Methods

Geographic Definitions

This report presents information for the entire City of New York, for each of the five boroughs, and for the neighborhoods within each borough. The city defines neighborhoods by dividing the boroughs into 59 community districts (CDs); the U.S. Census Bureau, however, divides the boroughs into 55 sub-borough areas (SBAs). This report provides data for community districts where available but otherwise employs data at the sub-borough level. The term neighborhood is used in this report to refer to both community districts and sub-borough areas even though they are larger than what many consider to be neighborhoods. We have included reference maps for community districts and sub-borough areas following this chapter.

Borough

New York City consists of five boroughs: the Bronx, Brooklyn, Manhattan, Queens, and Staten Island. Each borough is represented by a borough president, an elected official who advises the mayor on issues related to his or her borough and, along with the borough board, makes recommendations concerning land use and the allocation of public services. Each borough is also a county. Counties are legal entities with boundaries defined by state law.

Community District (CD)

Community districts are political units unique to New York City. Each of the 59 community districts has a community board. Half of the community board's members are appointed by the borough president and half are nominated by the City Council members who represent the district. The community boards review applications for zoning changes and other land use proposals and make recommendations for budget priorities.

Each community board is assigned a number within its borough. The borough and this number uniquely identify each of the 59 community districts. Therefore, the NYU Furman Center designates each community district with a two-letter borough code and a two-digit community board code. For example, BK 02 is the community district represented by Community Board 2 in Brooklyn.

Sub-Borough Area (SBA)

Sub-borough areas are geographic units created by the U.S. Census Bureau for the administration of the New York City Housing and Vacancy Survey and were designed to have similar boundaries to those of the community districts. These same areas are also defined by the U.S. Census Bureau as Public Use Microdata Areas (PUMAs) so we are able to use the two terms interchangeably.

Because sub-borough areas are constructed from Census tracts, their boundaries do not coincide precisely with community district boundaries, which generally follow major streets. However, they are similar enough that we use them interchangeably throughout this report. There are 59 community districts in New York City but only 55 sub-borough areas. The U.S. Census Bureau combined four pairs of community districts in creating the sub-borough areas to improve sampling and protect the confidentiality of respondents. These pairs are Mott Haven/Melrose (BX 01) and Hunts Point/Longwood (BX 02) in the Bronx, Morrisania/Crotona (BX 03) and Belmont/East Tremont (BX 06) in the Bronx, the Financial District (MN 01) and Greenwich Village/Soho (MN 02) in Manhattan, and Clinton/Chelsea (MN 04) and Midtown (MN 05) in Manhattan.

Rankings

This report includes rankings of the five boroughs and all 59 community districts or 55 sub-borough areas for each indicator. The neighborhood ranked first has the highest number or percentage for the measure, even if the measure is for a quality that one might think is "best" if lower. When possible, we rank all 59 community districts, however, because data for several indicators—including all indicators drawn from U.S. Census Bureau sources—are only available at the sub-borough area level, we can only rank the 55 sub-borough areas with respect to these indicators. In addition, a few indicators are not available for all neighborhoods so we provide rankings for a subset of neighborhoods. For instance, the NYU Furman Center only reports the index of housing price appreciation at the community district level for the predominant housing type in that district. Therefore, the rankings for these indicators come from a substantially reduced subset of the community districts.

Comparison Cities

The text of the State of New York City's Housing and Neighborhoods frequently compares indicators across the five U.S. cities with the largest populations according to the American Community Survey's 2012 estimates, including New York City. In 2012 these cities included, in descending size order, New York City, Los Angeles, Chicago, Houston, and Philadelphia.

Visualization in Geographic Information Systems

Maps displaying New York City-specific administrative and political boundaries use base map data provided by the New York City Department of City Planning's Bytes of the Big Apple program. These boundaries include boroughs, community districts, zoning boundaries, public streets, and individual properties.

United States Census Sources

A number of the indicators presented in the State of New York City's Housing and Neighborhoods are derived from five data sources collected by the U.S. Census Bureau. These sources are described below along with a discussion of issues of comparability across sources.

Decennial Census (Census)

From 1970 to 2000, the decennial Census consisted of two parts: the short form that collected information from every person and about every housing unit in the country, and the long form of additional questions asked of a sample of people and households. The short form collected information on age, race, Hispanic or Latino origin, household relationship, sex, tenure, and vacancy status. The long form provided more in-depth information about personal and housing characteristics such as income, employment status, and housing costs. In this edition of the *State of New York City's Housing and Neighborhoods*, we use data from the decennial Census short and long forms to derive demographic, economic, and housing measures for the year 2000. To create most of these indicators, we use summary Census data reported at the city, borough, and sub-borough area levels.

In 2010, the decennial Census only included the short form since most of the data that have previously been included in the long form have now been reported in the American Community Survey. While much of the short form data are also found in the American Community Survey, the numbers often differ because of statistical and methodological reasons. Whenever possible, we report data from the decennial Census with one exception: the rental vacancy rate in 2010.

American Community Survey (ACS)

The American Community Survey is an annual survey that collects data similar to those formerly collected by the Census long form, described above. As with the long form, the ACS covers only a sample of individuals and housing units. However, the ACS uses a smaller sample: the long form covered one out of every six housing units while the ACS only covers one in 40 housing units each year. The U.S. Census Bureau began developing the ACS in 1996, but reliable annual estimates for geographic areas with a population of 65,000 or more only became available in 2005. In December 2008, the U.S. Census Bureau began releasing three-year rolling estimates for all geographic areas with populations of 20,000 or more. In December 2010, the U.S. Census Bureau began releasing five-year rolling estimates for geographic areas as small as block groups.

Most of the indicators in this edition are derived from summary level data reported by the U.S. Census Bureau for PUMAs, which, as discussed above, are identical to New York City's sub-borough areas. Summary-level data are also reported at the borough and city levels. Because each PUMA in New York City has at least 100,000 residents, reliable annual estimates are available for each PUMA from the ACS. In this edition of the *State of New York City's Housing and Neighborhoods* we use annual estimates for almost all of the data we get from the ACS. One exception is the rental vacancy rate, for which we use the three-year estimate at the PUMA level (see the section below for more details). Because ACS one-year estimates can be prone to sizable margins of error and volatility at the PUMA level, we report only the first and last years of data available for each ACS-derived indicator shown on the community district data tables.

New York City Housing and Vacancy Survey (HVS)

The New York City Housing and Vacancy Survey is conducted every three years by the U.S. Census Bureau under contract

with the City of New York. The New York City Department of Housing Preservation and Development sponsors and supervises the HVS. The primary purpose of the HVS is to satisfy the city's statutory requirement to measure the rental vacancy rate in order to determine if rent regulation will continue. In addition to the housing unit information, a limited set of data are also collected about the household and the individual answering the questionnaire.

In this edition of the *State of New York City's Housing and Neighborhoods*, we use HVS data to construct one indicator that is specific to New York City and therefore not captured in the ACS: the number of units that are rent-stabilized or rent-controlled.

Public Use Microdata Sample (PUMS)

While most indicators that draw on U.S. Census Bureau data use measures that are already reported at a given geography, the NYU Furman Center calculates some indicators by aggregating person- and household-level data to the required geography. The U.S. Census Bureau makes household-level data available in Public Use Microdata Samples (PUMS), which are censored extracts from the confidential microdata that the U.S. Census Bureau uses in its own calculations from the decennial Census, the ACS, and the HVS. The NYU Furman Center uses PUMS data to calculate the income diversity ratio, median monthly rent for recent movers, median rent burden (low-income renters), rent-stabilized or rent-controlled units, several indicators in the State of New Yorkers section, and most indicators by income level in Part 1 of the report (see Household Income Distribution section below).

The PUMS data identify only the state and the PUMA in which a household is located, and does not identify the city or Census "place." New York City's and Philadelphia's PUMAs are completely coterminous with their place boundaries, so households can be placed in those cities by PUMA. The place boundaries of Chicago, Los Angeles, and, in particular, Houston, however, are not coterminous with PUMAs, which means that the data do not allow users to identify if households in several PUMAs in those metropolitan areas are in the City or bordering suburb. To address this issue, the NYU Furman Center weights observations by the share of the PUMA's households contained within the place boundary as calculated by the Missouri Census Data Center. (Specifically, if 60 percent of a PUMA's households live in the City of Chicago and 40 percent live in Cook County, outside of Chicago city limits, we assign each household in that PUMA a 60 percent weight.) For estimates prior to 2010, we use PUMA-to-place allocations as of the 2000 decennial Census, and for estimates afterward, we use allocations as of the 2010 decennial Census.

Comparisons Between Census Bureau Products

The U.S. Census Bureau makes continual adjustments to the decennial Census and the ACS to improve the coverage of the surveys and accuracy of the results. These adjustments often make cross-year comparisons difficult. Below is a discussion of the key areas where changes in sampling, question construction, or other methodology might affect the comparability of indicators that we report in the *State of New York City's Housing and Neighborhoods* over time. More information about comparability between U.S. Census Bureau data sources is available at: http://www.census.gov/acs/www/guidance_for_data_users/comparing_data/.

Sampling

Because both the ACS and HVS are sample surveys, not Censuses, all data derived from them are estimates, not exact counts. The ACS sample includes approximately three million housing units nationwide, including about 66,000 in New York City; the HVS samples 18,000 housing units. The sample for the HVS is designed primarily to achieve acceptable reliability in estimating the rental vacancy rate for the entire city, so estimates for smaller geographic units such as sub-borough areas are subject to potentially large sampling errors. Readers should treat all estimates with some skepticism and be aware that the true value may differ from the reported estimate. This is especially important when comparing small year-to-year changes in the ACS or with estimates that are derived from a reduced sample. For example, the median monthly rent does not use the entire sample but just the subset of respondents who are renters. The median monthly rent indicator for recent movers reduces the sample even more.

Income

Question construction and data collection for income information differs between the decennial Census and the ACS. The 1990 Census asked for the respondent's 1989 income,

and similarly, the 2000 Census asked for the respondent's 1999 income; thus incomes reported in 1990 and 2000 are all for one fixed period of time (calendar years 1989 and 1999 respectively). The ACS, by contrast, asks for the respondent's income over the "past 12 months" and as this information is collected on an on-going monthly basis, these figures are not directly comparable. The U.S. Census Bureau notes that a comparison study of the 2000 Census and the 2000 ACS found that incomes reported in the Census were about four percent higher than the incomes reported in the ACS. Because of the data collection methods mentioned above, adjacent years of ACS data may have reference months in common; thus comparisons of income data between adjacent ACS years (for example, 2010 and 2011) should not be interpreted as precise comparisons of economic conditions in those years. Indicators affected by the income methodology issues are income diversity ratio, median household income, poverty rate, and poverty rate by age. Note that for comparison purposes, we adjust all dollar amounts reported in this report to 2013 dollars (see below for more details).

Rental Vacancy Rate

To improve the accuracy of the rental vacancy rate, on the community district pages we report a three-year average rental vacancy rate for 2010–2012. We still report annual rental vacancy rates on the borough and city pages, but the reported value for community districts cannot be directly compared to any one year of borough or city data.

Industry and Occupation

We use industry and occupation of employment data in Parts 1 and 2 to examine shifts over time in the industries and required skill levels of jobs. These comparisons are difficult to undertake in original U.S. Census Bureau PUMS files due to changes in codes used to categorize industry and occupation. To ease these comparisons, we use Integrated Public Use Microdata Series PUMS files with consistent, harmonized industrial and occupational categories.

Indicator Notes

Household Income Distribution

In Part 1: Focus on Income Inequality and Integration, we report distributions of household income. These analyses use income and other characteristics from household- and person-level U.S. Census Bureau PUMS files (explained in more detail above). For 1990, we use decennial Census PUMS from the Integrated Public Use Microdata Series, and for 2012, we use American Community Survey PUMS. In order to facilitate comparison across space and time, we adjust all dollar amounts for inflation to constant 2013 dollars (see Inflation Adjustments section below) and stratify incomes into consistent categories. To reduce volatility in the lowest income category, we exclude all households without positive income from our analyses. For additional information about the treatment of income data in U.S. Census Bureau sources, please see the Income section above.

Neighborhood Characteristics by Household Income

Also in Part 1: Focus on Income Inequality, we report several indicators of neighborhood conditions (crime, public school student achievement, and park access) by household income. We construct these indicators through a multistep process. First we transform neighborhood condition data from their original unit of observation (e.g. police precincts or school districts) to the sub-borough area level (the finest geographic level of PUMS data), so that they can be assigned to each household. We then find the average neighborhood characteristics by household income category weighted by the number of households in that category. As a result, these indicators should be interpreted as average neighborhood conditions by income, not household outcomes by income. For example, the first bar of Figure 1.17 should not be interpreted as the share of public school students in households earning $20,000 who performed at or above grade level in math in 2000. The correct interpretation is that households earning $20,000 or less in 2000 lived in school districts where the average percentage of students performing at grade level in math was 34 percent.

Isolation Index of Household Income

The isolation index is an indicator of the concentration of some group over a larger area. Specifically, it measures—for an average member of a given group—the proportion of residents of her neighborhood that belongs to her same group. One typical application of the isolation index is to

measure racial segregation, but this year's *State of New York City's Housing and Neighborhoods* applies it to measure the segregation of low- and high-income households.

Using the bottom 10 percent of the household income distribution (its first or lowest decile) as an example, an isolation index of 0.25 means that the average household in the lowest income decile lives in a neighborhood where 25 percent of households are also in the lowest income decile. The values of the isolation index range from zero, indicating extreme dispersion of a group, to one, indicating extreme isolation of that group. The isolation index is sensitive to a group's overall share of a population, so if that share increases over time, so does the isolation index.

The isolation index is calculated using the following formula:

$$\sum_{i=1}^{n} \left(\frac{x_i}{X}\right)\left(\frac{x_i}{t_i}\right)$$

where x_i is the group population within a tract, X is the citywide population of the group of interest, and t_i is the total tract population.

We calculate isolation indices for the top and bottom 10 percent of the household income distribution using tract-level summary files for the 1990 Census and the 2008-2012 American Community Survey. Because these summary files report counts of households by dollar amount ranges and not percentile ranges, we construct approximate deciles based on the share of households each dollar amount range comprises. Table M.1 compares the actual shares each decile comprises in 1990 and 2008-2012 and shows that they have been relatively stable over time. Notably, our definition of the bottom decile shrank as a share of all households over this period. This has important implications for the isolation index, because if no households would have moved over those two decades, the isolation index should have fallen. We found that the isolation index for New York City actually increased from 0.148 in 1990 to 0.163 in 2008-2012, suggesting that our estimate of the citywide increase might be somewhat understated.

Table M.1: Actual Decile Shares of Approximated Deciles Used in Isolation Index, 1990 and 2008-2012, New York City

Household Income Decile	*1990*	*2008-2012*
Bottom 10%	10.5%	9.0%
Top 10%	12.3%	12.3%

Sources: U.S. Census (1990), American Community Survey (2008-2012), NYU Furman Center

Rental Housing Units by Regulation and Subsidy Status

Because so much of New York City's rental housing stock is subject to rent regulation or housing subsidy, we document changes and differences in the number of units participating in these programs. Throughout this report, we focus on four major types of regulation or subsidy: *rent-stabilized or rent-controlled, public housing, other subsidized (income-restricted), and market rate* (the absence of rent regulation and income-restricted subsidies). Several different agencies enforce the regulations of different programs: The New York City Department of Housing Preservation and Development, New York State Homes and Community Renewal, and the U.S. Department of Housing and Urban Development all regulate different housing programs. Thus, no single agency or organization has an authoritative count of the units participating across all statuses, although several data sets track certain subsets of those units, particularly the HVS, the New York City Housing Authority, and the NYU Furman Center's Subsidized Housing Information Project. We employ a general method that rectifies unit counts from these sources.

Our general method starts by identifying a total number of rental units, both vacant and occupied. Because the availability of data sources has changed over time, the source of the total number of rental units varies by year. For the total rental stock in 2012, we use the citywide estimate from the ACS. Although the ACS is available as early as 2005, in order to provide a longer term comparison, we use the HVS to get an estimate of the total rental stock (and rent-stabilized or rent-controlled stock, as described in more detail below) in 2002.

For the number of public housing units, we report the number of "current apartments" listed in the Summary of Developments section of the annual Development Data Books released by the New York City Housing Authority.[1] The number of *other subsidized (income-restricted)* units comes from the NYU Furman Center's Subsidized Housing Information Project (SHIP) Database, and reflects the number of units subsidized by at least one of four types of programs: HUD financing or insurance, HUD Project-Based Rental Assistance, the Low-Income Housing Tax Credit (LIHTC), or the Mitchell-Lama program. These four types of programs are unique in that they are the four largest

1 Available from http://www.nyc.gov/html/nycha/html/resources/development-databook.shtml.

subsidy programs used in New York City and all require means testing of residents. For 2012, we filter for the number of units that are "currently affordable," although the most recent data in the SHIP refers to 2011 conditions. For 2002, we filter out properties whose affordability started after 2002 or that were no longer subject to affordability restrictions before 2002. We generally treat our estimate of the number of other subsidized units as a low-bound estimate. For a property to be cataloged in the SHIP database, it must have at least one of the four subsidies listed above. The city and state administer some other programs that are not explicitly captured in the SHIP Database because they do not require means testing (e.g. LAMP, 8A, PLP). Those units are generally subject to rent-stabilization and so are classified as rent-regulated as described below.

Our estimate of *rent-stabilized or rent-controlled* units is an adjustment of totals reported in the HVS. First, we sum the number of rent-stabilized and rent-controlled units as indicated in the New Control Status Recode field. This field prioritizes rent stabilization over HUD subsidized status in cases when units are both stabilized and HUD subsidized. A deficiency of the HVS is that it does not track units subsidized with LIHTC. Instead those units are classified by the other subsidies they receive or the other regulations to which they are subject. Some LIHTC units technically are governed by rent stabilization because they also receive a city property tax incentive (we estimate 41,004 units were subject to both programs in 2011), though the LIHTC rent regulations are stricter than the rent stabilization regulation. Thus, we assume that these LIHTC units are classified as rent-stabilized in the HVS.

To avoid double-counting these units in our totals, we perform the following adjustment. In the SHIP we are able to identify units developed with a combination of LIHTC and either the 421-a or J-51 property tax incentive programs, which impose rent stabilization in addition to LIHTC's rent restrictions. We subtract the number of currently affordable LIHTC units with either 421-a or J-51 from the HVS rent-stabilized and rent-controlled unit total to arrive at a revised estimate of rent-stabilized or rent-controlled units. Our adjusted count of rent-stabilized or rent-controlled units might still include other LIHTC units with rent stabilization that we cannot identify. The rent-stabilized or rent-controlled count in 2012 might be further inflated by the fact that the HVS data represent 2011 conditions, and it is likely the number of rent-stabilized and rent-controlled units has experienced a slight net decline consistent with prior trends.

Finally, to estimate of the number of market rate units, we subtract public housing, other subsidized (income-restricted) units, and our revised estimate of rent-stabilized or rent-controlled units from the total number of rental housing units. Because our revised estimate of rent-stabilized or rent-controlled units might still include units should be classified as other subsidized, our estimate of market rate units might understate the true number of market rate units.

The general method above applies to totals presented at the city and borough levels. When we perform this analysis at the neighborhood level, we aggregate to the sub-borough area (SBA, the smallest geographic area available in the HVS), and we provide data only for 2011, due to the small sample size of the HVS. We also employ a few small additional changes to the method, which are explained below. Altogether, these changes would lead to minor differences in the total number of units by rent-regulation and subsidy status that we count citywide. Table M.2 compares these totals to the citywide totals reported in Part 2, Section 3: Renters and Their Homes using the general method reported above.

Table M.2: Differences Between Total Reported Rental Units by Rent-Regulation and Subsidy Status, and Totals Constructed by SBA-Level Estimates

Rental Stock Category	*Total (2012) as Reported in Section 3: Renters and Their Homes*	*Citywide Total of SBA-Level Estimates (2011)*
Market Rate	860,117	844,077
Other Subsidized (Income-Restricted)	181,904	181,826
Public Housing	178,914	179,693
Rent-Stabilized or Rent-Controlled	985,327	984,211
Total	2,206,262	2,189,807

Sources: American Community Survey, New York City Housing and Vacancy Survey, New York City Department of Finance, New York City Housing Authority, NYU Furman Center Subsidized Housing Information Project, NYU Furman Center

Because the total number of rental units reported in the ACS can be subject to volatility, we generally use the number of residential units reported in the New York City Department of Finance's final tax roll file for fiscal year 2011-2012, and multiply that total by one minus the homeownership rate of that SBA as reported in the 2011 ACS. The tax roll file estimates for two SBAs, 104 (Fordham/University Heights) and 109 (Morris Park/Bronxdale), were deemed unreliable, so we replaced them with the total rental units from the

ACS. Results for SBA 105 (Kingsbridge Heights/Bedford) led to a negative number of market rate units, so we instead used the total number of rental units from the HVS. Public housing counts come from a GIS shapefile of developments, which includes slightly more units than NYCHA's Development Data Book for 2011. Several properties cataloged in the SHIP do not have spatial coordinates and we cannot assign them to an SBA, so our other subsidized (income-restricted) counts are slightly lower at the SBA level.

U.S. Department of Housing and Urban Development Area Median Income

The U.S. Department of Housing and Urban Development (HUD) defines income eligibility limits for its Section 8 and HOME programs based on the area median income (AMI) in a metropolitan area. HUD generally determines three general income limits at 30, 50, and 80 percent of AMI for various household sizes. HUD does not publish income guidelines for households with more than eight members, although its methodology allows for their calculation. To ease computation, we apply the eight-person limits to these larger households. HUD assigns category names to ranges of the area median income. Extremely low-income households fall at or below 30 percent of AMI; and very low-income households have incomes above 30 and at or below 50 percent of AMI. Low-income households have incomes above 50 and at or below 80 percent of AMI, although this report uses "low-income" as shorthand for any household earning at or below the 80 percent limit.

We employ HUD's general method to calculate 120 and 200 percent of the area median income for various household sizes. While HUD does not set category names for higher income ranges, the NYU Furman Center defines moderate-income households as those making more than 80 and up to 120 percent of AMI; middle-income households as earning more than 120 and up to 200 percent of AMI; and high-income households as those earning more than 200 percent of AMI. Figure M.3 displays these income limits in nominal terms for three-person households (near the city's average household size in 2012) and their category names for years in which we publish indicators in Part 3. For more information about HUD's method and their published guidelines, refer to individual years' guidelines at http://www.huduser.org/portal/datasets/il.html.

Because income limits (and thus maximum affordable housing costs) very by household size, to measure the share of units affordable to households at certain income levels, we must also choose a household size. According to the 2012 ACS, New York City's average household size was 2.64, so we report the affordability of units from the perspective of three-person households. The lower panel of Figure M.3 shows maximum affordable rents (30 percent of monthly income) in nominal terms at each percentage of AMI for three-person households.

Index of Housing Price Appreciation

The index of housing price appreciation is a measure of relative change in property values over time. We construct housing price appreciation indices for four different property types (condominiums, 1 family buildings, 2–4 family buildings, and 5+ family buildings) for New York City as a whole and for each borough and community district. Estimating price indices separately for different types of properties allows for different market valuations and fluctuations

Figure M.3: Section 8 and HOME Program Income Guidelines and Maximum Affordable Rents for Three-Person Households, New York City

	Percentages of HUD Area Median Income				
	Extremely Low-Income	Very Low-Income	Low-Income	Moderate-Income	Middle-Income
Year	30%	50%	80%	120%	200%
	Income Limits (Nominal $)				
2000	15,150	25,300	40,450	60,700	101,150
2006	19,150	31,900	51,050	76,550	127,600
2010	21,400	35,650	57,050	85,550	142,550
2012	22,450	37,350	59,800	89,650	149,400
	Maximum Affordable Rent (Nominal $)				
2000	379	633	1,011	1,518	2,529
2006	479	798	1,276	1,914	3,190
2010	535	891	1,426	2,139	3,564
2012	561	934	1,495	2,241	3,735

Source: U.S. Department of Housing and Urban Development, NYU Furman Center

within each property type. Due to insufficient data, we report the price indices only for the predominant property type at the community district level and at the two predominant property types for each borough.

The data used to construct the price index come from two sources, both obtained from the New York City Department of Finance. The first dataset is an annual sales file, which we receive under an exclusive arrangement. The second dataset is the Automated City Register Information System (ACRIS) sales data, which is available online from the Department of Finance. Both datasets contain information on address, price, and date of sale for all transactions involving sales of apartment buildings, condominium apartments and single- and multi-family homes in New York City between 1974 and 2013. While the ACRIS data are updated daily, the system contains less information on the circumstances of the sale than the annual sales file. The ACRIS data are used only if the sale is not recorded by the time we receive our annual sales file.

The repeat sales price indices are created using statistical regression techniques. Economists use two basic approaches to estimate housing price indices: the hedonic regression and the repeat sales method. Both of these approaches estimate temporal price movement controlling for the variation in the types of homes sold from period to period. Each method has its own strengths and weaknesses.

The repeat sales methodology controls for housing characteristics by using data on properties that have sold more than once. An attractive feature of this method is that, unlike the hedonic approach, it does not require the measurement of house quality; it only requires the quality of individual houses in the sample to be time invariant. The most important drawback of the repeat sales method is that it fails to use the full information available in the data. In most datasets, only a small proportion of the housing stock is sold more than once; the data on single sales cannot be used. Moreover, properties that transact more than once may not be representative of all properties in the market, raising concerns about sample selection bias. However, as the index period lengthens, more properties have changed hands more than once. This reduces sample selection bias but exacerbates a heteroskedasticity problem: Case and Shiller (1989) show evidence that price variability is positively related to the interval of time between sales because the longer the amount of time between sales, the more likely it is that the surrounding neighborhood has experienced an exogenous shock.

This report overcomes most of the problems associated with the repeat sales method. Specifically, the dataset used here is quite large, so we lose little precision by eliminating properties that sold only once. Moreover, because we have sales data over such a long period (39 years), by 2012, more than 61 percent of residential lots changed hands at least twice. Finally, we use the three-step procedure suggested by Case and Shiller (1989) and modified by Quigley and Van Order (1995) to account for the possibility of time dependent error variances.

In the first stage, the difference between the log price of the second sale and the log price of the first sale is regressed on a set of dummy variables, one for each time period in the sample (a year, in this case) except for the base year (2000). The dummy variables have values of +1 for the year of the second sale, -1 for the year of the first sale, and zeros otherwise.

In the second stage, the squared residuals from the first stage are regressed on a constant term, the time interval between sales, and the time interval squared. The fitted value in the stage-two regression is a consistent estimate of the error variance in the stage-one regression. In the third stage, the stage-one regression is re-estimated by generalized least squares, using the inverses of the square root of the fitted values from the stage-two regression as weights.

Mortgage Lending Indicators

The Federal Home Mortgage Disclosure Act (HMDA) requires financial institutions with assets totaling $39 million or more to report information on loan applications and originations if they have originated or refinanced any home purchase loans on 1–4 family properties (including condominium and co-op units) in the previous year. Thus, the HMDA data capture most, but not all, 1–4 family residential mortgage lending activity. The NYU Furman Center uses this dataset to calculate the home purchase loan rate, the refinance loan rate and a number of derivative indicators.

All figures in our analysis are based on 1–4 family, non-business-related loans. We exclude from our analysis any loans for manufactured or multi-family housing (5+ families) and any loans deemed to be business related (classified as those loans for which a lender reports an applicant's

ethnicity, race and sex as "not applicable"). The loans that we consider constituted more than 80 percent of all loan applications in New York City in 2010.

Beginning in 2004, HMDA requires lenders to report when the spread between the annual percentage rate (APR) of a loan and the rate of Treasury securities of comparable maturity is greater than three percentage points for first-lien loans and five percentage points for junior-lien loans. In this report, all loans with an APR above this threshold are referred to as higher-cost loans.

Loan applicants were assigned to a racial/ethnic group for purposes of our research based on the first reported race of the primary applicant. However, if the applicant reported his or her ethnicity as "Hispanic" the applicant was classified as Hispanic, regardless of the applicant's reported race. When an applicant provided information to the lender via mail, internet or telephone and did not provide information on their race, we assigned those loans to the "not reported" racial category. These loans were included in our city and borough level analyses, but were omitted when calculating racial shares for our State of New Yorkers table in the New York City section.

Notices of Foreclosure

The NYU Furman Center collects data on *lis pendens* (LP) filings from a private vendor, Public Data Corporation. An LP may be filed for a host of reasons unrelated to a mortgage foreclosure so we use a variety of screening techniques to identify only those LPs related to a mortgage. These techniques include searching for words within either of the party names and dropping any LPs that relate to a tax lien, a mechanic's lien, or are originated by a government agency. If the same property receives any additional LPs within 90 days of the initial LP, the additional LPs are not included in our rate to avoid counting the same foreclosure twice.

Properties That Entered REO

The data for this indicator come from two sources—LPs from Public Data Corporation and residential sales data from the New York City Department of Finance. Each of these datasets identifies properties using a unique borough, block and lot number (BBL). Starting with the set of all LPs, we use BBLs to match each LP issued since 1993 with the most recent sale of that property prior to the LP (if the sale happened in 1974 or later). We then match the LP to any sales that occurred within three years from the date of the LP, and assume that the first such sale was undertaken in response to the foreclosure filing. To identify transfers into REO, we search the grantee name field of the first sale after the LP for the word "bank" or the name of any large bank or subsidiary. Finally, we check if the name of the grantee matches the name of the LP servicer. If this is the case we classify the sale as a transfer into REO.

Population Weighting Formula

Several indicators included in this report are provided at geographic levels other than the community district level such as police precincts, school districts, or zip codes. We aggregate data to the community district level, weighing observations by the distribution of housing units.

For instance, when aggregating the student proficiency rates from the 32 school districts to the 59 community districts, we first calculate the rate for each of the 32 school districts. If a community district only contains one school district then that rate is directly used for the community district. If multiple community districts fall within the same school district, we assign the same proficiency rate to each. If a community district contains more than one school district, we weight each school district based on the number of housing units within the community district that are in that school district.

For example, if community district 1 contains three school districts A, B, and C, and of the 100 housing units in community district 1, 50 are in school district A, 30 are in school district B, and 20 are in school district C, then school district A would have weight 50/100, school district B would have weight 30/100, and school district C would have weight 20/100. The rate for community district 1 would be given by: $rate_{CD1} = rate_A * .5 + rate_B * .3 + rate_C * .2$

Calculating Distances to Amenities

This report reports the percentage of housing units within one-quarter mile of parks. To determine walking distances, the NYU Furman Center uses the New York City Department of City Planning's LION geodatabase of public streets to create network buffers of pedestrian rights-of-way within a specificed distance of an amenity. Using geographic information systems (GIS) software, we then selected the

parcel polygons from the New York City Department of City Planning's MapPLUTO data that intersected this network buffer. Finally, we summed the total number of residential units associated with the parcels within the specified distance of the amenity, and divided by the total number of residential units.

To calculate distance from parks, we first constructed a data set of all parks, playgrounds, and Greenstreets that are administered by the New York City Department of Parks and Recreation through data posted on the City of New York's Open Data portal in 2010. Because this data set does not contain information on park entrances, we calculated walking distances from points along each park's perimeter. For parks with an area of 2.5 acres or less, we decomposed park polygons into their component points that typically rest at their corners. For parks larger than 2.5 acres, this process often resulted in perimeter points that were too far apart to generate realistic service areas. Instead, we used the intersections of pedestrian rights-of-way within 150 feet of these larger parks to approximate their perimeters. Consistent with indicators used in the City of New York's *PlaNYC* report, we did not include parks with areas of less than 0.25 acres in this analysis.

Inflation Adjustments

Unless stated otherwise, when reporting dollar-denominated indicators, we adjust amounts to 2013 dollars using the Consumer Price Index for All Urban Consumers (Current Series) without seasonal adjustments from the Bureau of Labor Statistics over all major expenditure classes for the relevant metropolitan area. This allows for more consistent comparisons across years for individual indicators. The inflation-adjusted values include median monthly rent, median household income, and median price per unit.

Index of Community Districts

The Bronx

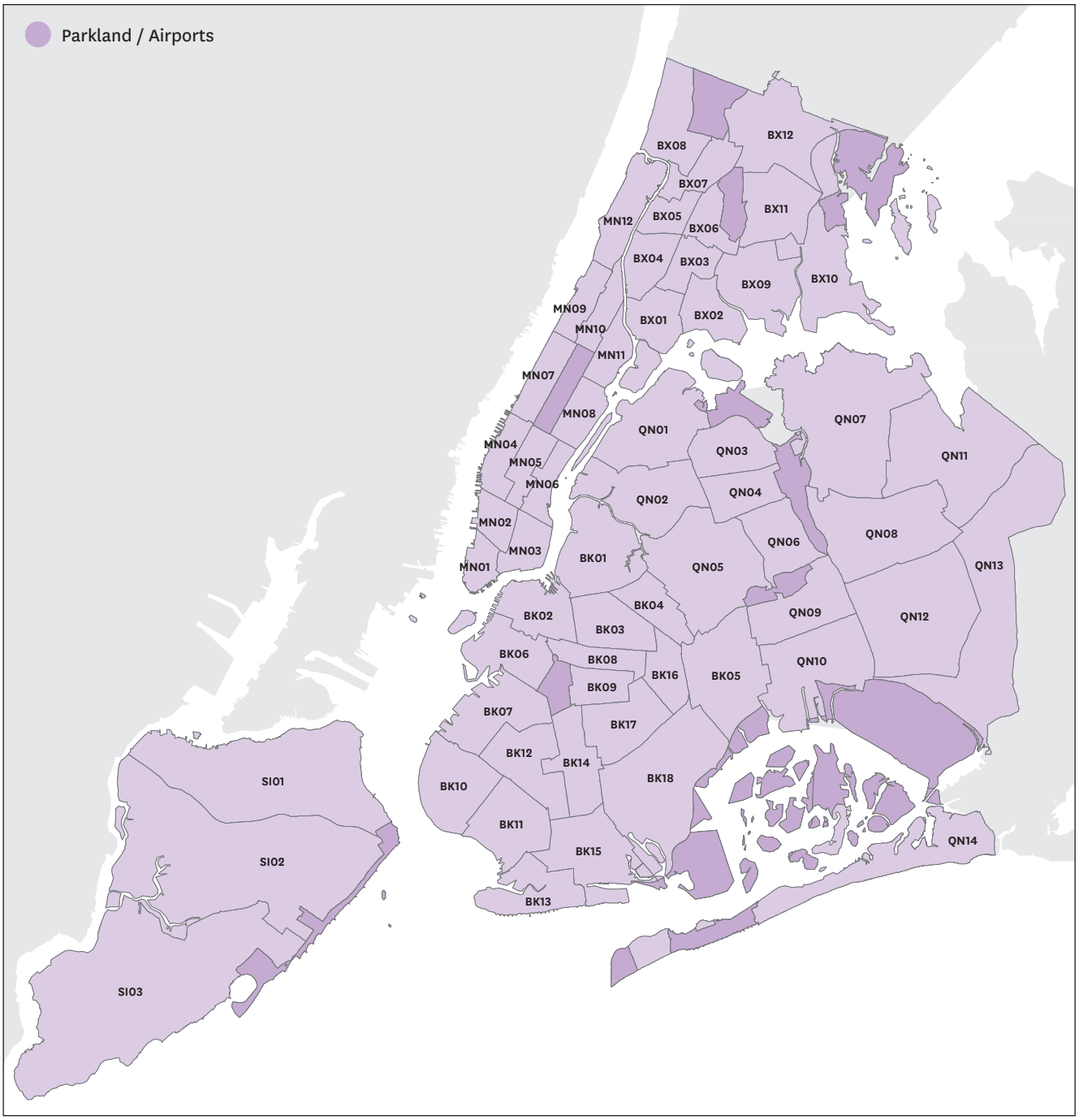
Brooklyn

Manhattan

Queens

Staten Island

New York City Community Districts



New York City Sub-Borough Areas