



# **In the Shadow of 2020**

**Navigating the Pitfalls of Using ACS Data After the Pandemic & 2020 Census**

**Joel Alvarez, Eric Ketcham, Erica Maurer, & Peter Lobo**  
**NYC City Planning, Population Division**  
**May 18<sup>th</sup> 2023**

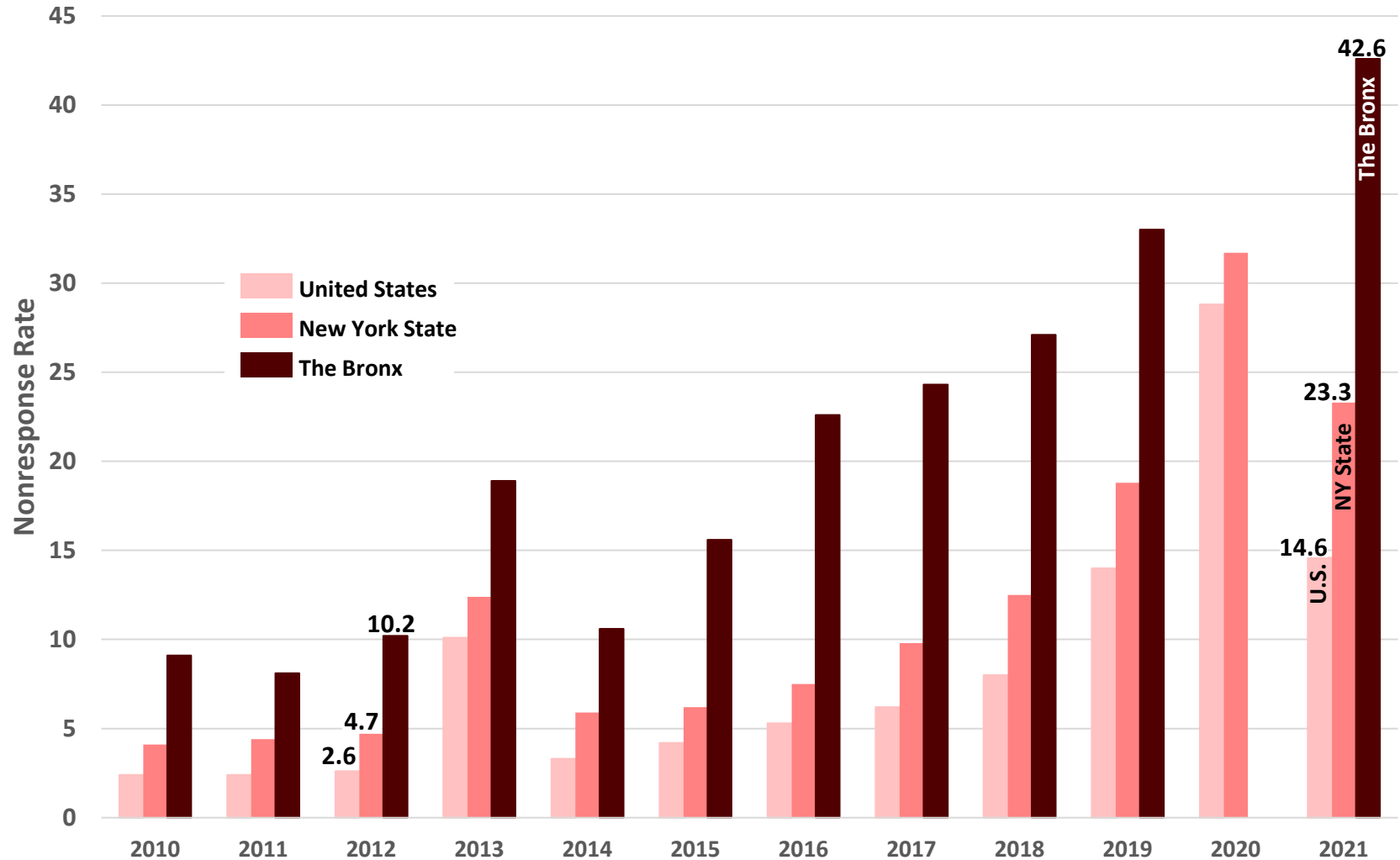


- **Diminishing Reliability**
- **Control Totals**
- **Guidance and Recommendations**

- **Diminishing Reliability**
- Control Totals
- Guidance and Recommendations

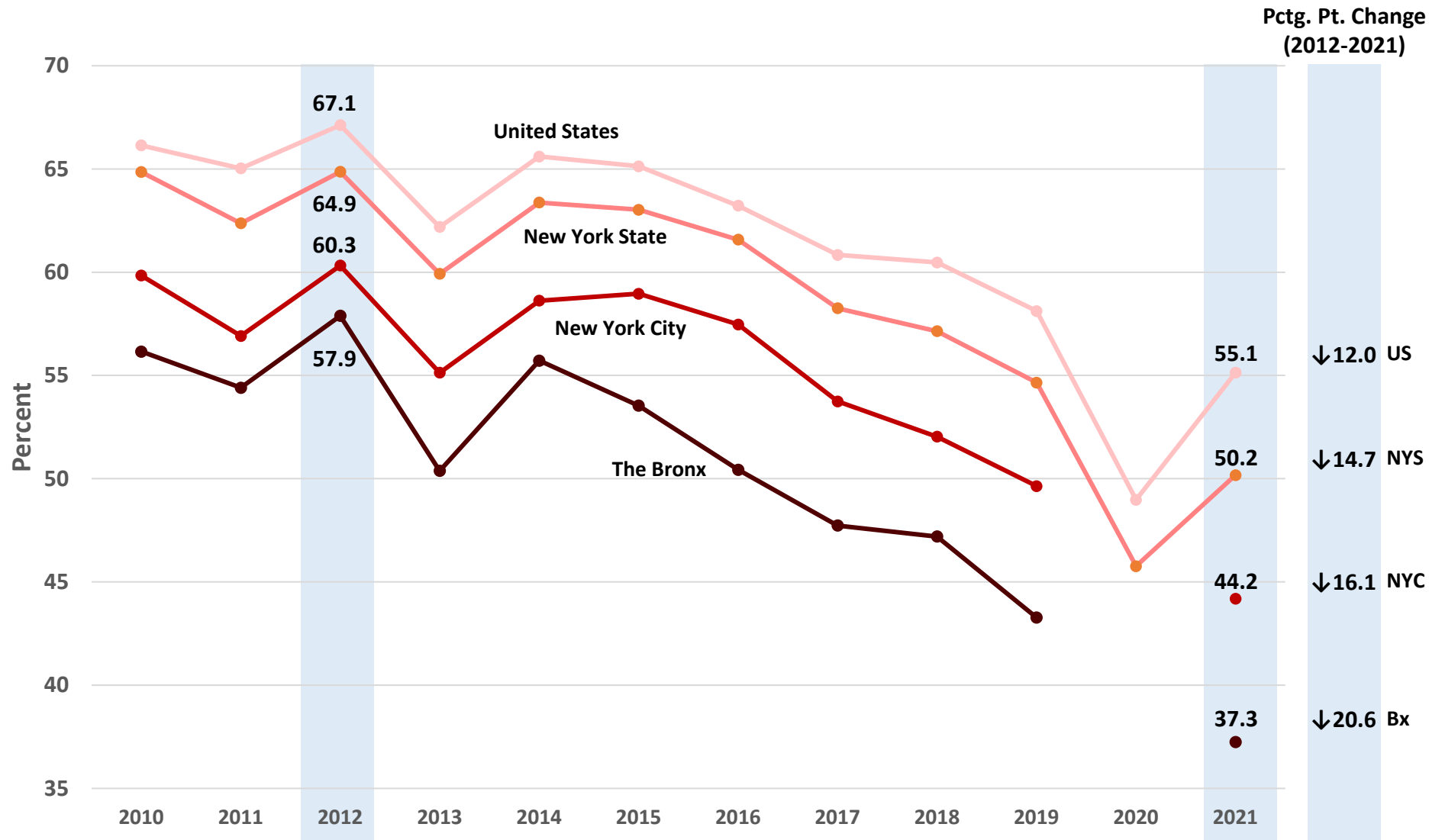
# ACS Nonresponse Rates

## U.S., New York State, and Bronx County, 2010 to 2021



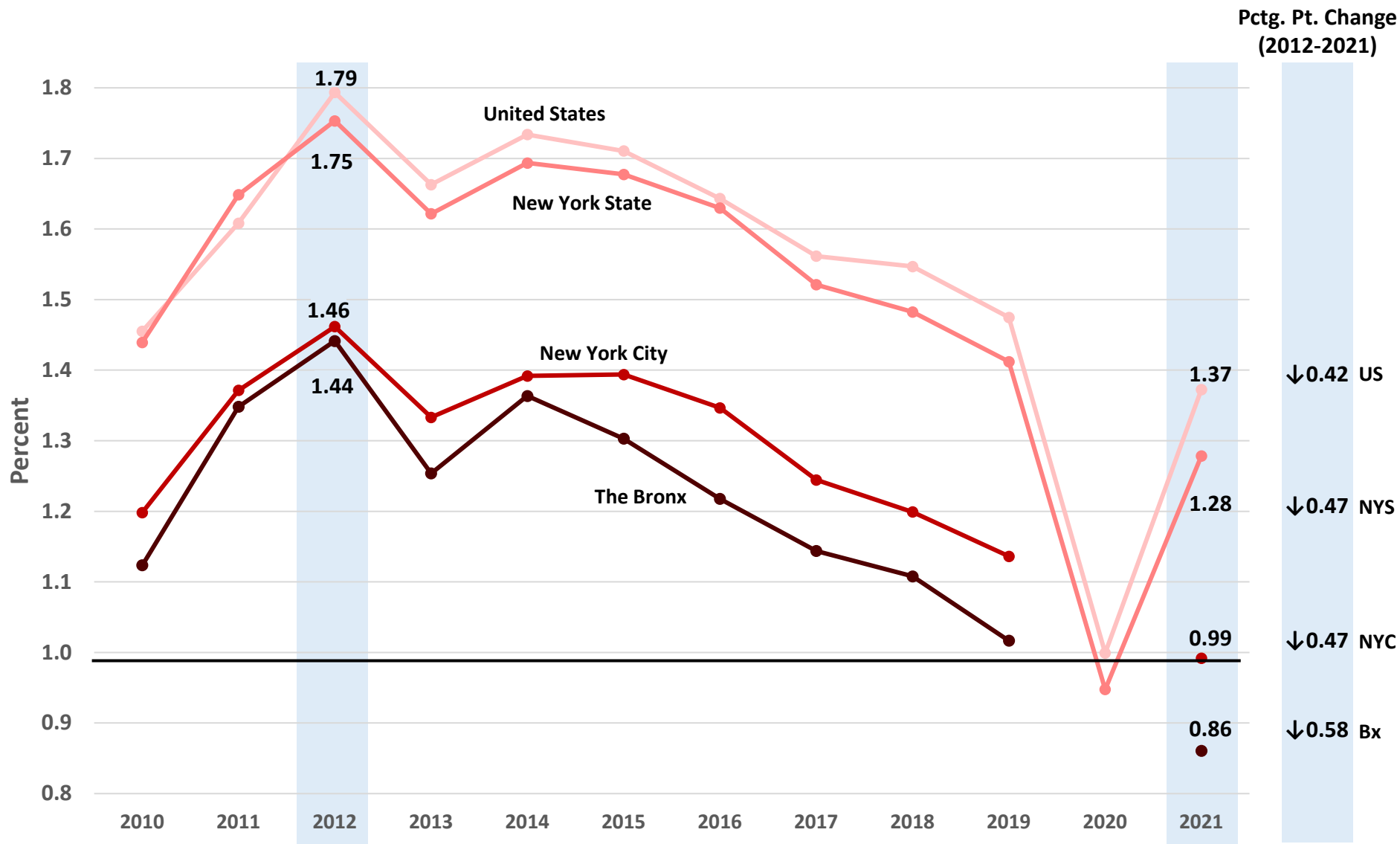
# Percent of Initial Sampled Addresses with Final ACS Interviews

## U.S., New York State, New York City, and Bronx County, 2010 to 2021

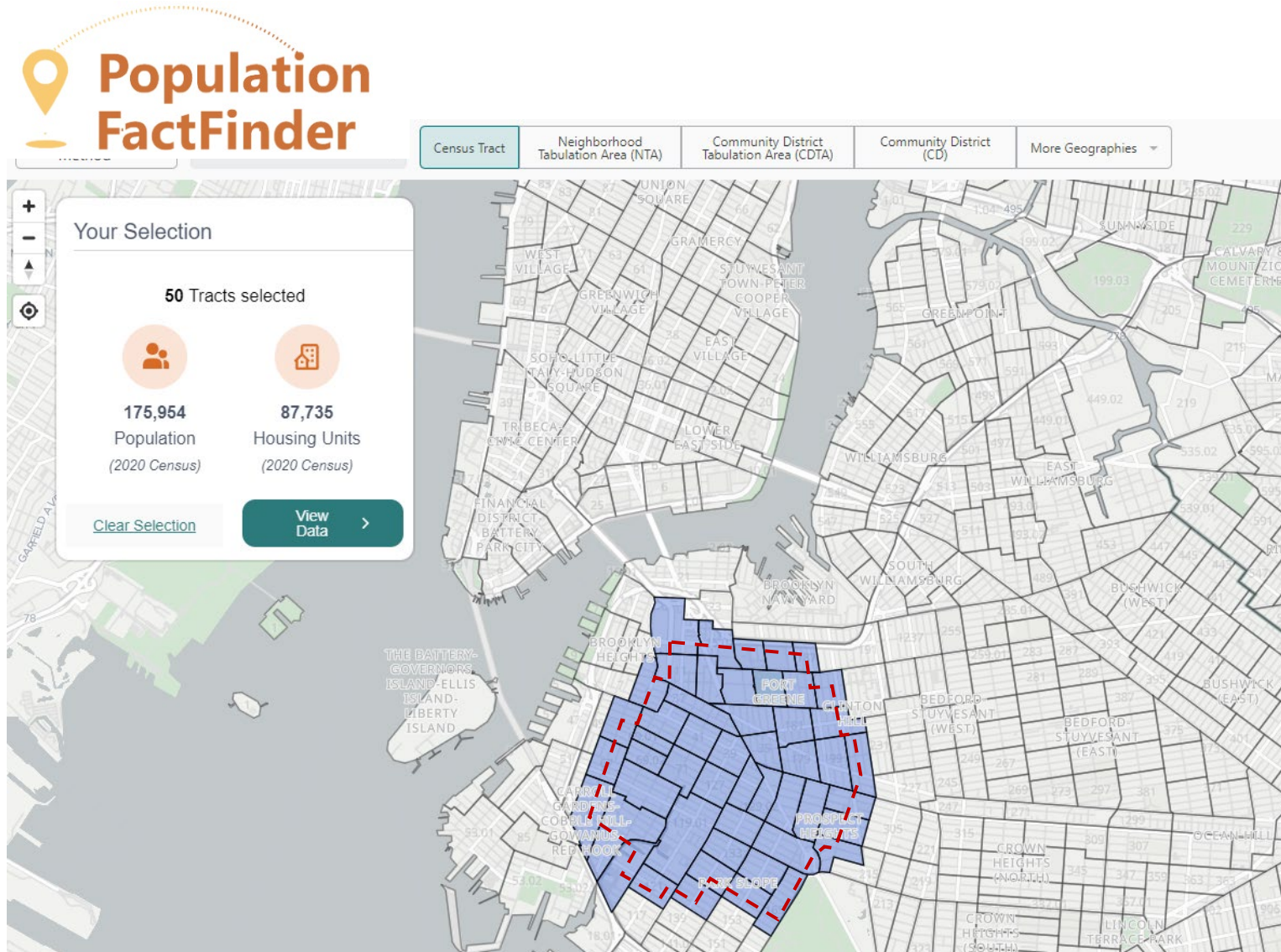


# Percent of Total Housing Units with Final ACS Interviews

## U.S., New York State, New York City, and Bronx County, 2010 to 2021



# Reduced ACS Reliability Impacts NYC Population FactFinder App





# Selection of ACS Variables Used in NYC Population FactFinder

## Demographic

Population 85 years and over  
Median Age  
Females 65 and over  
Asian nonhispanic  
Chinese, excluding Taiwanese  
Asian Indian  
Bangladeshi  
Southeast Asian

## Social

Single female head, own children under 18  
65 and over living alone  
Less than high school diploma  
Population with ambulatory difficulty  
Born in New York State  
Born in Haiti  
Foreign-born non-citizen  
Speaks Spanish, limited English Proficiency

## Economic

Unemployed  
Mean travel time to work  
Workers in professional occupations  
Workers self employed  
Household income \$200,000 or more  
Median household income  
Population 65 and over below poverty  
No health insurance coverage

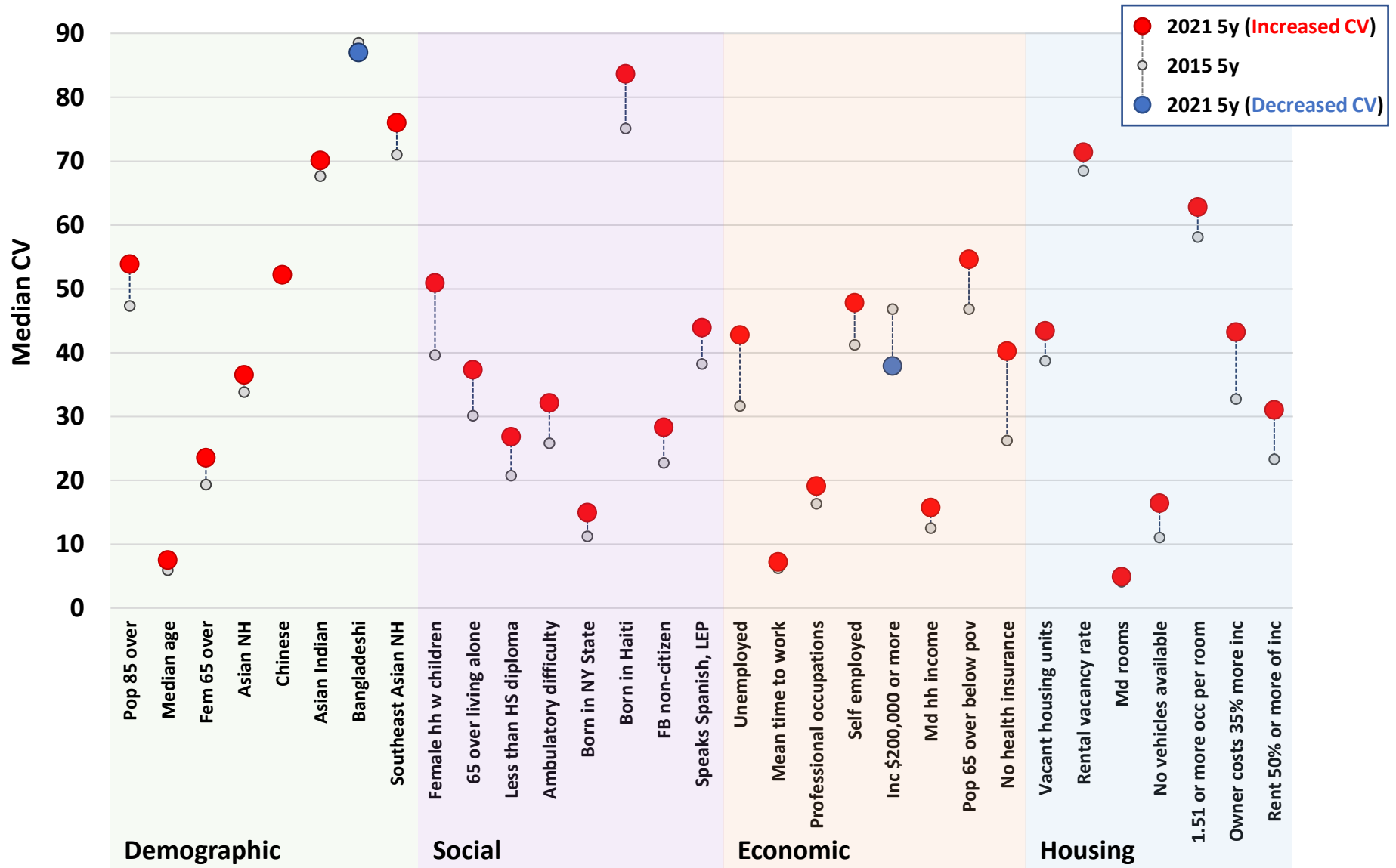
## Housing

Vacant housing units  
Rental vacancy rate  
Median number of rooms  
No vehicles available  
1.51 or more occupants per room  
Owner costs 35% or more of income  
Rent 50% or more of income



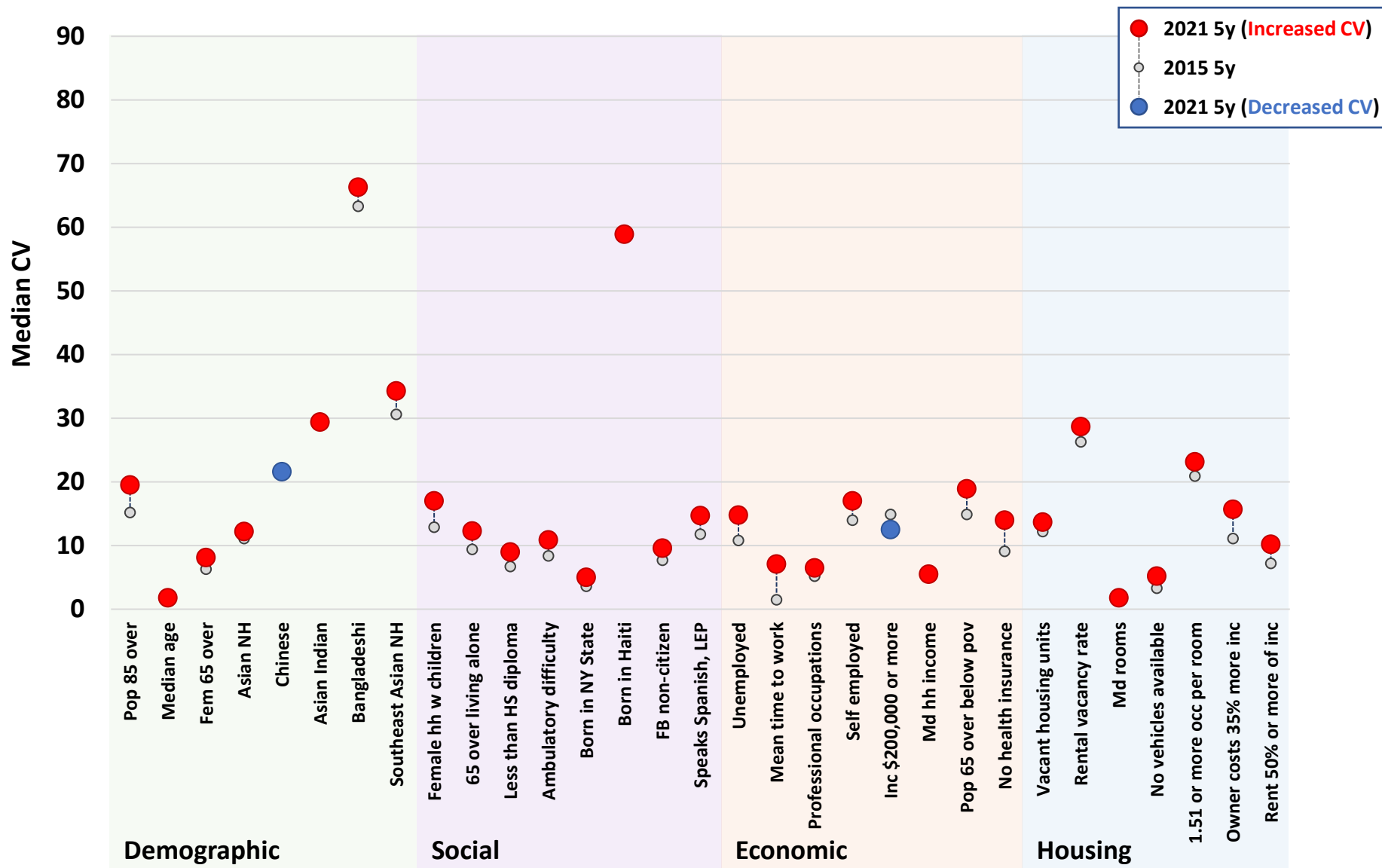
# Median Coefficients of Variation (CVs) for Selected Variables

## New York City Census Tracts, 2011-2015 & 2017-2021 ACS



# Median Coefficients of Variation (CVs) for Selected Variables

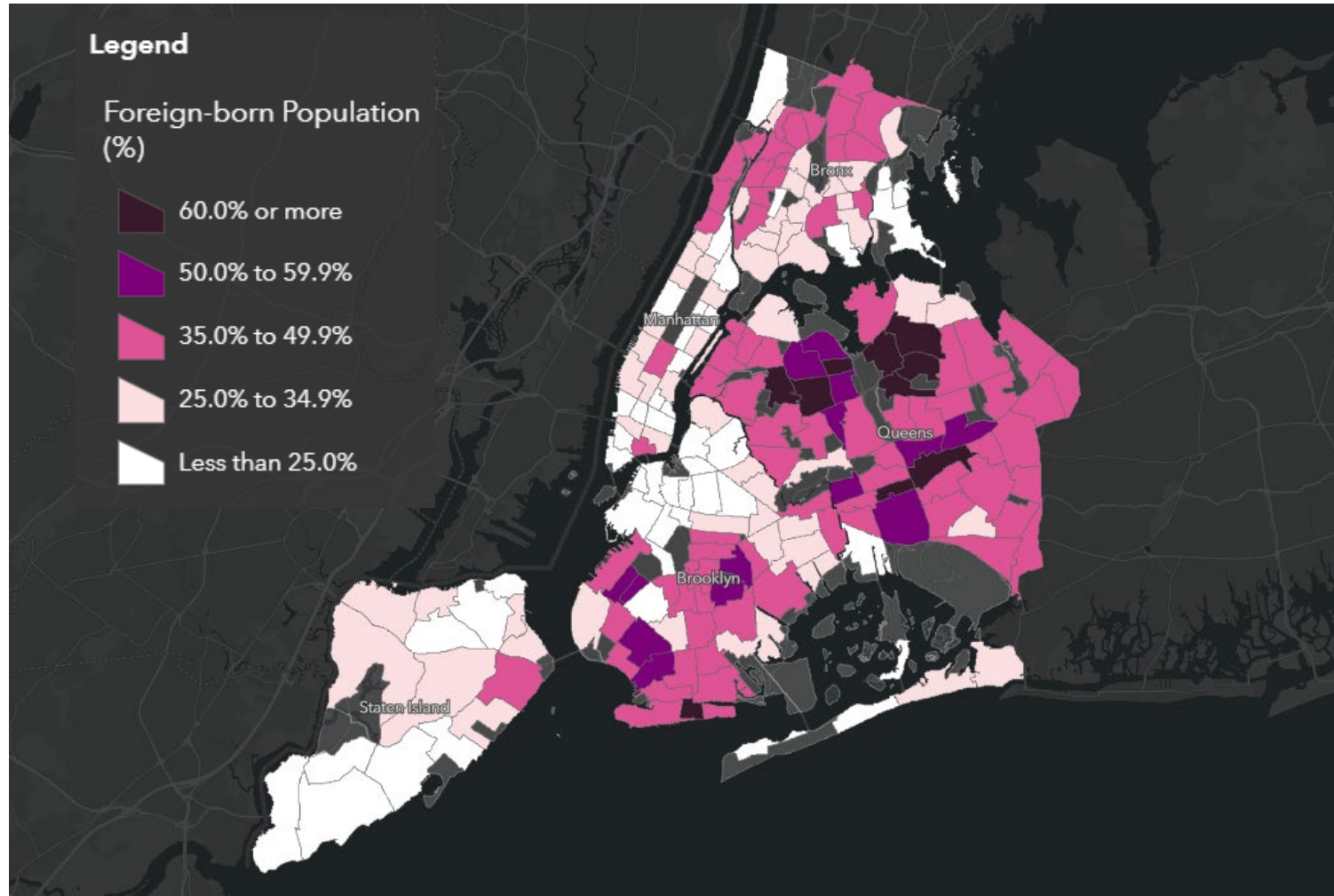
## New York City Neighborhood Tabulation Areas\* (NTAs), 2011-2015 & 2021 ACS



\* Neighborhood Tabulation Areas (NTAs) are groupings of census tracts that approximate New York City neighborhoods.

Sources: U.S. Census Bureau, 2011-2015 and 2017-2021 American Community Survey – Summary File

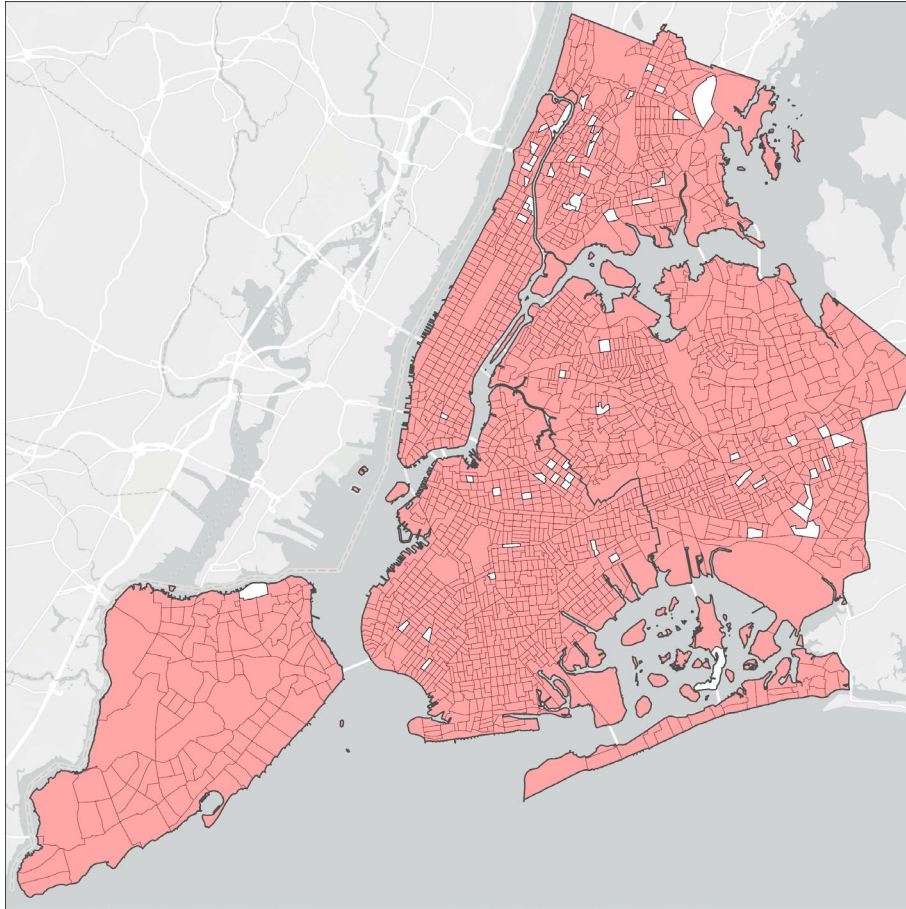
## NYC Population MapViewer



# Reliability of Unemployment Estimates

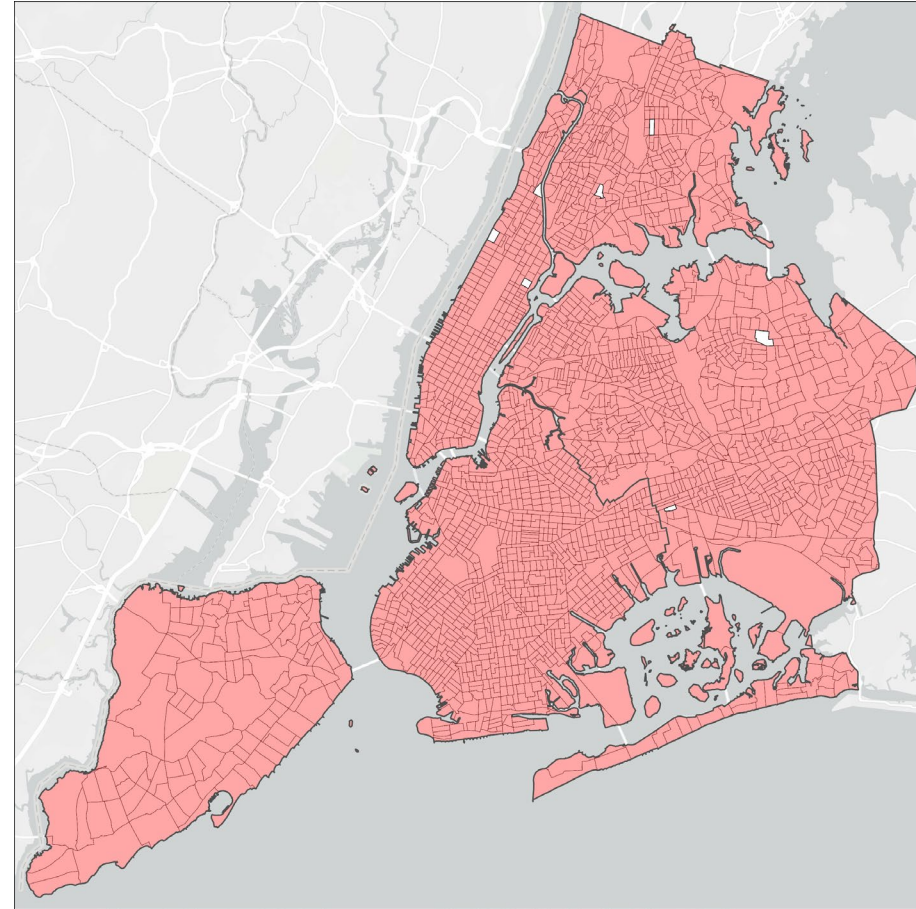
## New York City Census Tracts, 2011-2015 & 2017-2021 ACS

**2011-2015**



Reliable (CV < 20)  
Unreliable (CV ≥ 20)

**2017-2021**



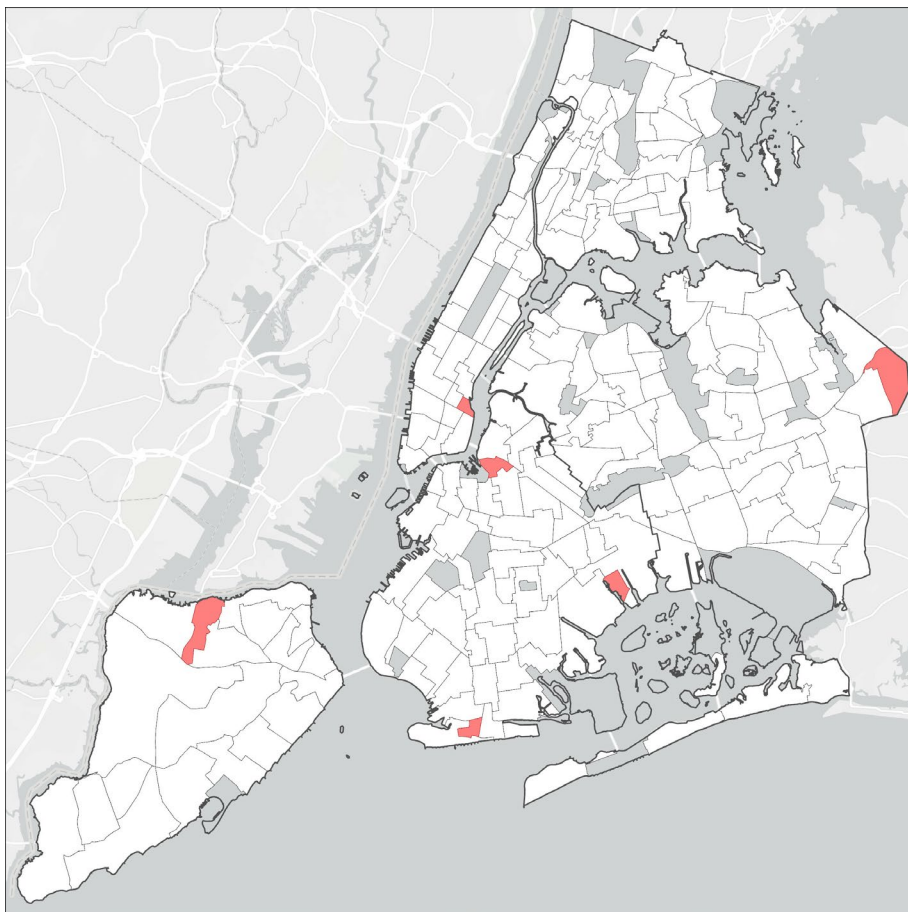
Reliable (CV < 20)  
Unreliable (CV ≥ 20)



# Reliability of Unemployment Estimates

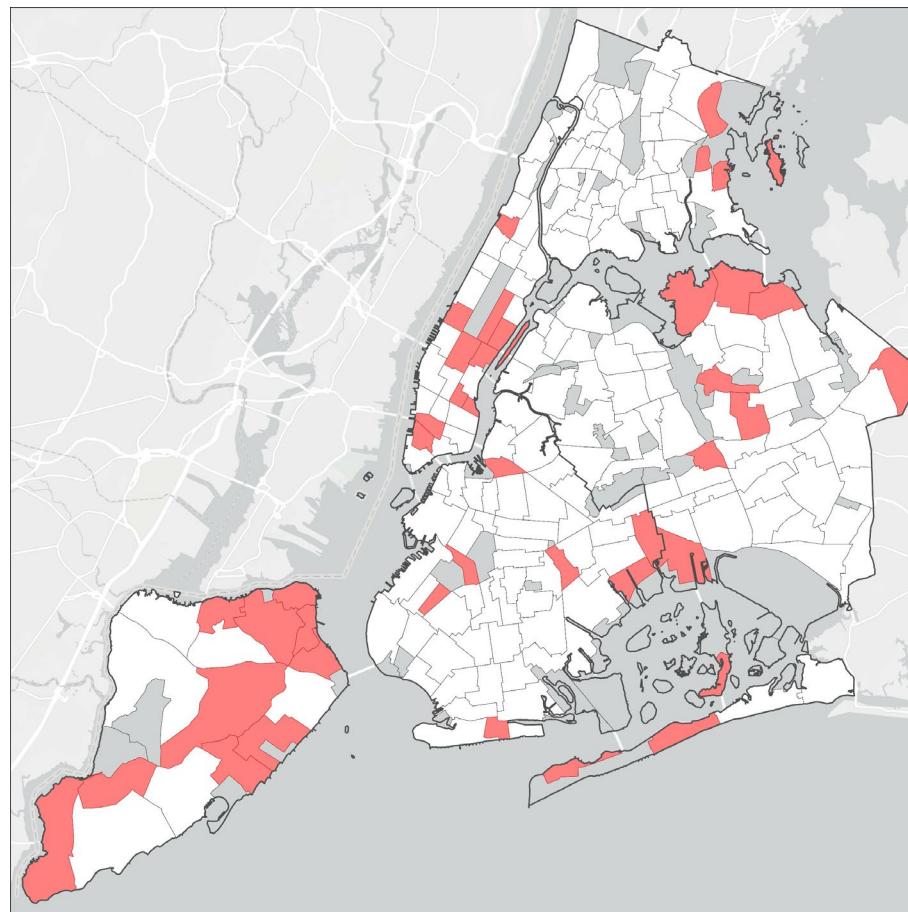
## New York City Neighborhood Tabulation Areas\* (NTAs), 2011-2015 & 2017-2021 ACS

**2011-2015**



Reliable (CV < 20)  
Unreliable (CV >= 20)

**2017-2021**



Reliable (CV < 20)  
Unreliable (CV >= 20)

\*Neighborhood Tabulation Areas (NTAs) are groupings of census tracts that approximate New York City neighborhoods.

Sources: U.S. Census Bureau, 2011-2015 and 2017-2021 American Community Survey – Summary File

## ACS Map Reliability Calculator

### STEP 1

#### Insert estimates & Margins of Error (MOEs)

(Insert up to 2,500 lines)

	Estimates	MOEs
1	0.00	
2	1105.00	222.00
3	2667.00	358.00
4	0.00	
5	4028.00	998.00
6	6463.00	737.00
7	4132.00	619.00
8	1120.00	162.00
9	695.00	110.00
10	1882.00	560.00
11	1709.00	246.00
12	3419.00	400.00
13	1734.00	231.00
14	1470.00	244.00
15	3663.00	390.00
16	5231.00	428.00
17	3813.00	583.00
18	4951.00	778.00
19	1373.00	256.00

### STEP 2

#### Select number of classes

(Type in number from 2 to 7)

Classes

4

### STEP 3

#### Select class breaks

(Type in lower limit for each class)

#### User Defined

	Class Breaks	Count	Reliability *
top class	5,000.00	52	11.9
lowest (2 classes)	2,500.00	384	11.0
lowest (3 classes)	1,000.00	1,241	6.4
lowest (4 classes)	0.00	490	7.3
lowest (5 classes)			
lowest (6 classes)			
lowest (7 classes)			
Total		2,167	7.6

Reliable

\*The reliability score is the probability that any given estimate is erroneously classed.

A map classification is considered to be reliable if the total reliability score is less 10% and all individual classes are less than 20%.

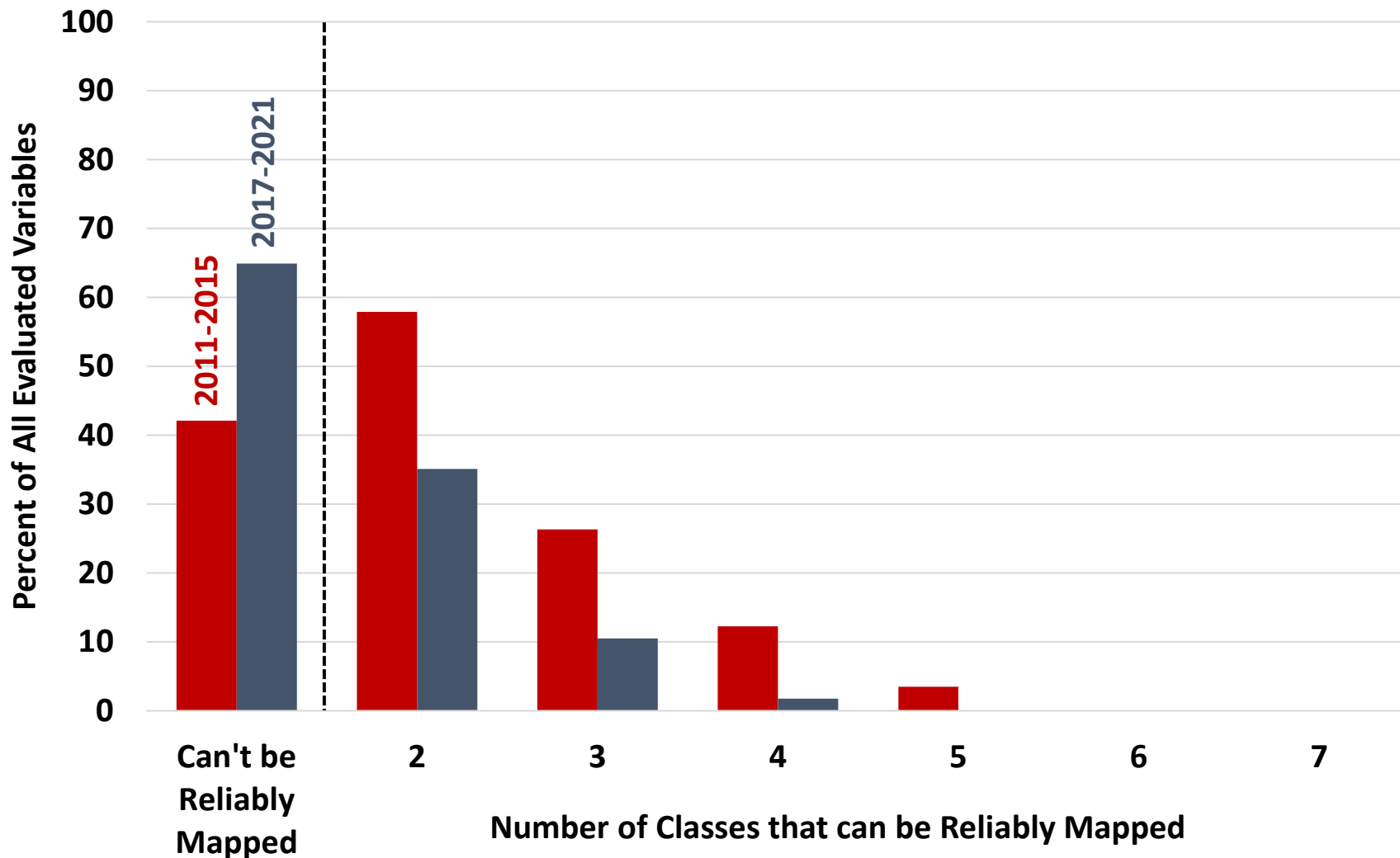
#### Suggested notation for maps that pass this reliability test:

For each individual category, less than 20% of geographies are likely to be misclassified due to sampling error;  
fewer than 10% of all geographies are likely to be misclassified across all categories.

Source: New York City Department of City Planning, Population Division

# “Mapability” of Selected Variables

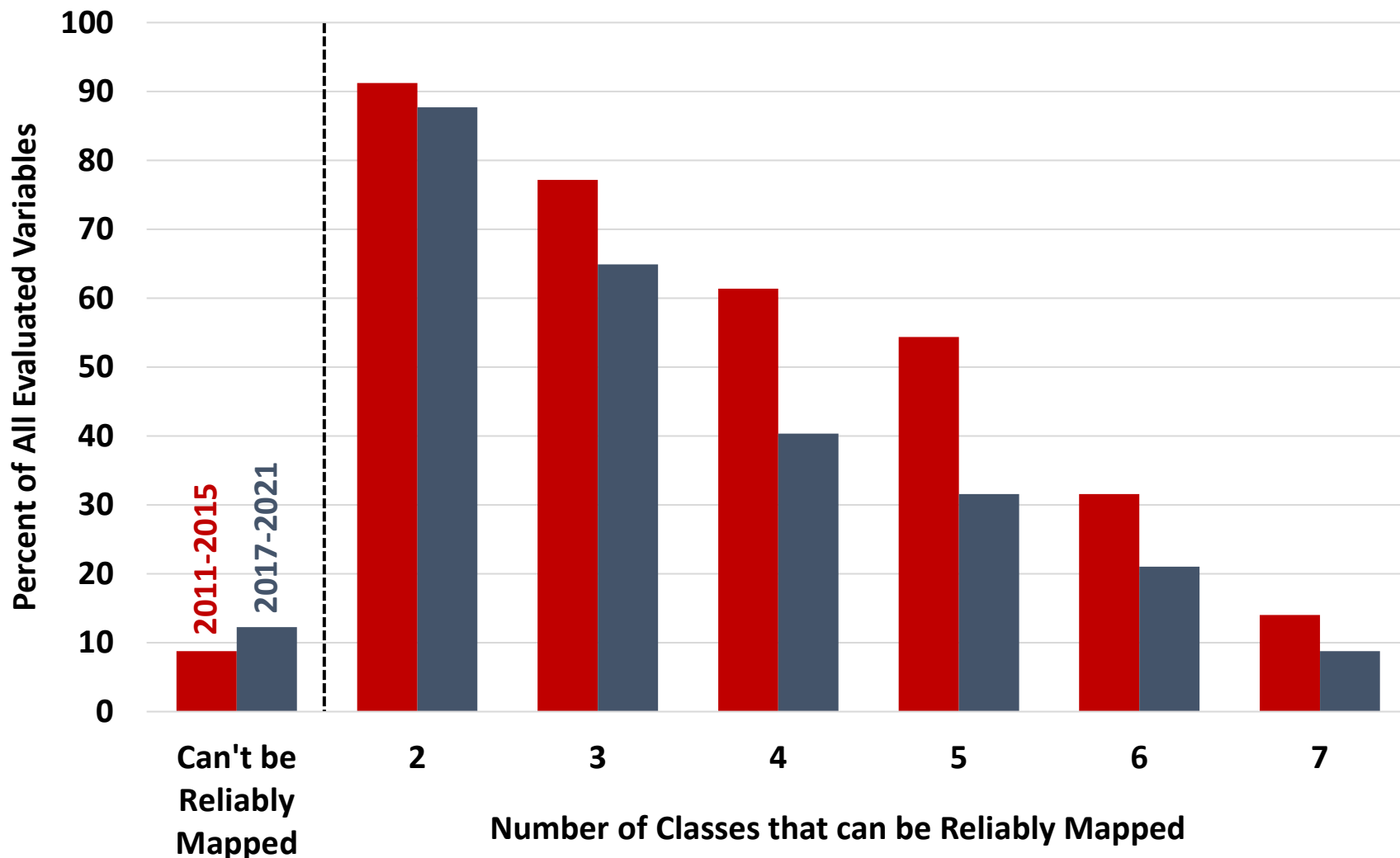
## New York City Census Tracts, 2011-2015 & 2017-2021 ACS





# “Mapability” of Selected Variables

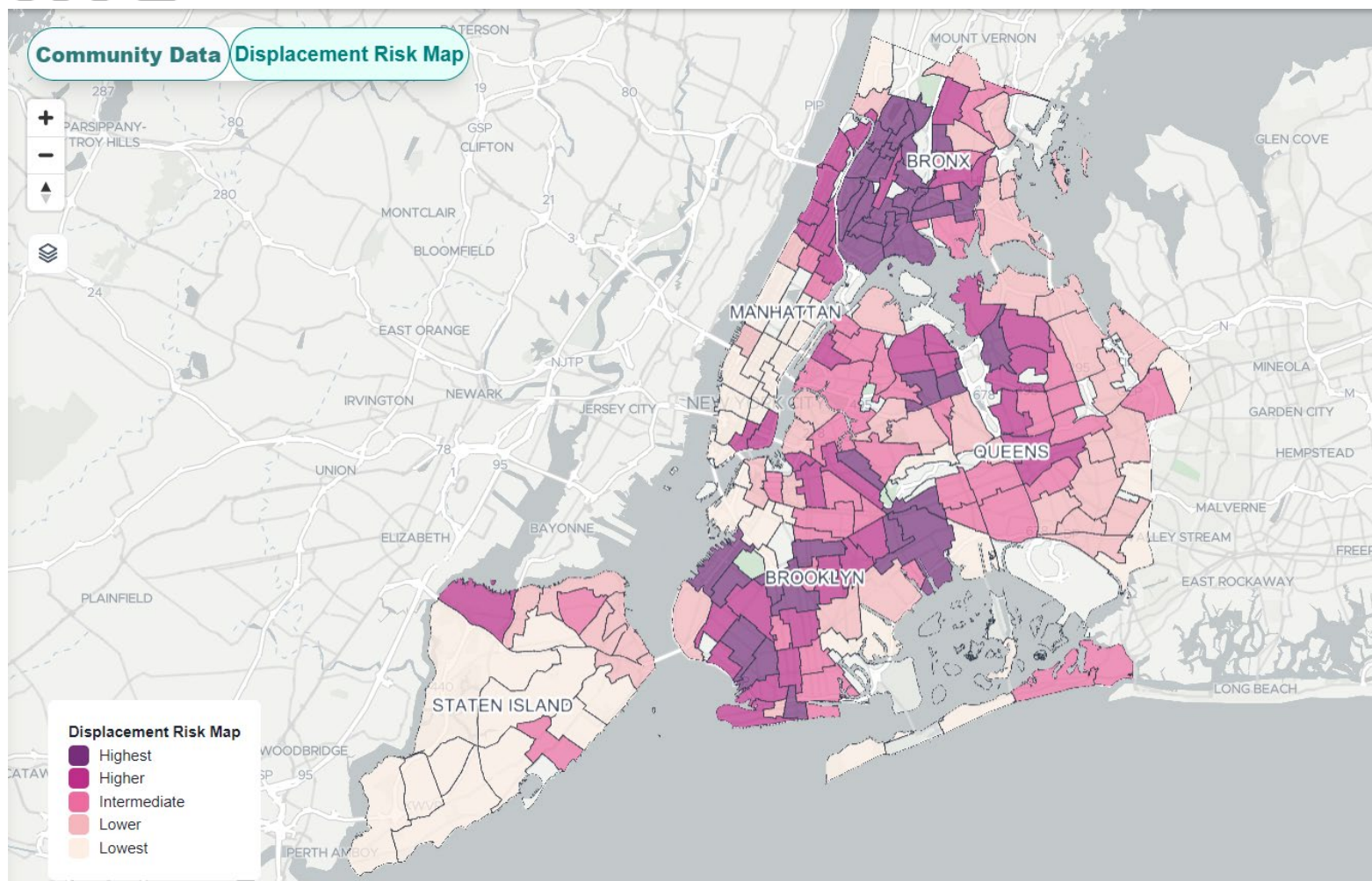
New York City Neighborhood Tabulation Areas\* (NTAs), 2011-2015 & 2017-2021 ACS



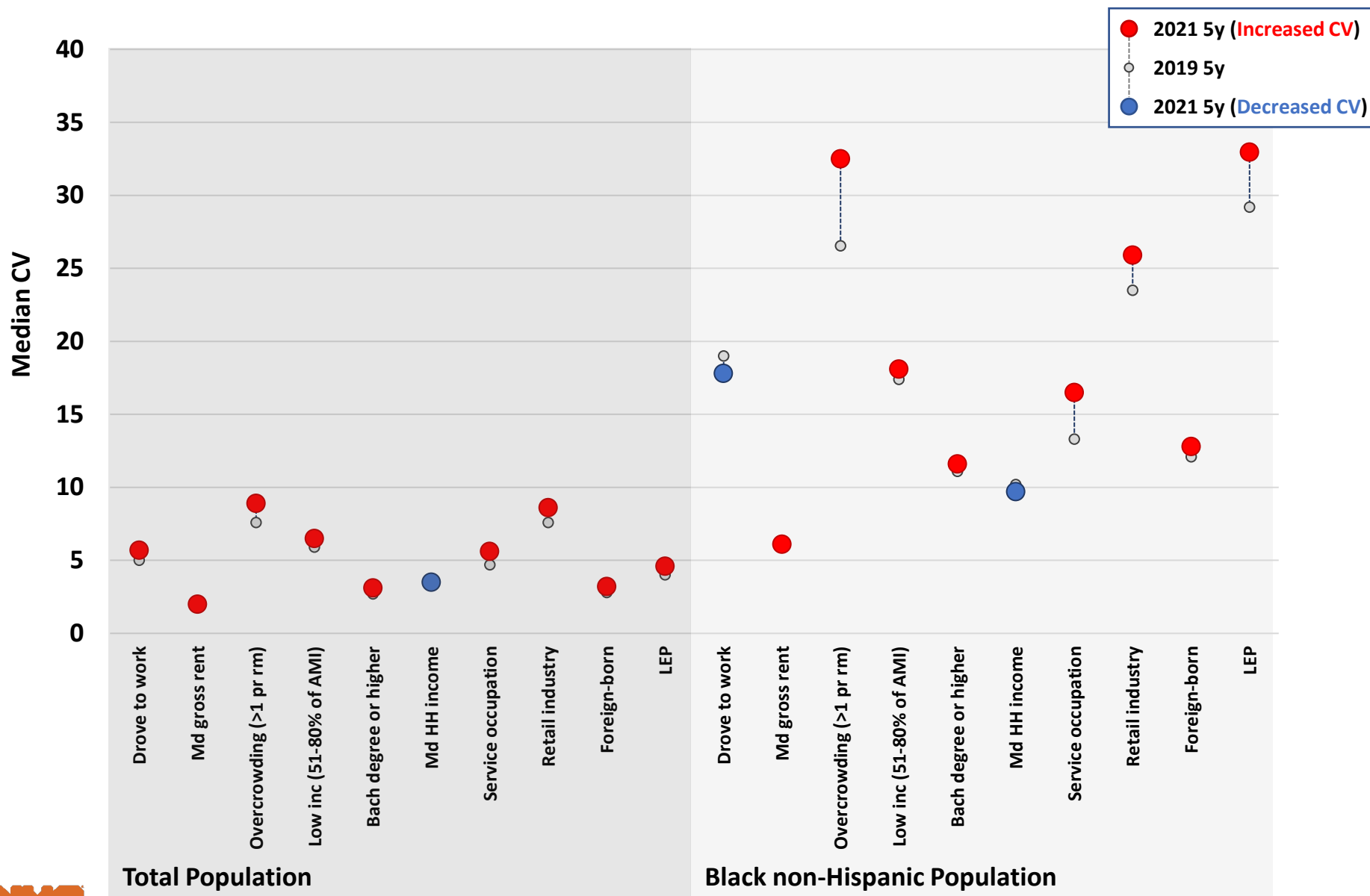
# Reduced ACS PUMS Reliability Impacts Equitable Development App



## Equitable Development Data Explorer



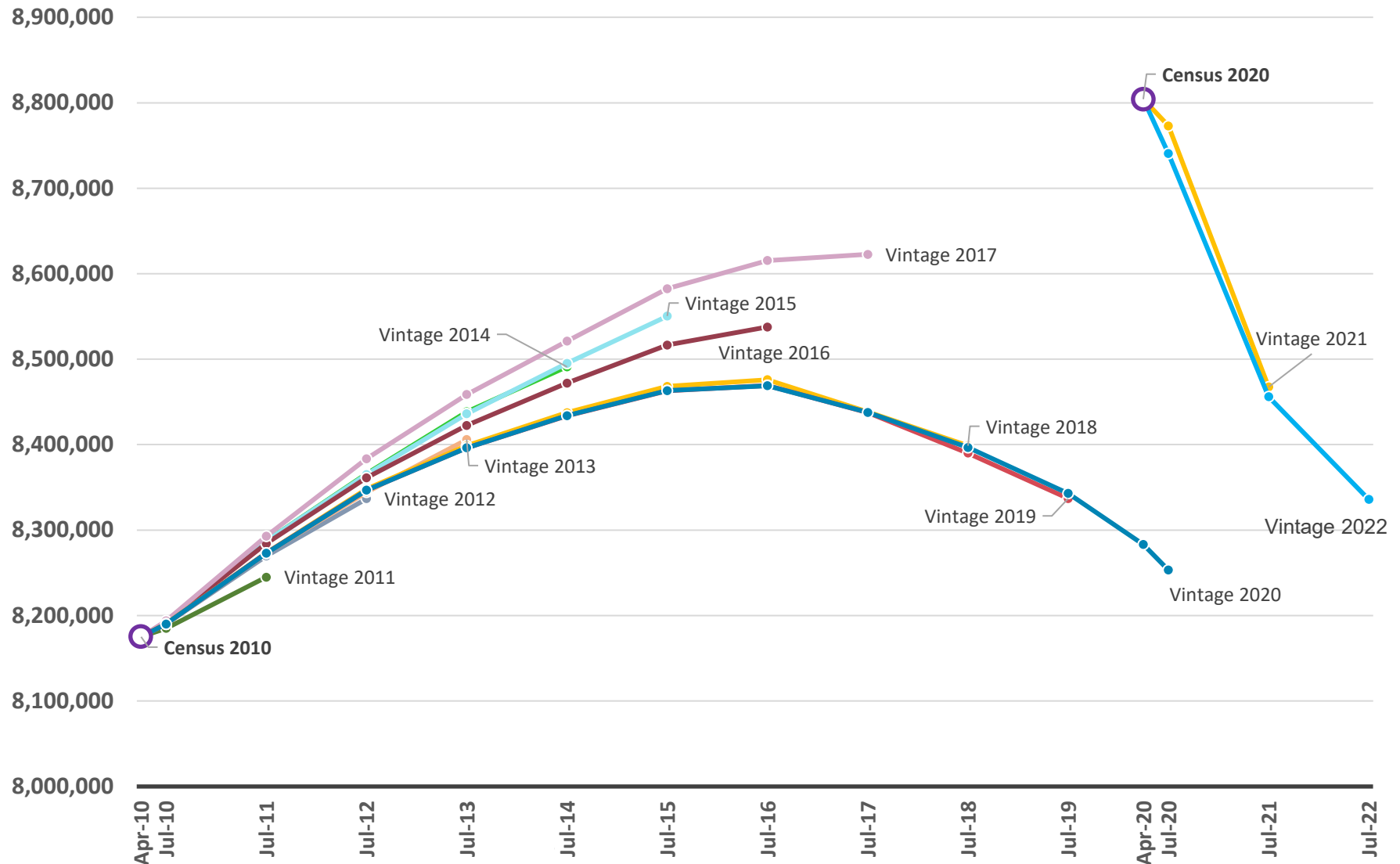
# Median Coefficients of Variation (CVs) for Selected Variables NYC Public Use Microdata Areas (PUMAs), 2015-2019 & 2017-2021 PUMS



- Diminishing Reliability
- **Control Totals**
- Guidance and Recommendations

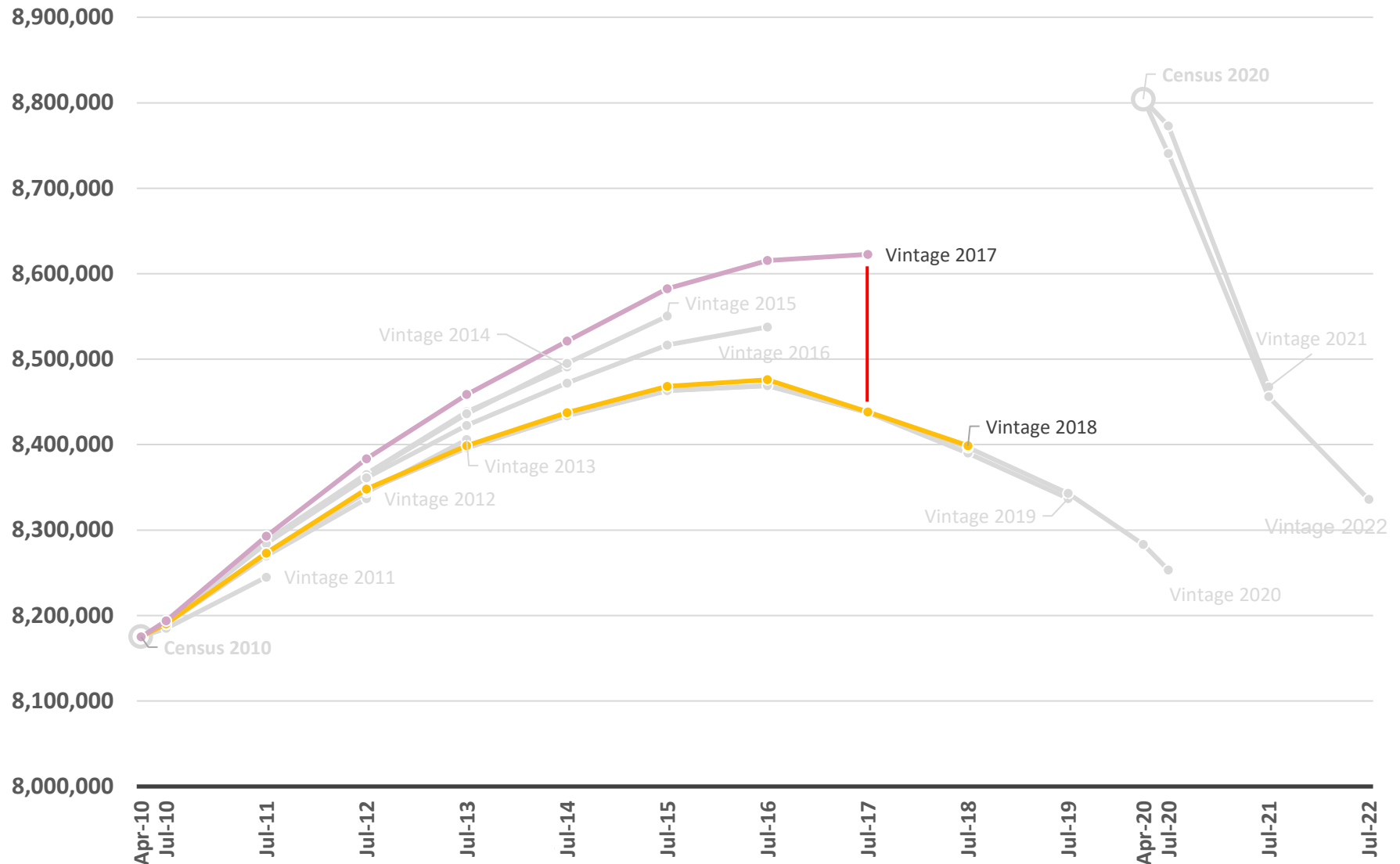
# Population Estimates Vintages

## New York City, 2010 to 2022



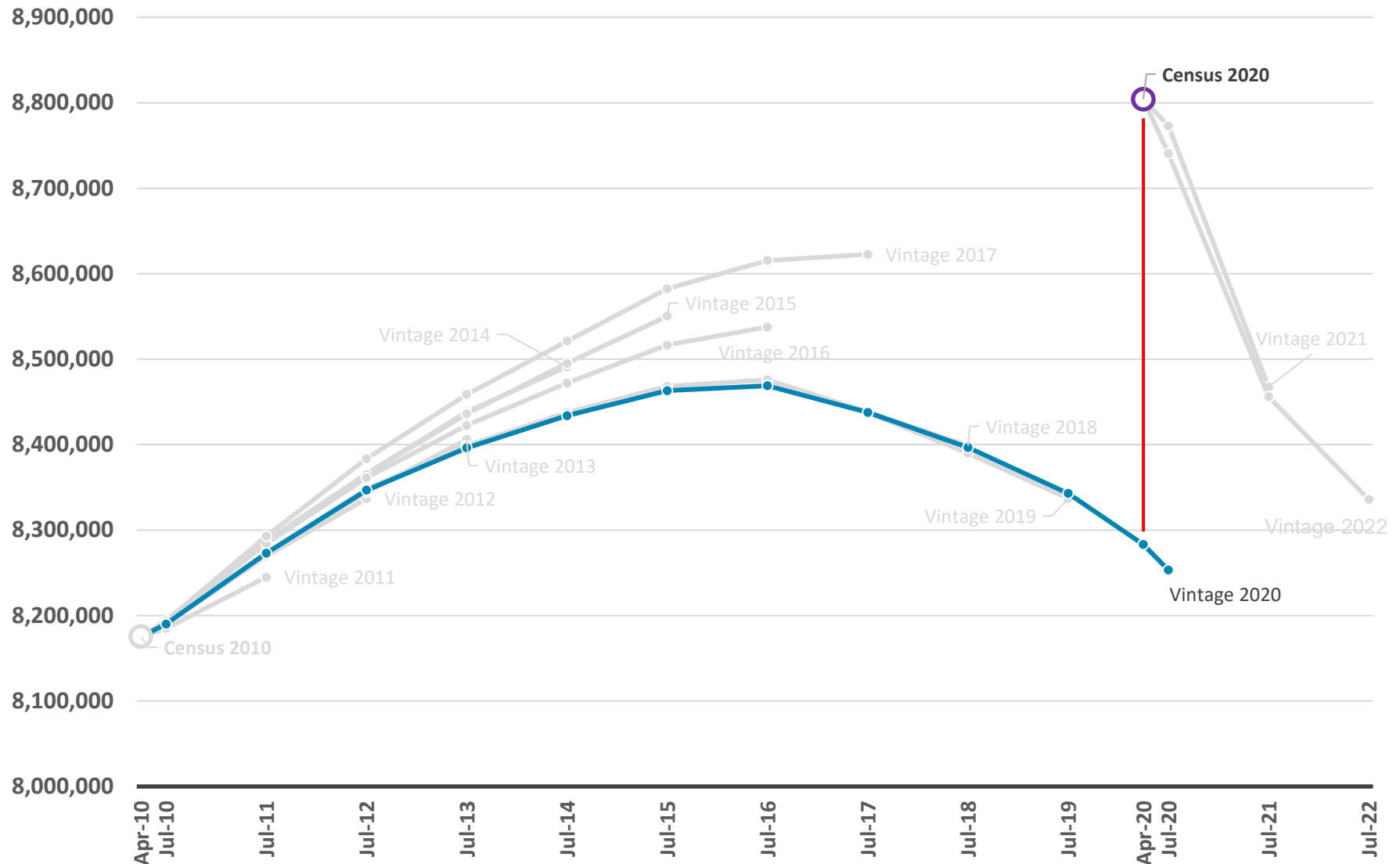
# Population Estimates Vintages

## New York City, 2010 to 2022



# Population Estimates Vintages

## New York City, 2010 to 2022

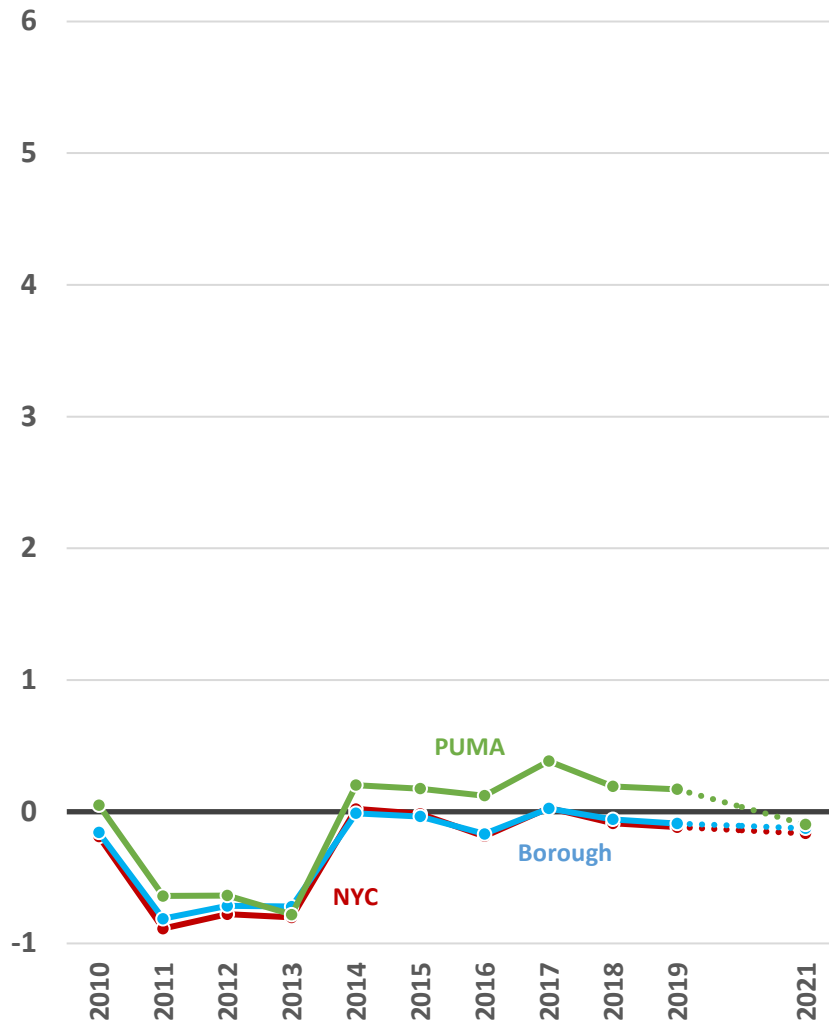




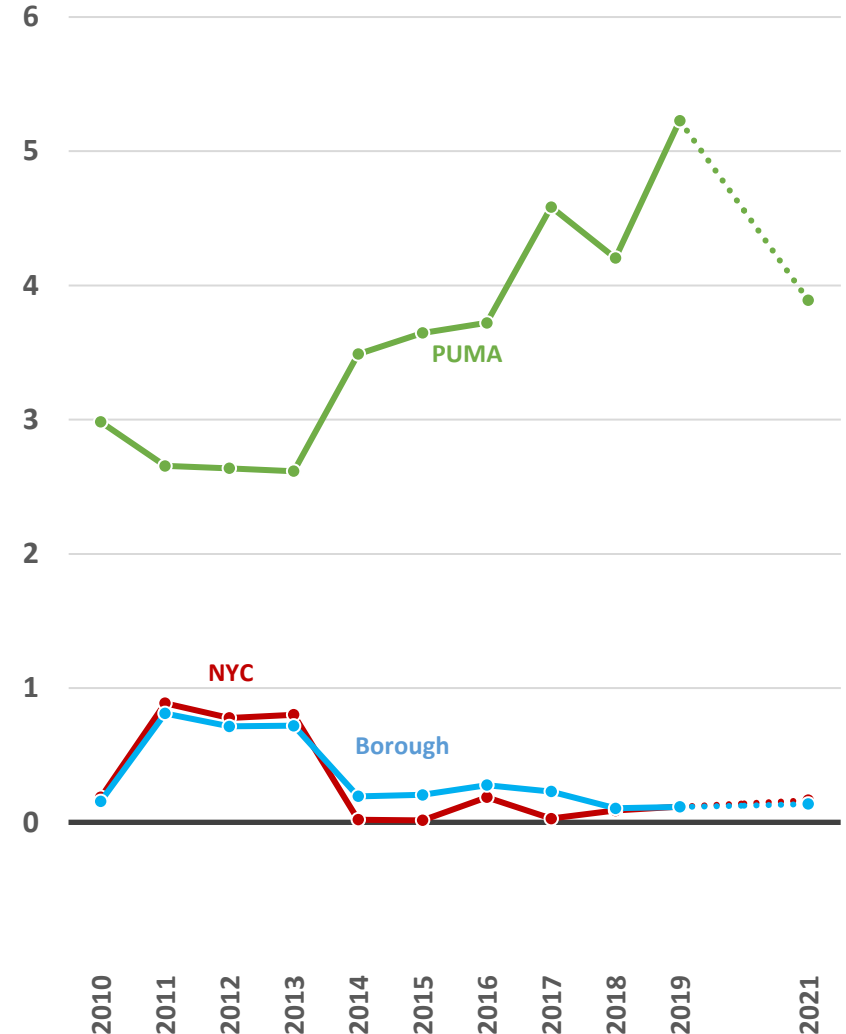
# ACS 1-year Housing Unit Estimates Compared to DCP Estimates\*

## New York City, Boroughs, and PUMAs, 2010 to 2021

MALPE



MAPE

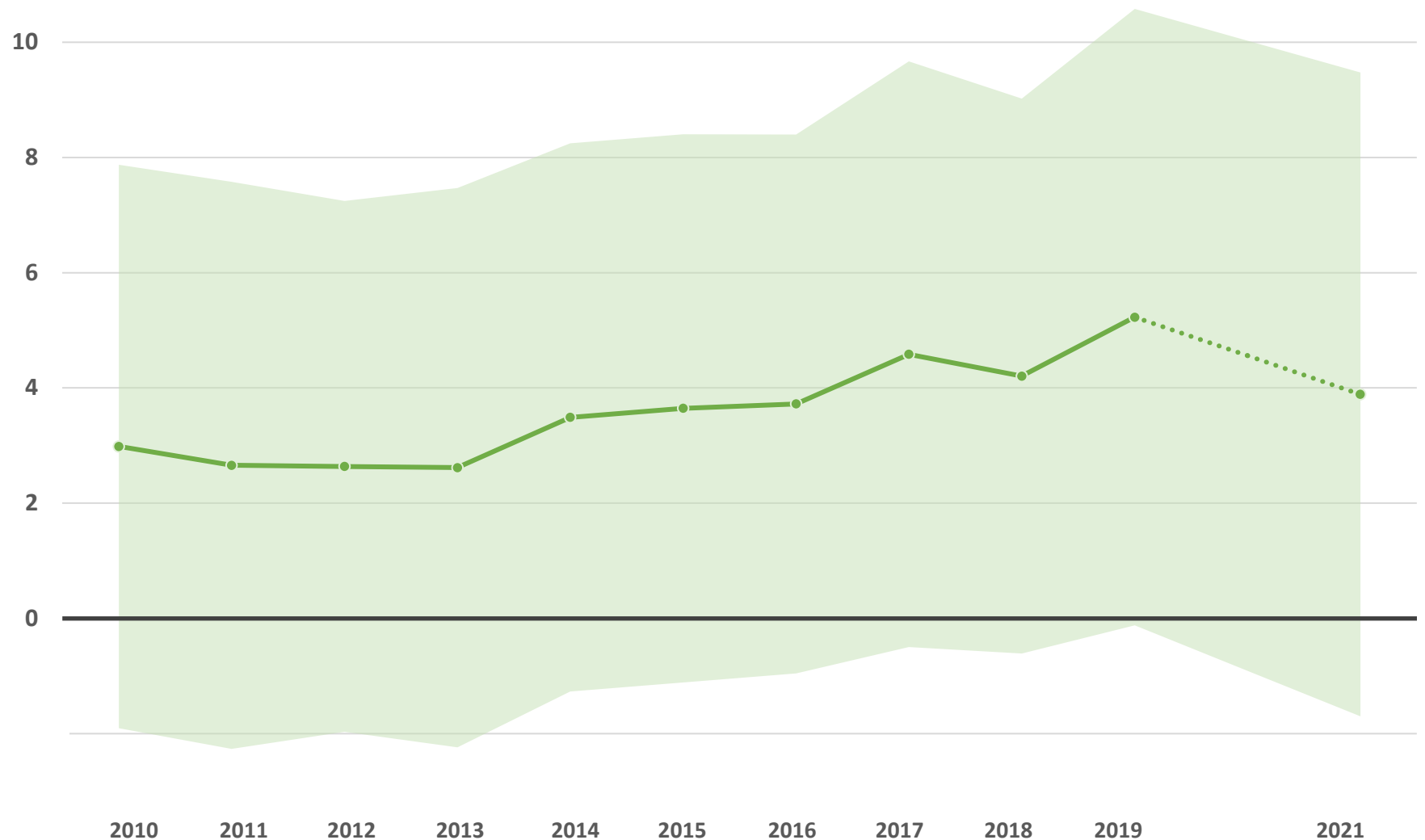


\* DCP estimates are the housing unit count as of the preceding census plus net housing unit change according to the NYC DCP Housing Database

(<https://www.nyc.gov/site/planning/data-maps/open-data/dwn-housing-database.page>).

Sources: U.S. Census Bureau, 2010-2021 American Community Survey – Summary File; NYC Department of City Planning, Housing Database; Population Division – NYC Department of City Planning

# MAPE and “MOE”\*, ACS 1-year HU Estimates Compared to DCP Estimates New York City PUMAs, 2010 to 2021

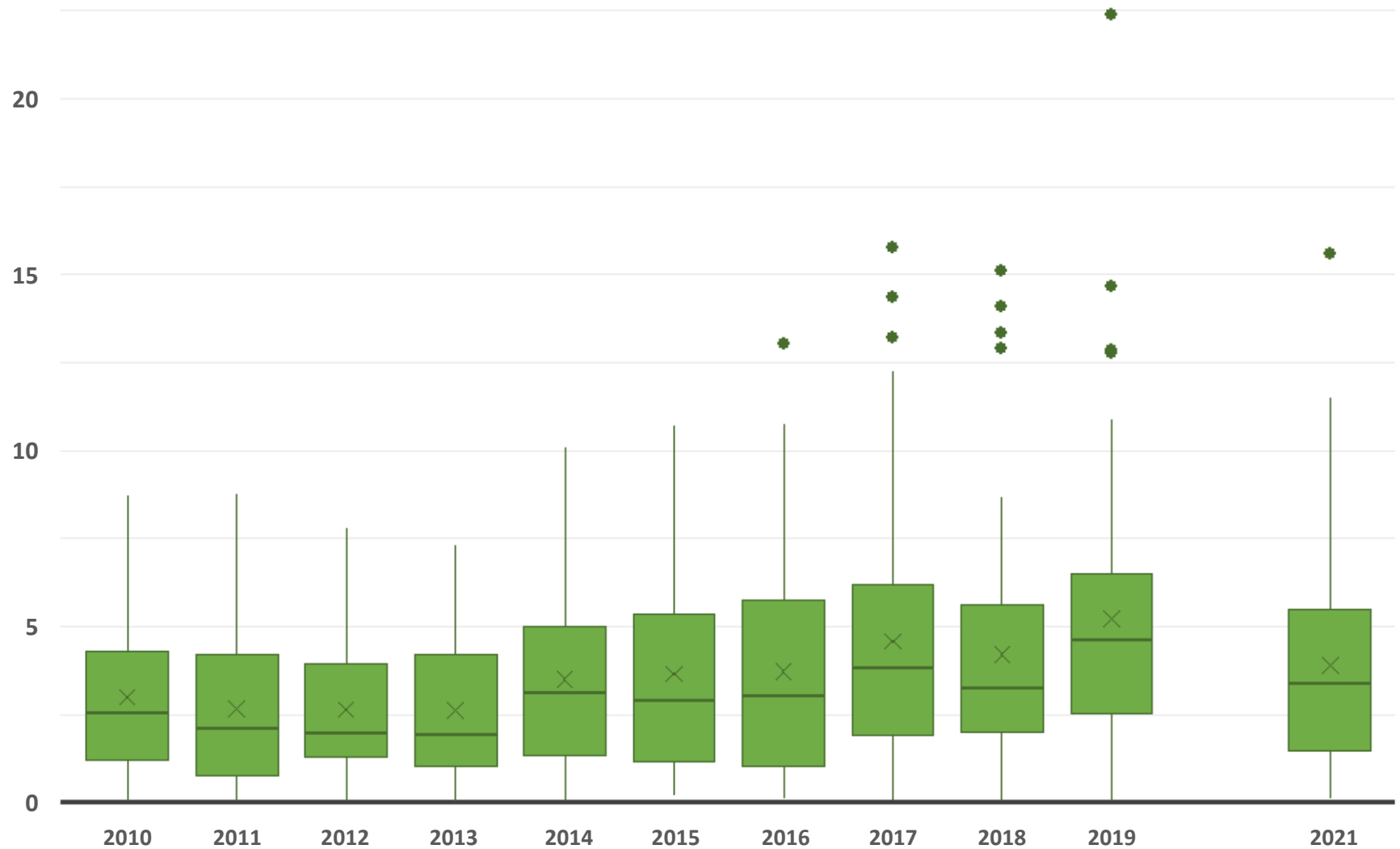


\* “MOE” refers to average ACS MOE as a percent of ACS estimated housing units within each PUMA.

Sources: U.S. Census Bureau, 2010-2021 American Community Survey – Summary File; NYC Department of City Planning, Housing Database; Population Division – NYC Department of City Planning

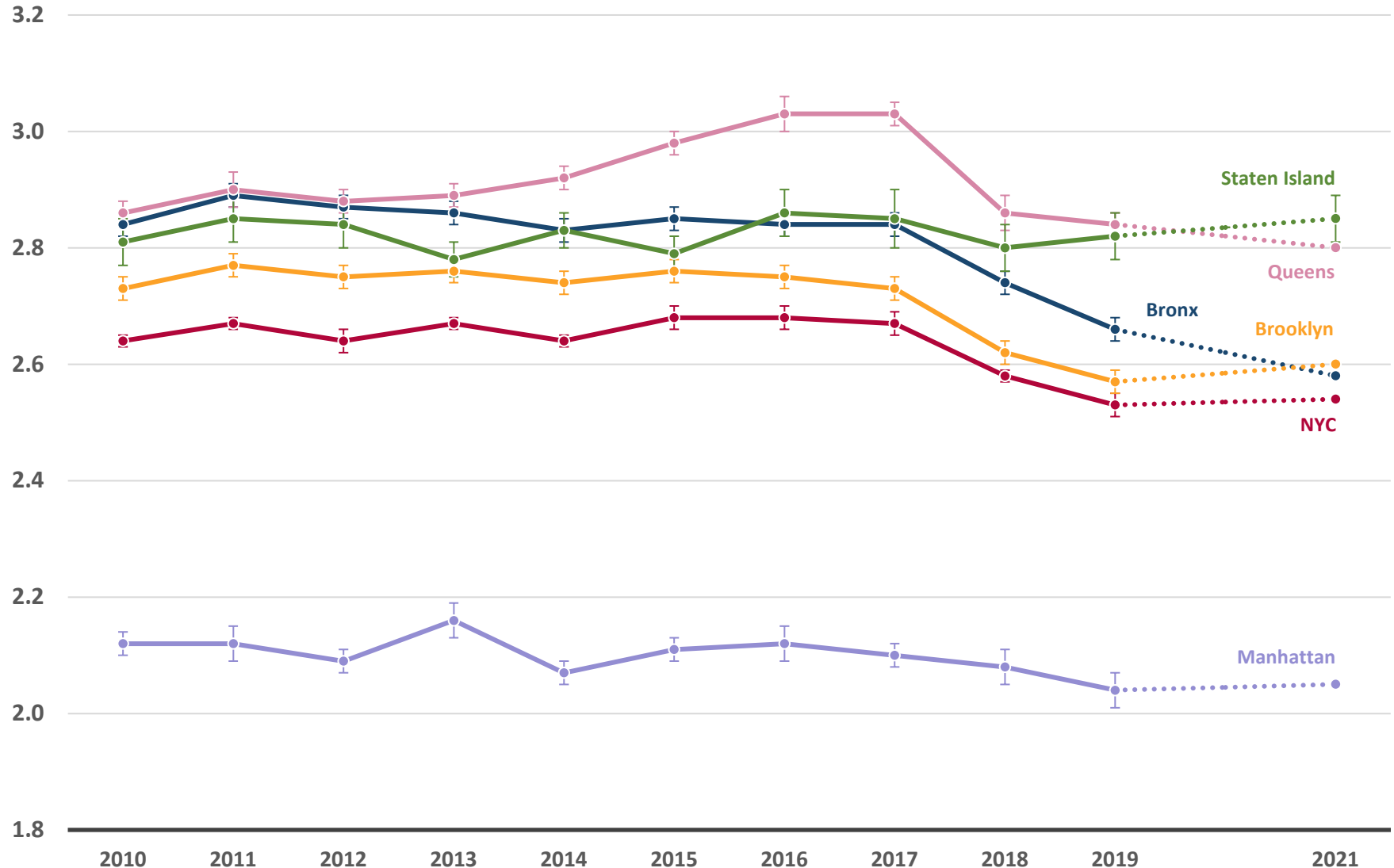
# Distribution of MAPEs

## New York City PUMAs, 2010 to 2021

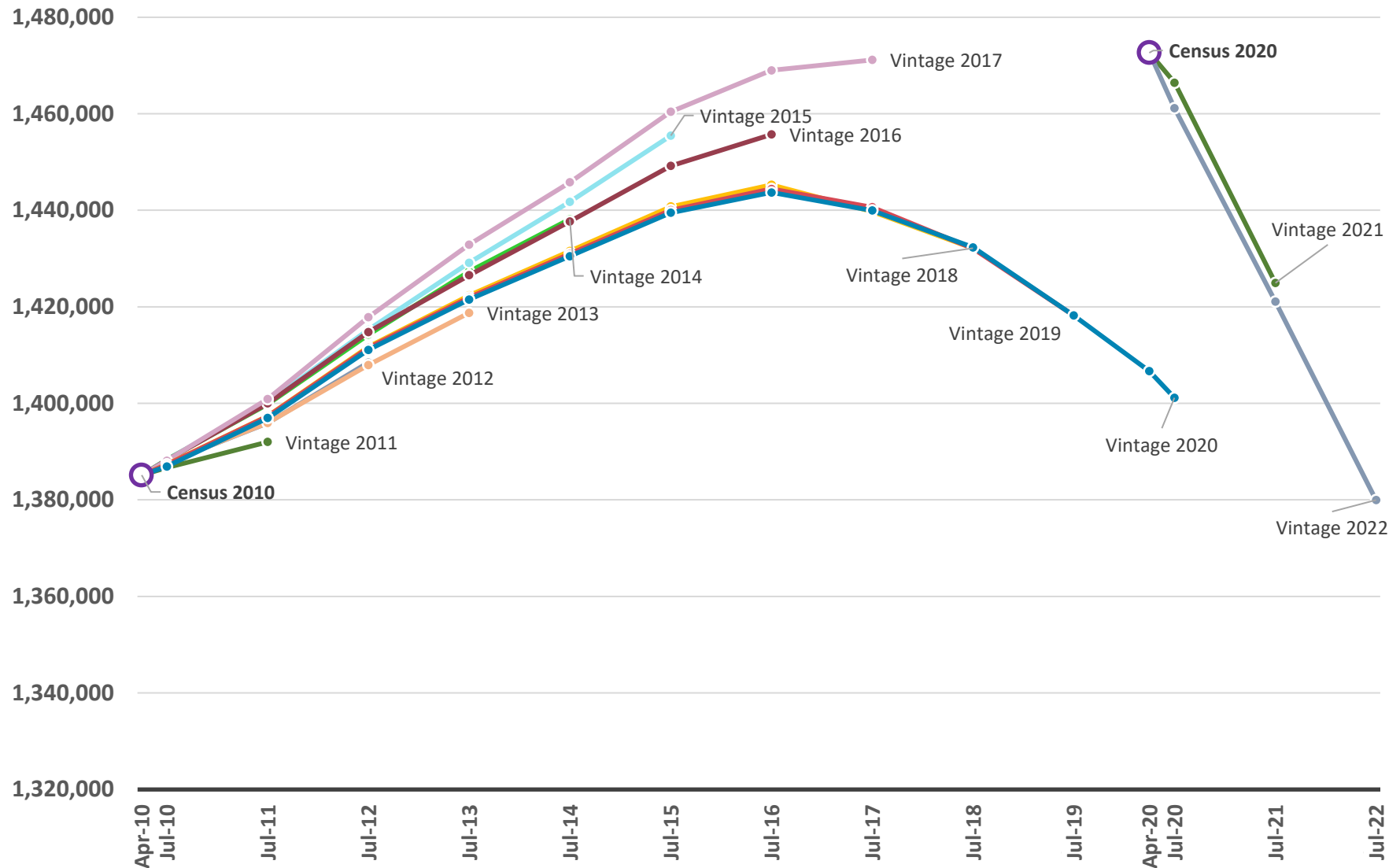


# Persons per Household

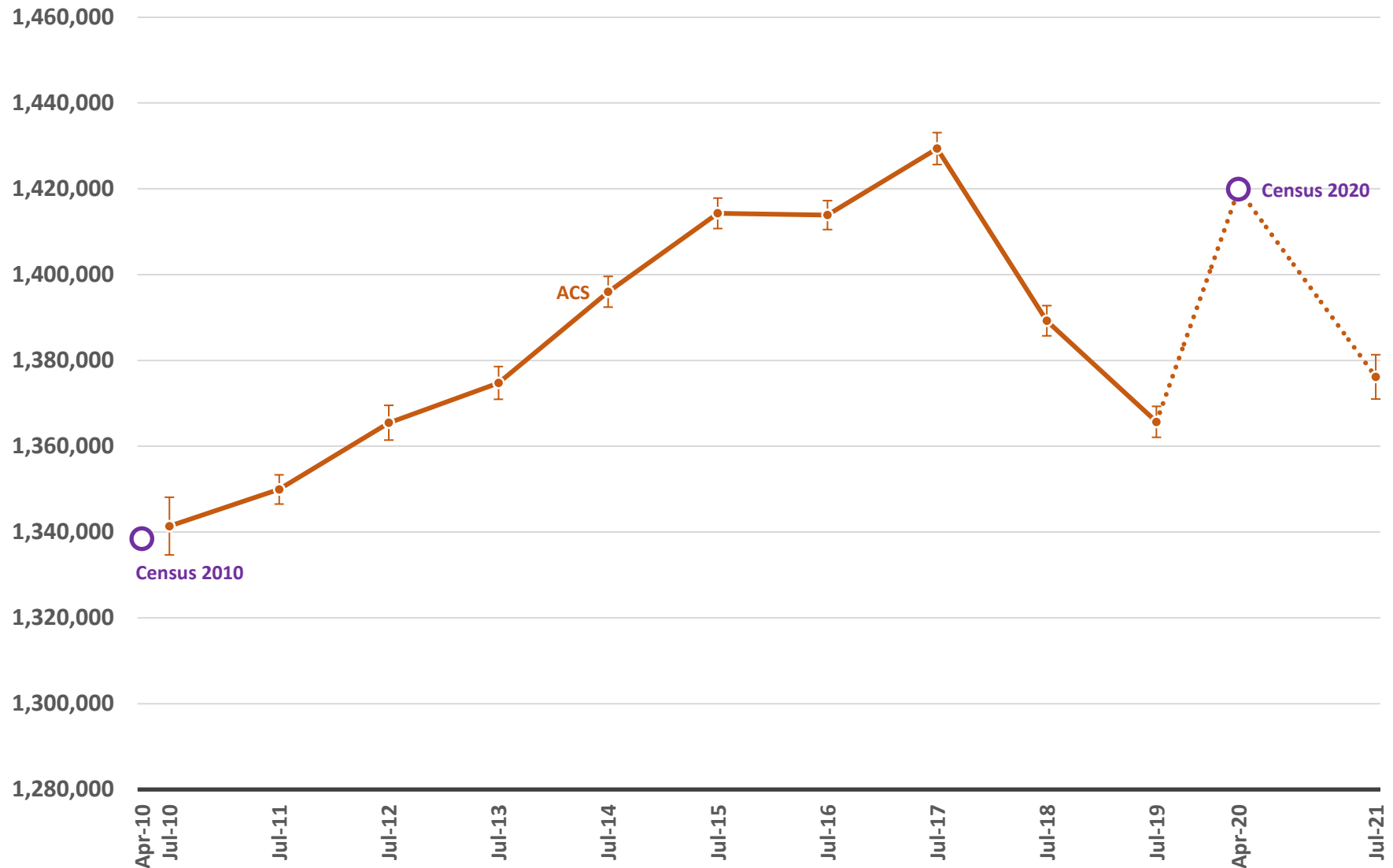
## New York City and Boroughs, 2010 to 2021



# Population Estimates Vintages Bronx County, 2010 to 2022

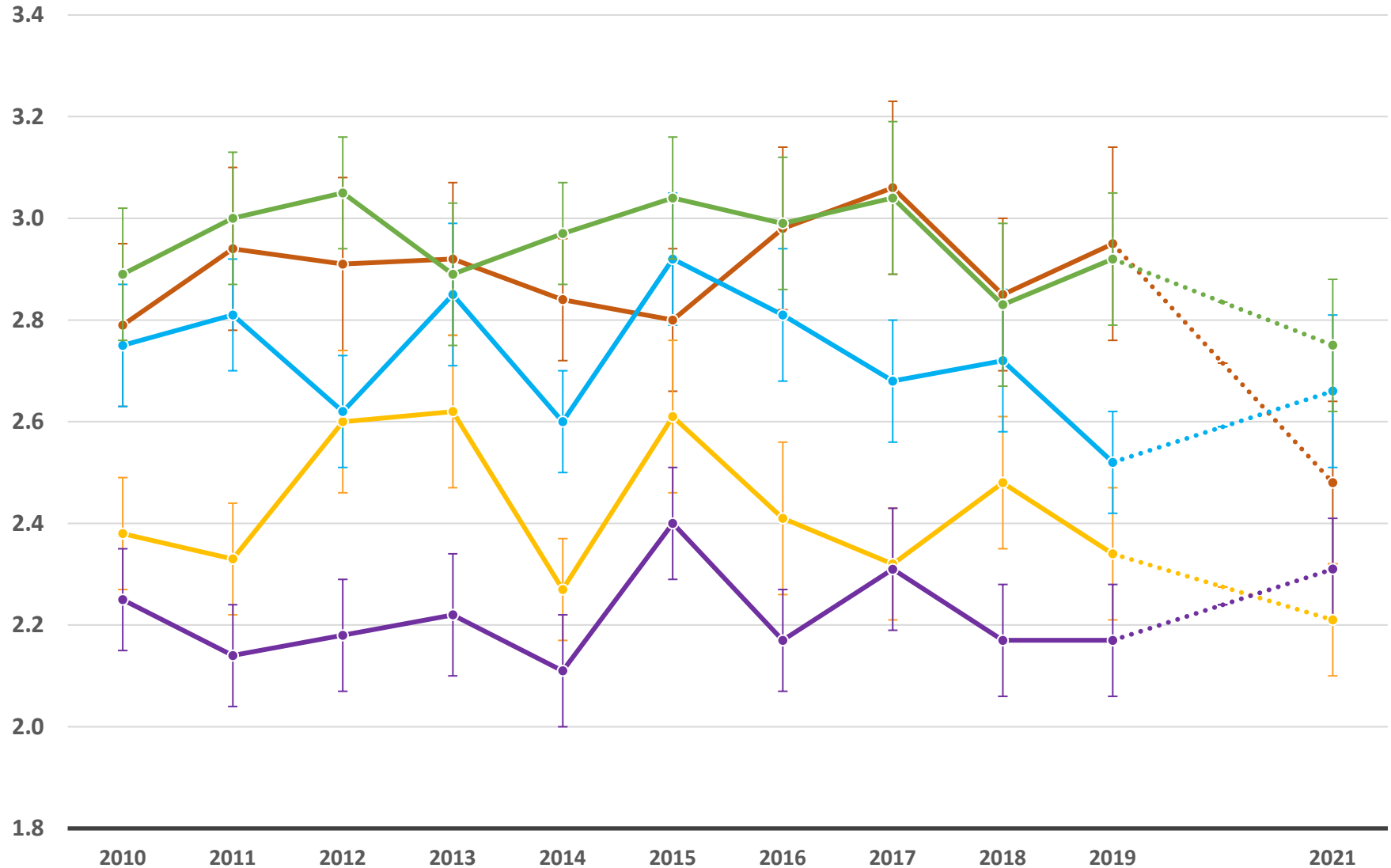


# Household Population Bronx County, 2010 to 2021



# Persons per Household

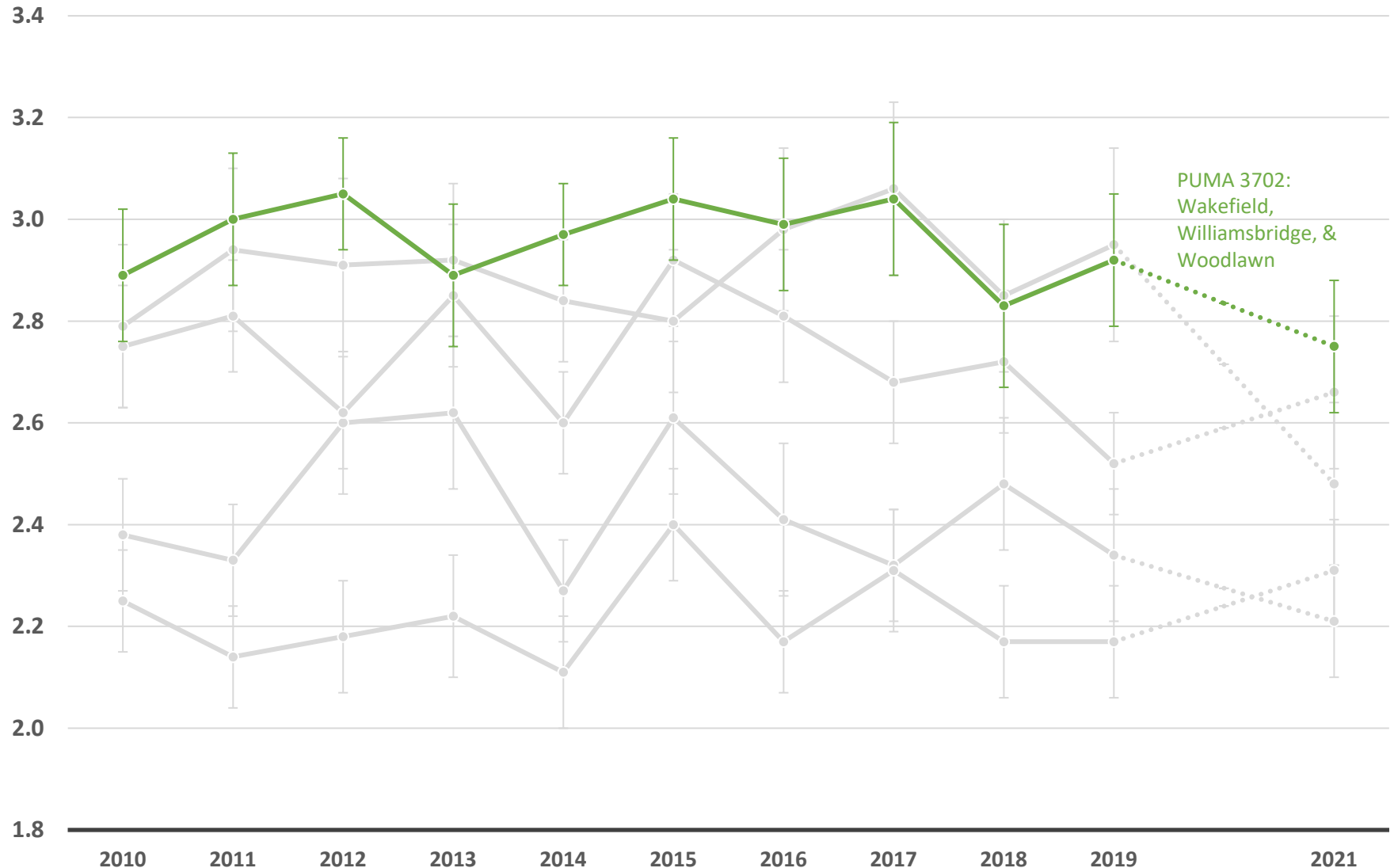
## Selected PUMAs within New York City, 2010 to 2021





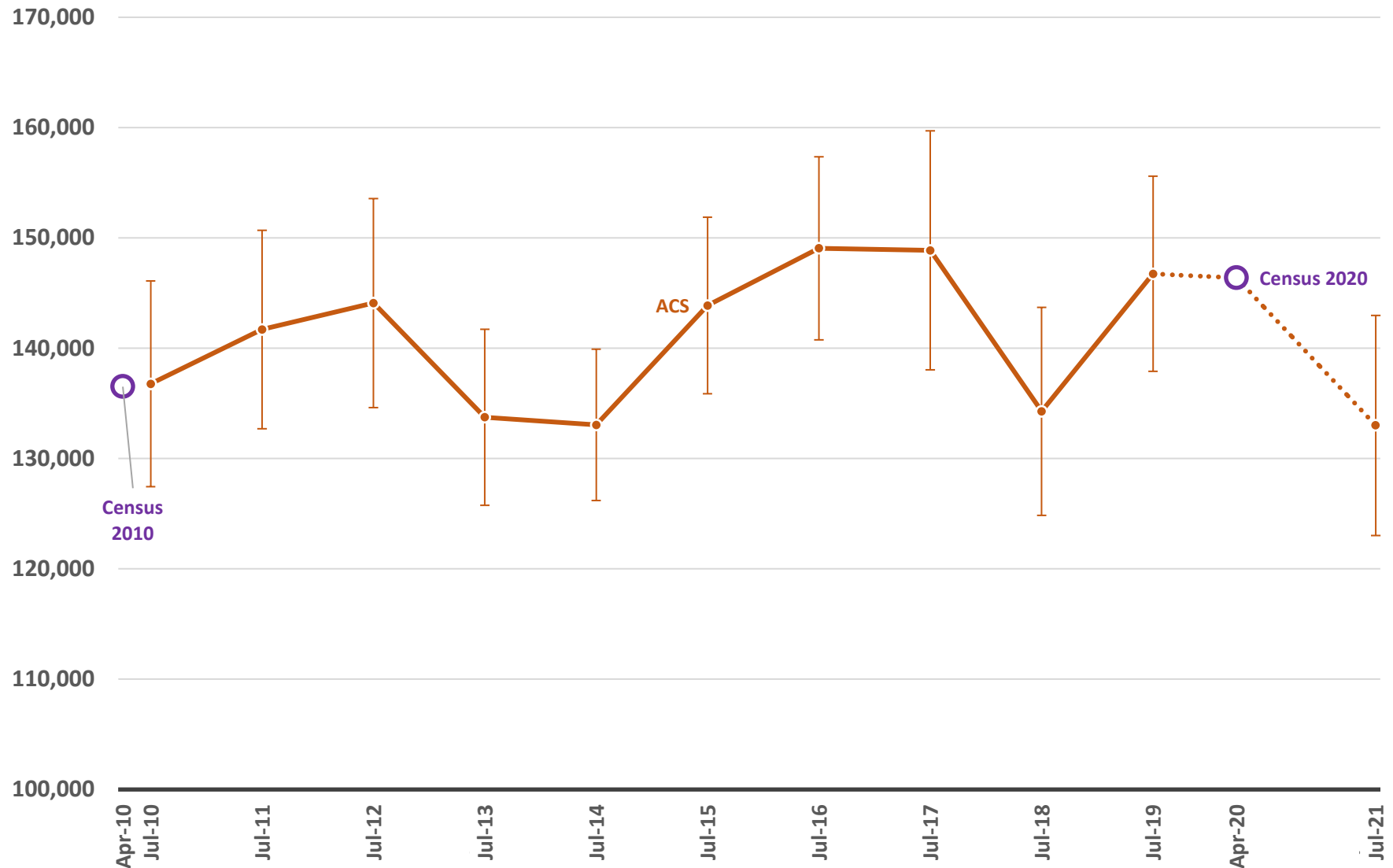
# Persons per Household

## Selected PUMAs within New York City, 2010 to 2021



# Household Population

## PUMA 3702: Wakefield, Williamsbridge, & Woodlawn, 2010 to 2021



- Diminishing Reliability
- Control Totals
- **Guidance and Recommendations**



## Awareness is half the battle

- Census tract ACS data are generally unreliable
- County-level controls depend on PEP estimates
- Noisiness of estimates for non-controlled sub-county geographies limits usability

## Working with the data

- Flag data points with poor reliability
- Assess the general reliability of datasets
- Conduct significance tests
- Assess map reliability
- Administrative data can provide useful counterpoint

## Higher hanging fruit

- Increase sample size
- Sub-county PUMA-level controls
- Campaign against non-response

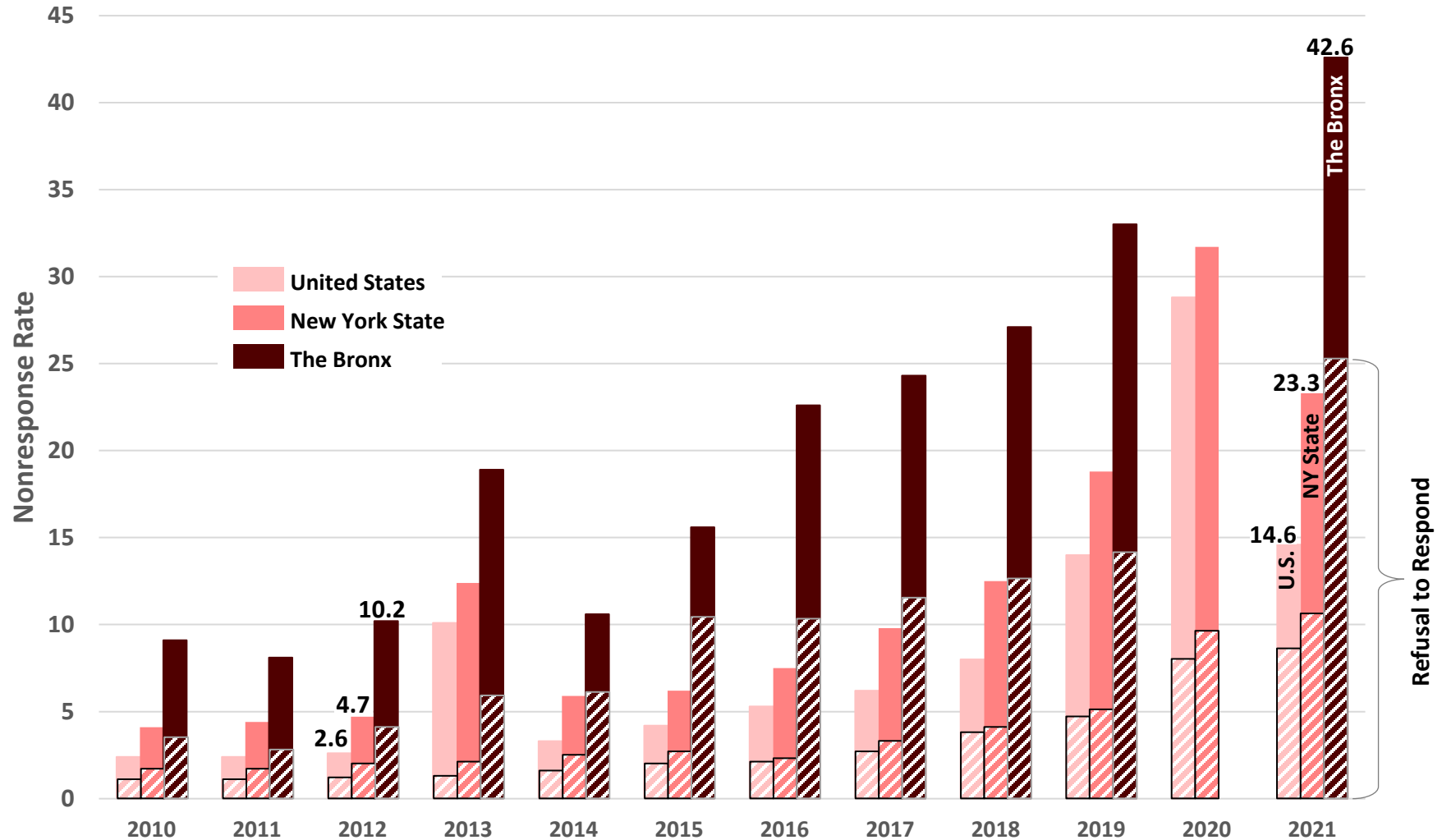
## Lower hanging fruit

- Bring back 3-year estimates
- More guidance about data limitations



# Appendix

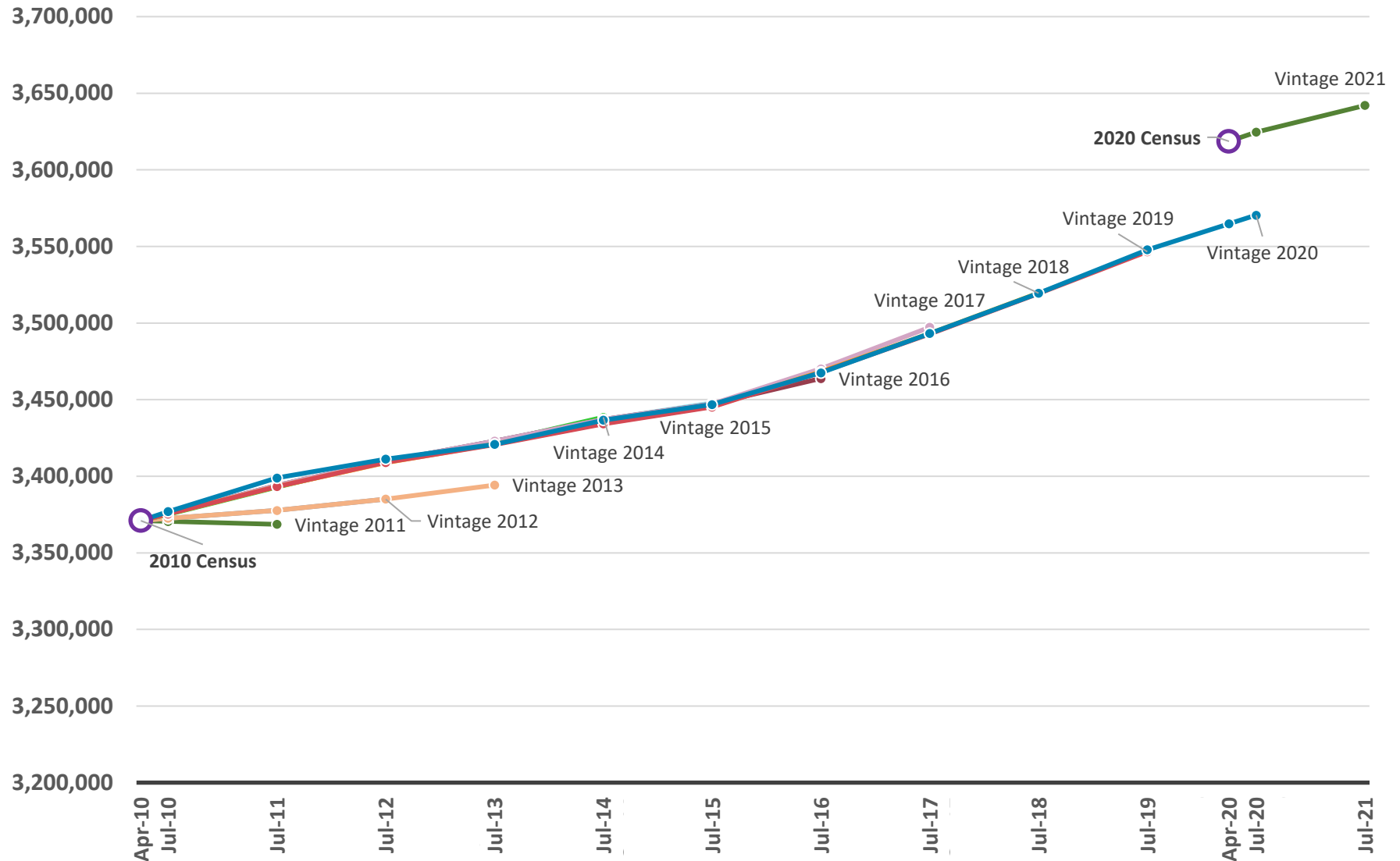
# ACS Nonresponse Rates and Refusal to Respond U.S., New York State, and Bronx County, 2010 to 2021





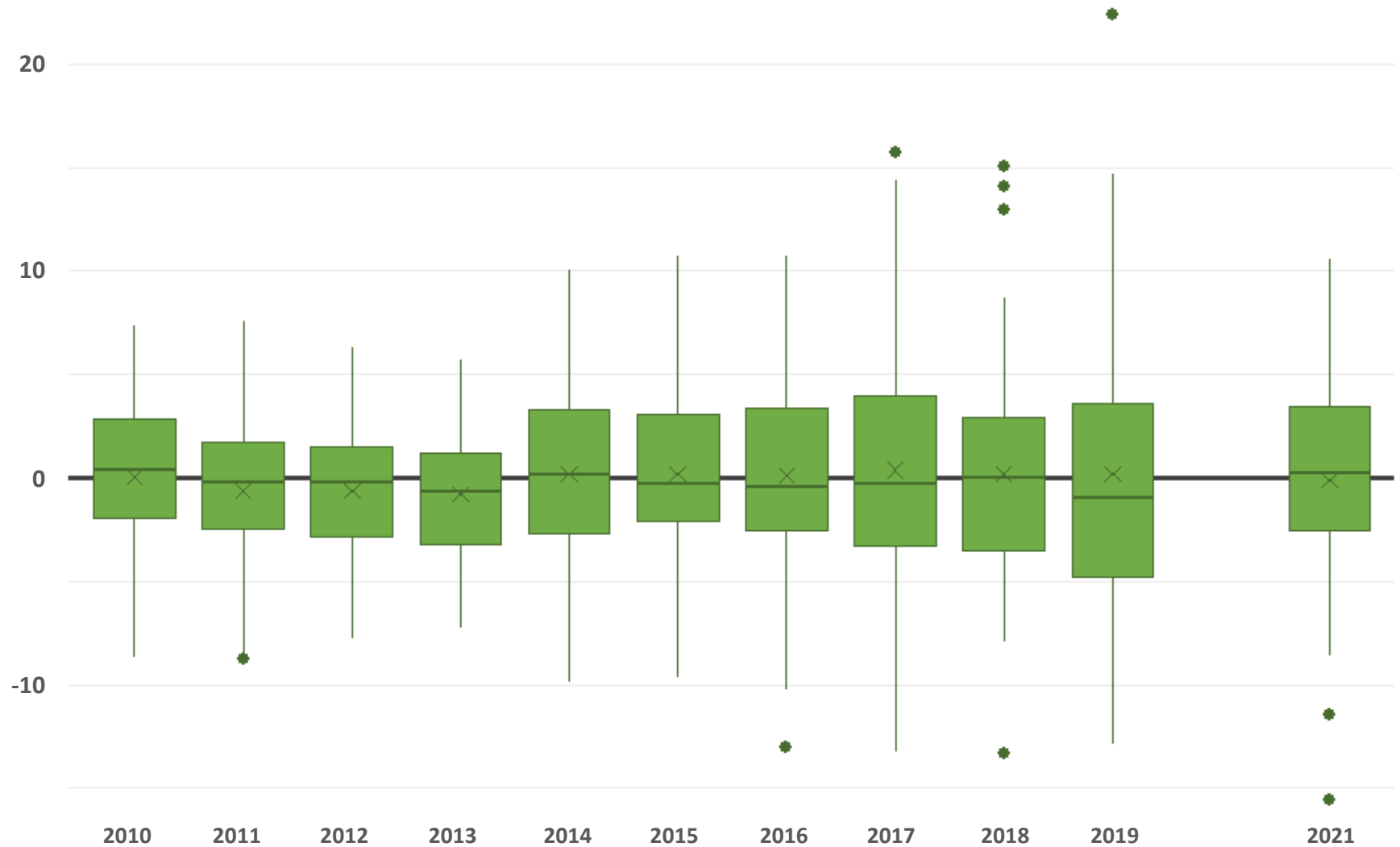
# Housing Unit Estimates Vintages

## New York City, 2010 to 2021



# Distribution of MALPEs

## New York City PUMAs, 2010 to 2021

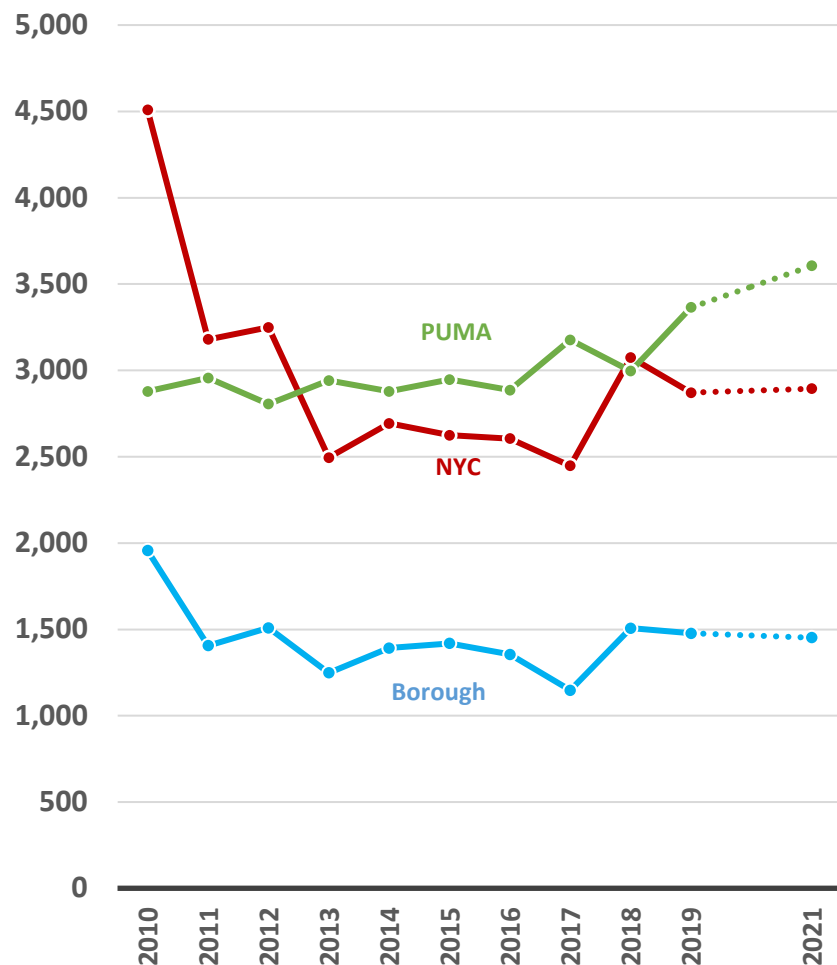


# Housing Unit Estimate Margins of Error

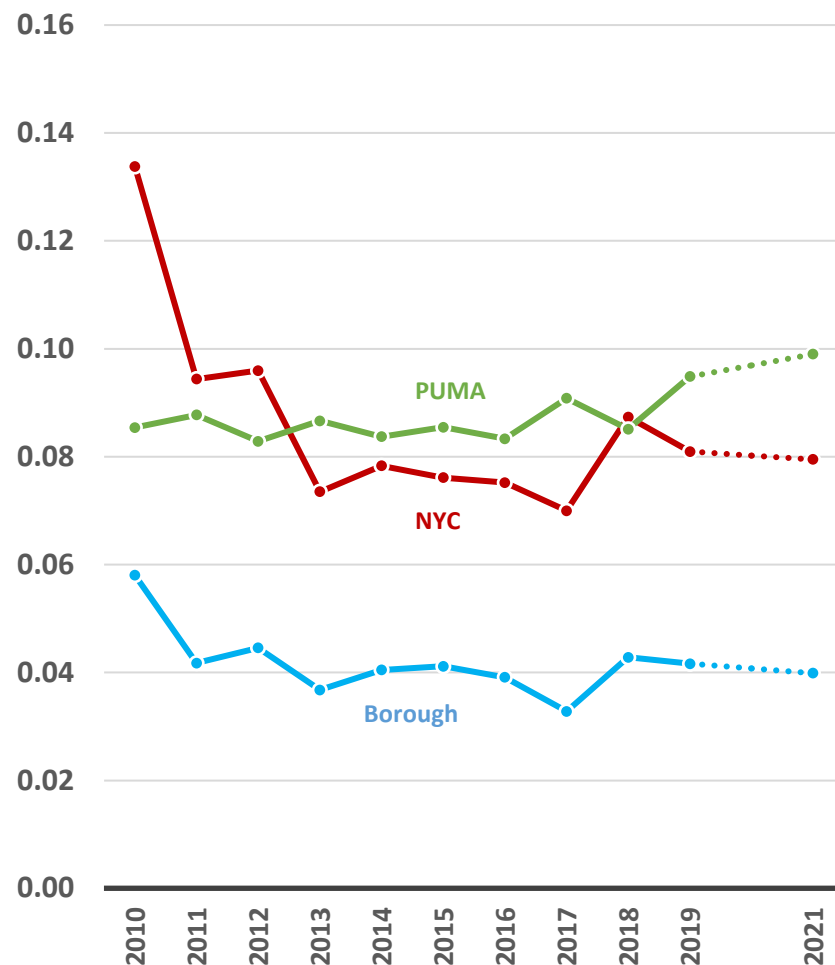
## New York City, Boroughs, and PUMA, 2010 to 2021



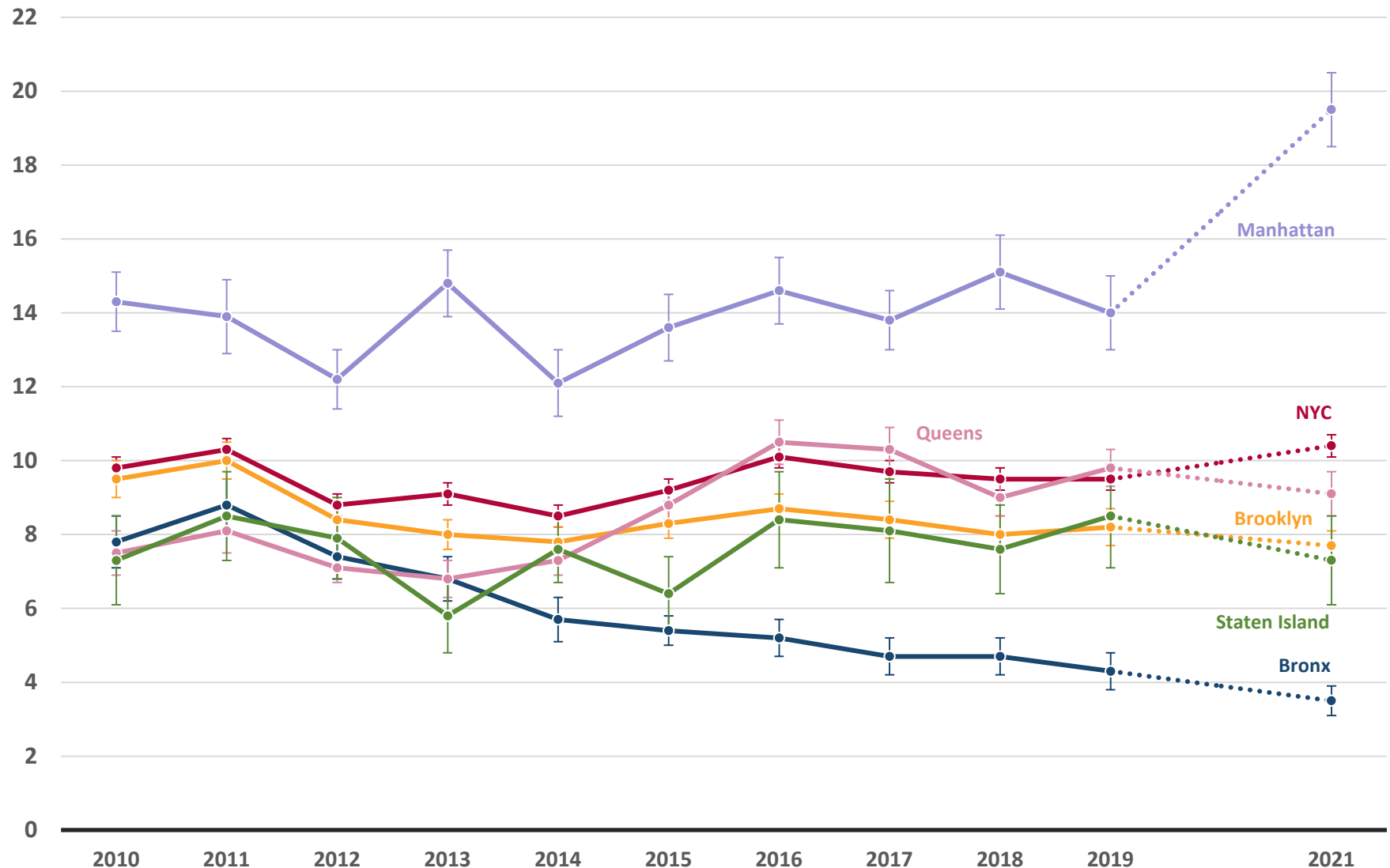
Mean MOE



Mean MOE as Percent of Total NYC Housing Unit Estimate



# Percent Vacant Housing Units New York City and Boroughs, 2010 to 2021



# Percent Vacant

## Selected PUMAs within New York City, 2010 to 2021

