51	22.07	1.14	99.42	80.71	14.26	40.95	93.47

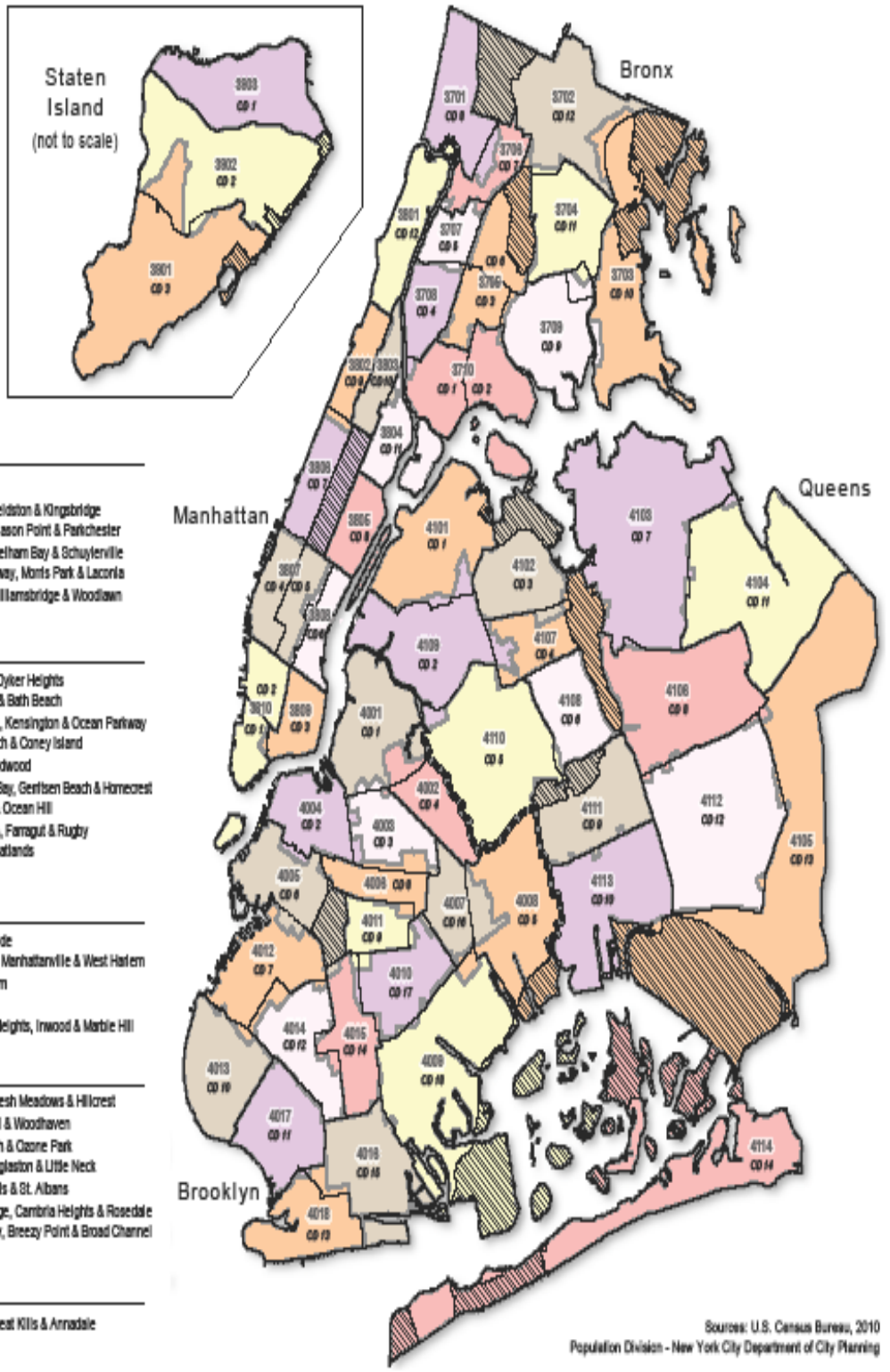
New York City PUMAs and Community Districts

Public Use Microdata Areas (PUMAs) approximate NYC Community Districts (CDs).

3702 PUMAs

CD 12 Community District boundaries

Joint Interest Areas (JIAs) *e.g. parks and airports*



Bronx

CD	PUMA	PUMA Name
1 & 2	3710	Hunts Point, Longwood & Melrose
3 & 6	3705	Belmont, Crotona Park East & East Tremont
4	3708	Concourse, Highbridge & Mount Eden
5	3707	Morris Heights, Fordham South & Mount Hope
7	3706	Bedford Park, Fordham North & Norwood
8	3701	Riverdale, Fieldston & Kingsbridge
9	3709	Castle Hill, Clason Point & Parkchester
10	3703	Co-op City, Pelham Bay & Schuylerville
11	3704	Pelham Parkway, Morris Park & Laconia
12	3702	Wakefield, Williamsbridge & Woodlawn

Brooklyn

1	4001	Greenpoint & Williamsburg
2	4004	Brooklyn Heights & Fort Greene
3	4003	Bedford-Stuyvesant
4	4002	Bushwick
5	4008	East New York & Starrett City
6	4005	Park Slope, Carroll Gardens & Red Hook
7	4012	Sunset Park & Windsor Terrace
8	4006	Crown Heights North & Prospect Heights
9	4011	Crown Heights So., Prospect Lefferts & Wingate
10	4013	Bay Ridge & Dyker Heights
11	4017	Bensonhurst & Bath Beach
12	4014	Borough Park, Kensington & Ocean Parkway
13	4016	Brighton Beach & Coney Island
14	4015	Flatbush & Midwood
15	4016	Sheepshead Bay, Gerritsen Beach & Homecrest
16	4007	Brownsville & Ocean Hill
17	4010	East Flatbush, Farragut & Rugby
18	4009	Canarsie & Flatlands

Manhattan

1 & 2	3810	Battery Park City, Greenwich Village & Soho
3	3809	Chinatown & Lower East Side
4 & 5	3807	Chelsea, Clinton & Midtown Business District
6	3808	Murray Hill, Gramercy & Stuyvesant Town
7	3806	Upper West Side & West Side
8	3805	Upper East Side
9	3802	Hamilton Hts, Manhattanville & West Harlem
10	3803	Central Harlem
11	3804	East Harlem
12	3801	Washington Heights, Inwood & Marble Hill

Queens

1	4101	Astoria & Long Island City
2	4109	Sunnyside & Woodside
3	4102	Jackson Heights & North Corona
4	4107	Elmhurst & South Corona
5	4110	Ridgewood, Glendale & Middle Village
6	4108	Forest Hills & Rego Park
7	4103	Flushing, Murray Hill & Whitestone
8	4106	Briarwood, Fresh Meadows & Hillcrest
9	4111	Richmond Hill & Woodhaven
10	4113	Howard Beach & Ozone Park
11	4104	Bayside, Douglaston & Little Neck
12	4112	Jamaica, Hollis & St. Albans
13	4105	Queens Village, Cambria Heights & Rosedale
14	4114	Far Rockaway, Breezy Point & Broad Channel

Staten Island

1	3903	Port Richmond, Stapleton & Mariner's Harbor
2	3902	New Springville & South Beach
3	3901	Tottenville, Great Kills & Annadale

Sources: U.S. Census Bureau, 2010
Population Division - New York City Department of City Planning

	Home	Pov	Bach	Pov*home	Pov*bach	home*bach	home*bach*pov	BID	PC pol	PCsan	PCBallots	log(cont)
home	1											
pov	-.7559	1										
Bach	.1656	-.5639	1									
Pov*home	.4431	-.0540	-.2745	1								
Pov*bach	-.4189	.1453	.5197	-.0848	1							
home*bach	.6983	-.7965	.7722	.0245	.0415	1						
home*bach*pov	.4587	-.5170	.6544	.4591	.4889	.7033	1					
BID	-.0743	-.1464	.5148	-.1894	.3798	.2835	.2999	1				
PCpol	-.3908	.1959	.3729	-.4241	.4241	.0212	.0359	.4213	1			
PCsan	.4904	-.4031	.2833	-.0509	-.0509	.4921	.3846	.0904	.3843	1		
PCBallots	.0126	-.1668	.4047	.2733	.2733	.2482	.2010	.5153	.4536	.1775	1	
log(Cont)	.1017	-.5254	.7842	.4153	.4153	.5227	.4281	.4876	.2744	.2661	.3209	1

	Average	Std dev.
Change between 2000 - 2010 in Zoning Commercial	1.011413	2.039638
Change between 2000 - 2010 in Zoning Manufacturing	0.417328	5.324318
Change between 2000 - 2010 in Zoning Residential	-1.42874	4.885634

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