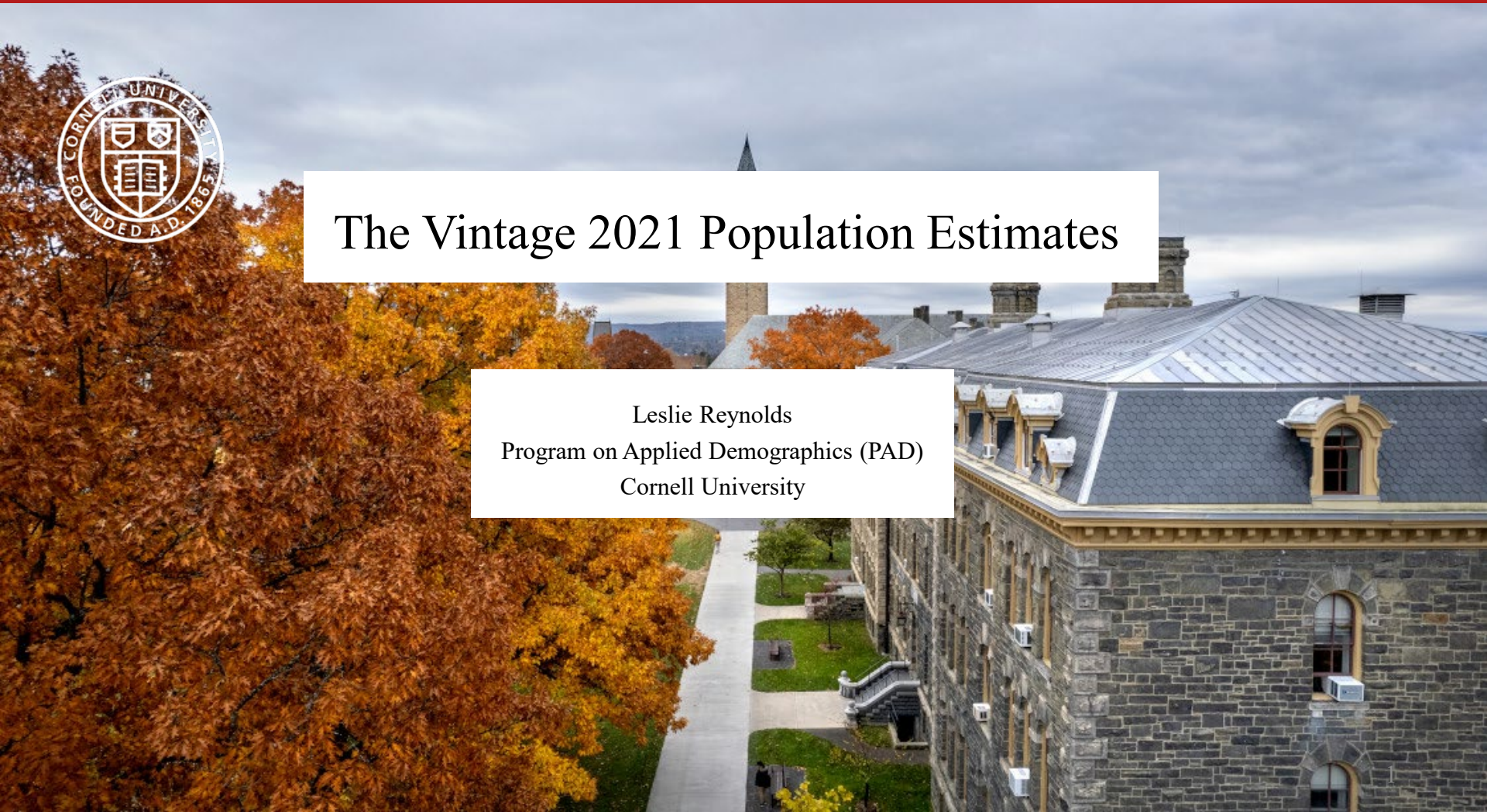

The Vintage 2021 Population Estimates

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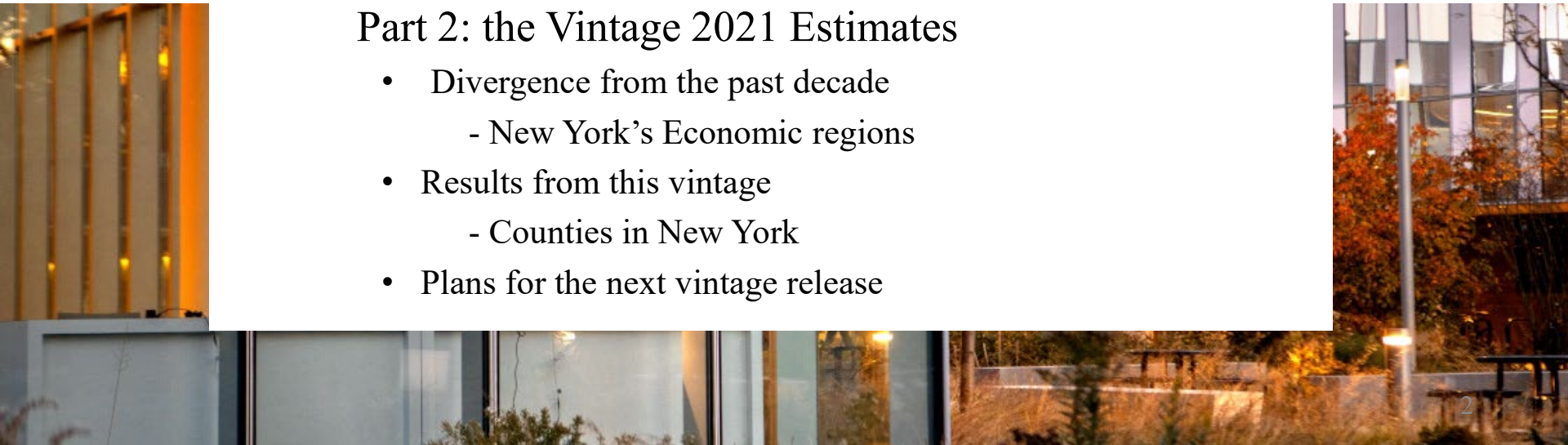
Overview

Part I: Foundations of the Population Estimates

- Discussion of purpose and methods
- the Modified Race File and Blended Base
- the components and their challenges

Part 2: the Vintage 2021 Estimates

- Divergence from the past decade
  - New York's Economic regions
- Results from this vintage
  - Counties in New York
- Plans for the next vintage release



The Population Estimates Program

- Official measures of population and housing units between decennial censuses
  - Estimates for monthly, yearly, and decadal intervals
  - April 1st of the most recent Census to July 1st of the current year (i.e. "Vintage" year)

- Informs federal spending (e.g. the CARES Act 2020), research and programs in the public and private sector
  - Used for controls in major surveys including the Current Population Survey (CPS) and the American Community Survey (ACS)

Coverage by Topic and Geography

- Total population and demographic components of change for…
  - the U.S., states, counties, metro/micropolitan statistical areas, Puerto Rico and its municipios
  - Total population **only**: cities, towns, other sub-county areas

- Resident population by age, sex, race, and Hispanic origin for…
  - The U.S., states, and counties
  - Age and sex only for Puerto Rico and its municipios
  - Monthly population: residents plus Armed Forces overseas, civilian, and civilian non-institutionalized populations at the national level only

- National, state, and county level estimates of housing units

Coverage by Topic and Geography (cont.)

Census Bureau Chart of Estimate Type by Geography

Estimate Type	U.S.	States	Metro/ Micro Statistical Areas	Counties	Cities and Towns	Puerto Rico	Puerto Rico Municipios
Total Resident Population	X	X	X	X	X	X	X
Components of Change (Births, Deaths, Net Migration)	X	X	X	X		X	
Population Characteristics (Age, Sex, Race, Hispanic Origin*)	X	X		X		X	X
Monthly Population (Five Universes**)	X						
Group Quarters Population	X (by char)	X (totals)		X (totals)			
Housing Units	X	X		X			

*For Puerto Rico Commonwealth and its municipios, population estimates are produced by age and sex only.
**The five estimates universes are: resident, resident plus Armed Forces overseas, civilian, civilian noninstitutionalized, household.

United States Census 2020

Methodology of the Estimates

The Cohort Component Method

Nation, state, and county populations

Distributive Housing Unit Method

Sub-county populations

Methodology (cont.)

Key principle of the estimates: consistency over geography and characteristics

- E.g. county totals of a single race must sum to the state total of that race

Estimates production takes a "top-down" approach:

- National monthly population by age, sex, race, and Hispanic origin
  - ➢ Total annual populations for counties summed to the state level
    - ➢ Estimates for states and counties by age, race, sex, and Hispanic origin.

Modified Race File

Both the Estimates and Decennial Censuses follow the 1997 OMB standards:

- White, Black or African American, American Indian and Alaska Native, Asian, and Native Hawaiian/Other Pacific Islander
  - The Census adds the option of Some Other Race

The MRF adjusts race counts based on Census data, by 5-year age group, sex, and Hispanic origin

- Normally used for the postcensal population estimates and projections
- Reconciles the Census race categories with those in the records/data used for population estimates/projections
- Some Other race must be allocated to an OMB race category
- Many significant changes to the coding/processing of race and ethnicity responses in Census 2020 (e.g. request for national origin with each racial group, coding of Hispanic origin responses to the race category as some other race)

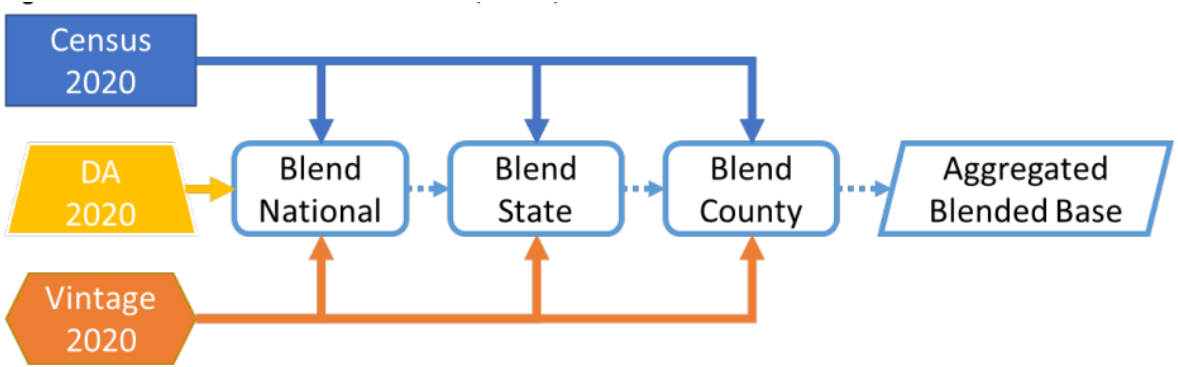
Vintage 2021 Blended Base

Many challenges for the 2020 Census

- New disclosure avoidance system applied to the 2020 Census
- COVID-19 pandemic and administrative challenges
- Delays made decennial characteristic data unavailable at time of production
- Research still ongoing regarding suitability of the 2020 Census data for use as a full-detail estimates base population.

Base comprised of detailed Vintage 2020 estimates controlled to the combined DA and Census data

Vintage 2021 Blended Base (cont.)



Using a similar top-down approach as the postcensal estimates:

Nationally:

- Population totals from the decennial census
- Age and sex from Demographic Analysis
- Race and Hispanic origin from the Vintage 2020 estimates

- State-level estimates controlled to national blended base by detail, and to Census population totals
- County-level estimates controlled to the state Blended Base and population counts from the Census

Vital Statistics

- Data from birth and death certificates
  - From the NCHS
    - Births: date of birth, sex of child, age/residence of mother, race/Hispanic origin of both parents
    - Deaths: date of death, residence, age, sex, race/Hispanic origin
  - Geographic distribution of vital events from the FSCPE

- Challenges:
  - NCHS data has a two-year lag (i.e. births and deaths by demographic detail reference two years prior)
  - Necessary to reflect impact of COVID-19 Pandemic on births and deaths
  - Birth certificates only contain race/Hispanic origin of the parents, not the child (Kidlink process)
  - inconsistencies between imputed births by race/Hispanic origin and the Census

Net Domestic Migration

Data sources and methods depend on age group and level of detail

Total state and county total estimates based on:

1. Internal Revenue Service (IRS) tax return data for ages 0-64
2. Medicare enrollment data from Centers of Medicare and Medicaid Services (CMS) for ages 65+
3. Social Security Administration's Numerical Identification File (NUMIDENT) for all ages
4. Change in the group quarters population*

*Demographic Characteristics file (DCF) used for Domestic migration by full demographic detail

Challenges:

- Not everyone files taxes
- Not all eligible individuals enroll in Medicare

Net International Migration

Most complex to measure

- Immigration of the foreign born
  - 1-year ACS, residence one year ago (ROYA)
- Emigration of the foreign born
  - NCHS Hispanic life tables by age and sex.
  - Immigration estimates from the ACS year of entry question
- Net migration between the United States and Puerto Rico
  - 1-year ACS ROYA, Puerto Rico Community Survey (PRCS)
- Net migration of natives to and from the United States
  - Residual from two consecutive time periods of population registers and censuses in other countries
- Net movement of the Armed Forces population to and from the United States
  - Defense Manpower Data Center (DMDC), 1-year ACS (population by race)

Net International Migration (cont.)

Challenges:

- In general, more uncertainty
  - Input data less complete than vital records
  - One person can experience multiple migration events
  - Migration patterns may vary by characteristic (e.g. age, sex etc.)
  - International migration status occurs through multiple pathways (e.g. temporary, legal, undocumented etc.)
- COVID-19 created unprecedented issues

Group Quarters Population

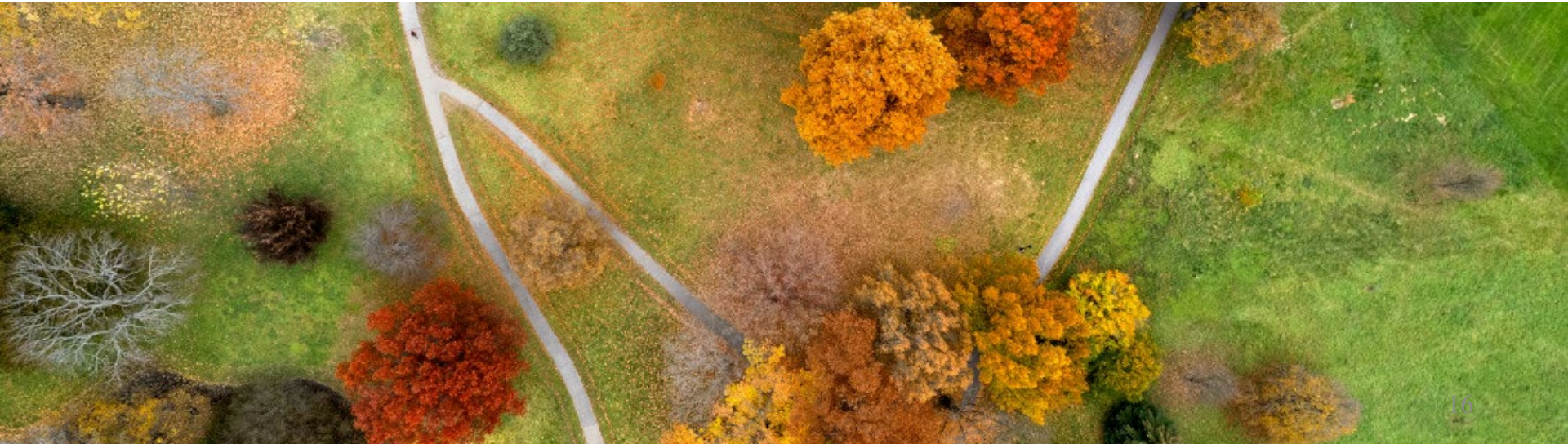
Begins with estimates base derived from the previous decennial census

- Assumes that the total GQ population remains constant throughout the decade unless data on change is received
- Changes to GQ population comes from annual Group Quarters Report (GQR)
  - Facility level time series data from the military, Department of Veterans Affairs, and Federal-State Cooperative for Population Estimates (FSCPE)

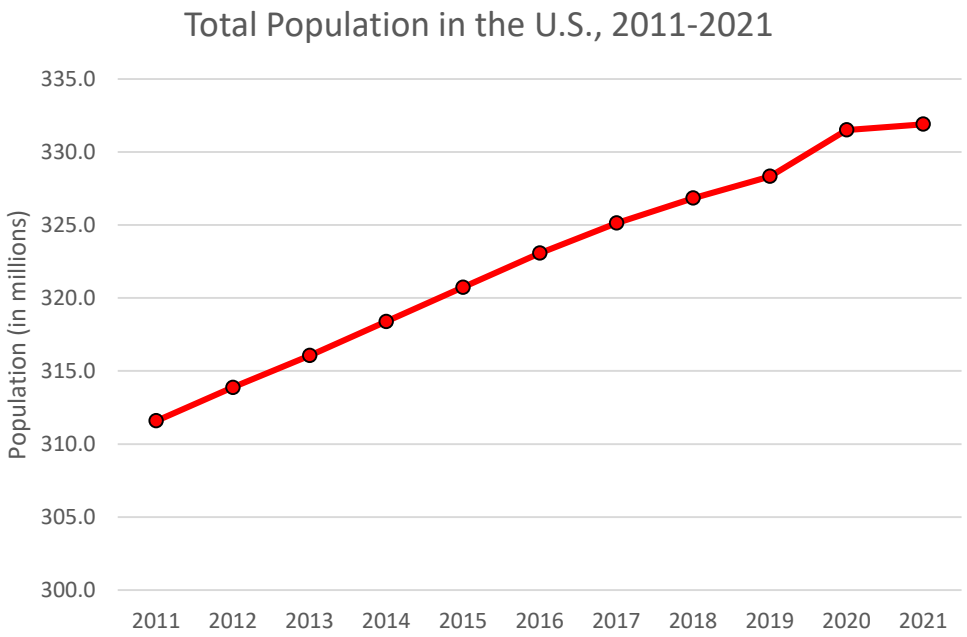
Facility-level data → National totals + Census distribution of demographic detail by facility type

Facility-level data → County-level totals + Census distribution of demographic detail by facility type

Part II: Results From the 2021 Vintage Estimates

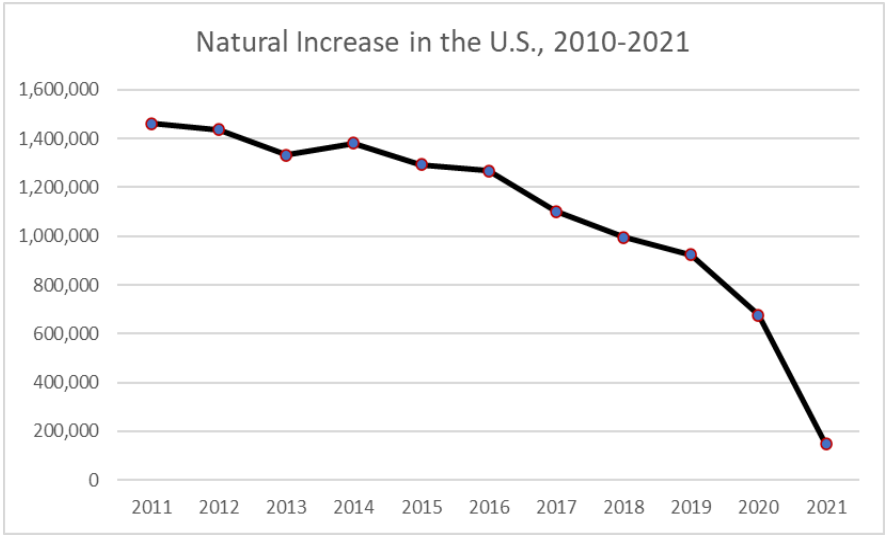


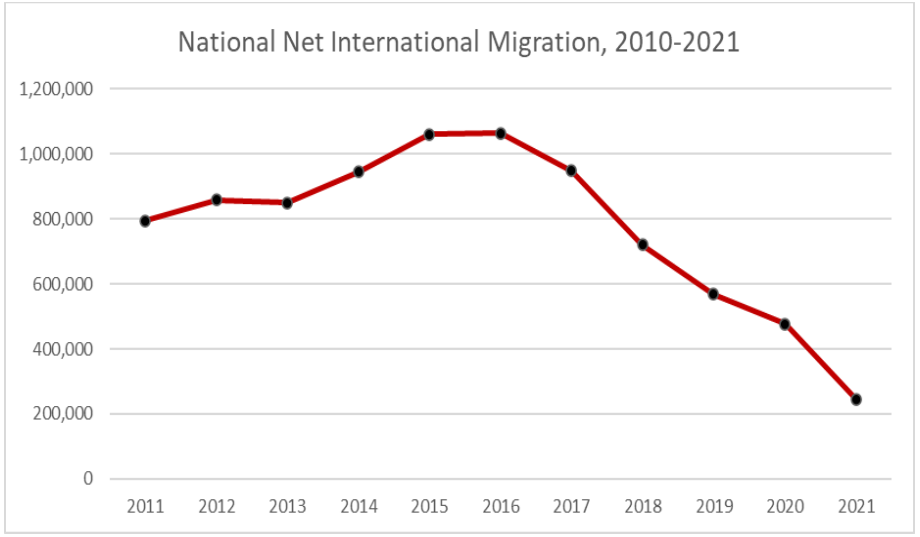
Trends in the U.S. Population



- Population in the U.S. has been steadily growing (at various rates) since the nation's founding
- Population growth rate reached a historic low from 2020-2021 at 0.1%
  - Growth had slowed in recent years but was exacerbated by the COVID-19 Pandemic
- Second lowest growth year was 1918-1919 (0.5%), during World War I and the Influenza Pandemic (Rogers, 2021)

Trends in U.S. Components of Change, 2010-2021

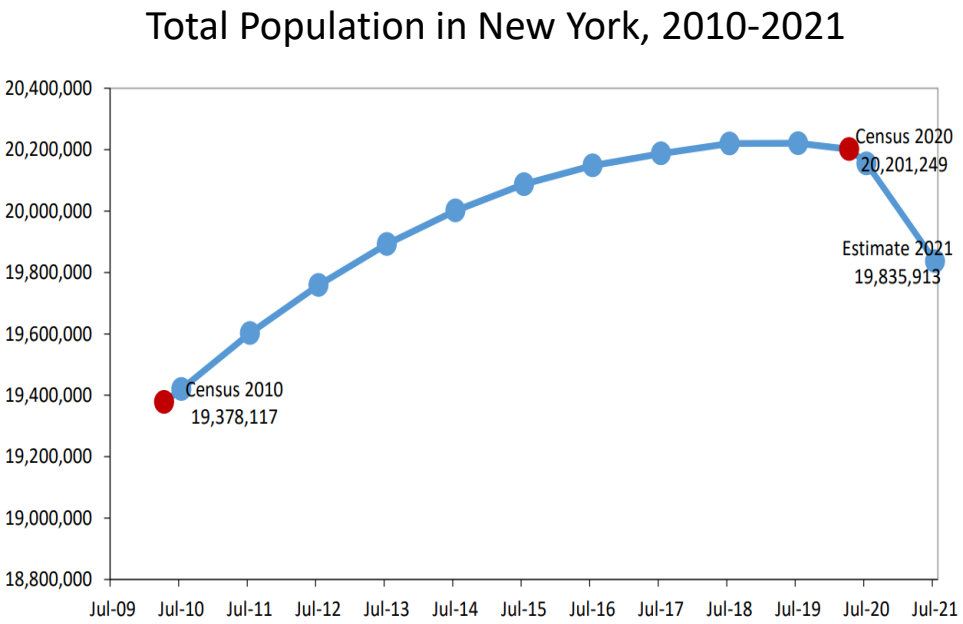




Note: X-axis displays the ending year for the interval of calculation, e.g. 2011 represents the natural increase from 2010 to 2011

- Natural increase in the U.S. has been falling since 2014
  - Though more people were born than died in the U.S, natural increase declined steeply (-529,098) between the 2019/2020 and 2020/2021 period
- Net international migration also fell steeply from the 2019/2020 to 2020/2021 period, but also remained positive

Trends in the New York Population



- The 2020 Census count for New York State was slightly higher than the July 2020 estimate
- New York state population declined for the first time this decade (by 319,020 people) from July 2020 to July 2021
- The population reached an 8-year low in 2021 (just under the 2013 count of 19,892,626)

Trends in the New York Population Estimates (cont.)

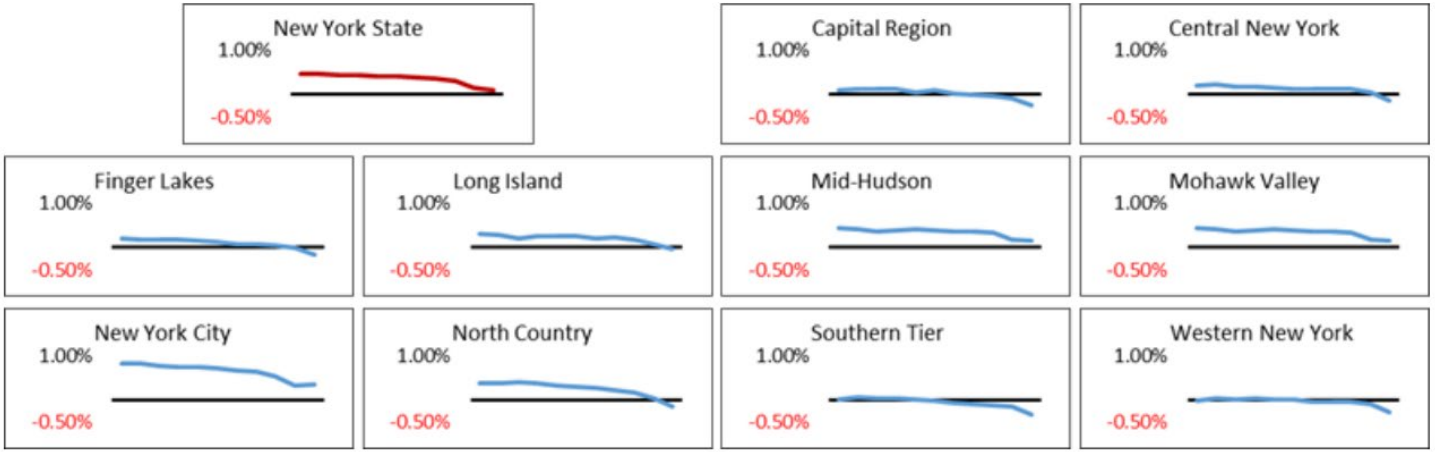
Population and Components of Change for New York State, 2010-2021

Year	July 1 Population	Population Change		Natural Increase			Migration		
		Number	Percentage	Births	Deaths	Natural Increase	Domestic	Inter-national	Net-Migration
2010	19,420,428								
2011	19,602,284	181,856	0.9%	243,117	149,781	93,336	-80,685	87,332	6,647
2012	19,758,608	156,324	0.8%	239,907	146,887	93,020	-108,325	90,304	-18,021
2013	19,892,626	134,018	0.7%	239,882	152,565	87,317	-112,510	78,010	-34,500
2014	20,001,450	108,824	0.5%	237,033	148,863	88,170	-145,557	84,452	-61,105
2015	20,087,231	85,781	0.4%	239,348	153,901	85,447	-166,054	84,301	-81,753
2016	20,148,194	60,963	0.3%	235,792	151,604	84,188	-194,135	88,805	-105,330
2017	20,187,536	39,342	0.2%	231,207	155,117	76,090	-188,058	69,336	-118,722
2018	20,219,669	32,133	0.2%	229,316	156,755	72,561	-180,043	57,774	-122,269
2019	20,220,596	927	0.0%	223,378	162,158	61,220	-183,857	41,869	-141,988
2020	20,154,933	-65,663	-0.3%	219,021	179,649	39,373	-206,992	26,939	-180,053
2021	19,835,913	-319,020	-1.6%	210,640	192,137	18,503	-352,185	18,307	-333,878

- Population decline in New York began from 2019/2020, and steepened 2020/2021
- Significant drop in natural increase from 2020/2021 (53%)
- Net migration continued to decline at increasing scale
  - Driven by people moving domestically out of the state

Trends in the New York Population Estimates (cont.)

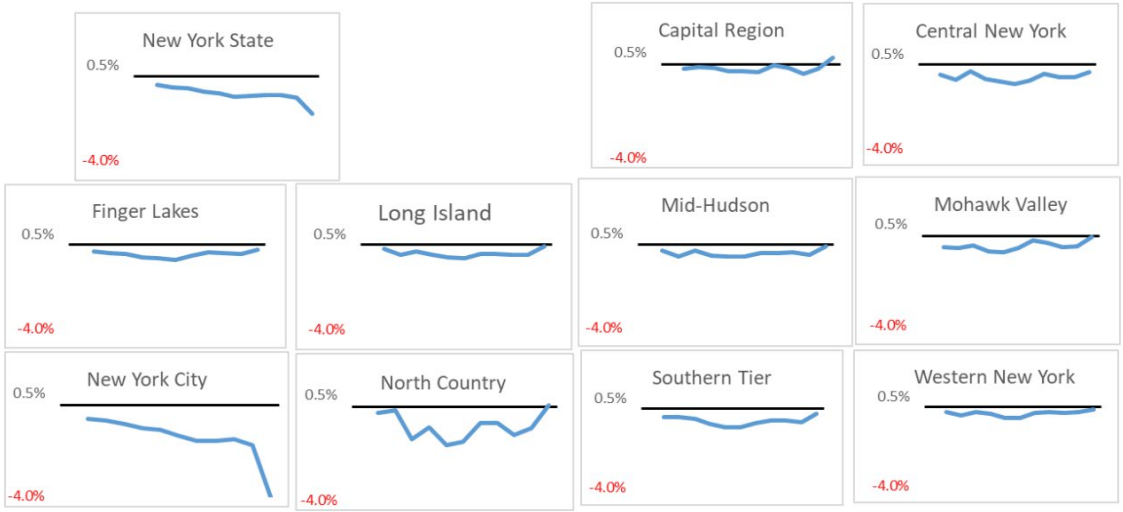
Annual Rate of Change Due to Natural Increase by Economic Region, 2011-2021



- Natural Increase remained positive for New York State overall in 2021
  - Natural decrease (more deaths than births) for 7 of 10 economic regions
- New York City region held largest rate due to natural increase
  - Southern Tier and Western New York had the largest declines due to natural decrease

Trends in the New York Population Estimates (cont.)

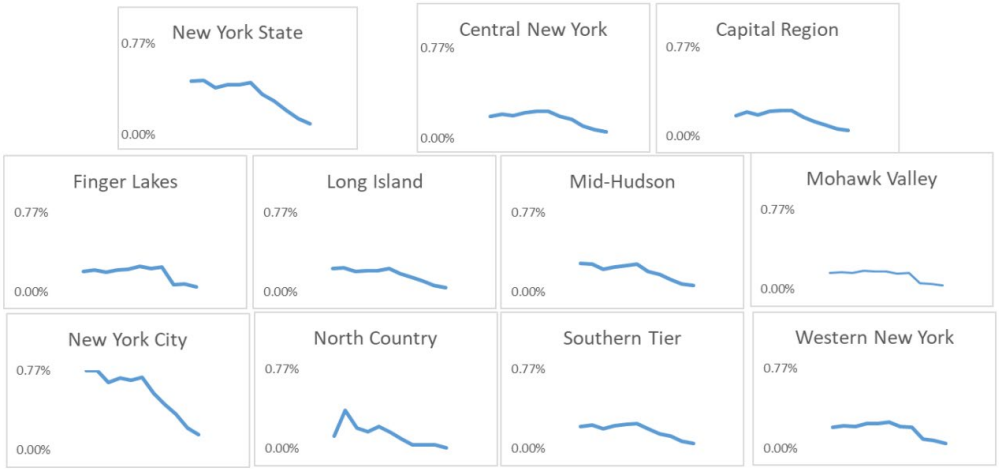
Annual Rate of Change Due to Net Domestic Migration, 2011-2021



- State trends often driven by New York City
  - Sharp decline in rate of change in the NYC region due to people moving out
- Most other regions had negative change due to domestic migration except for the Capital Region (Albany) and the North Country

Trends in the New York Population Estimates (cont.)

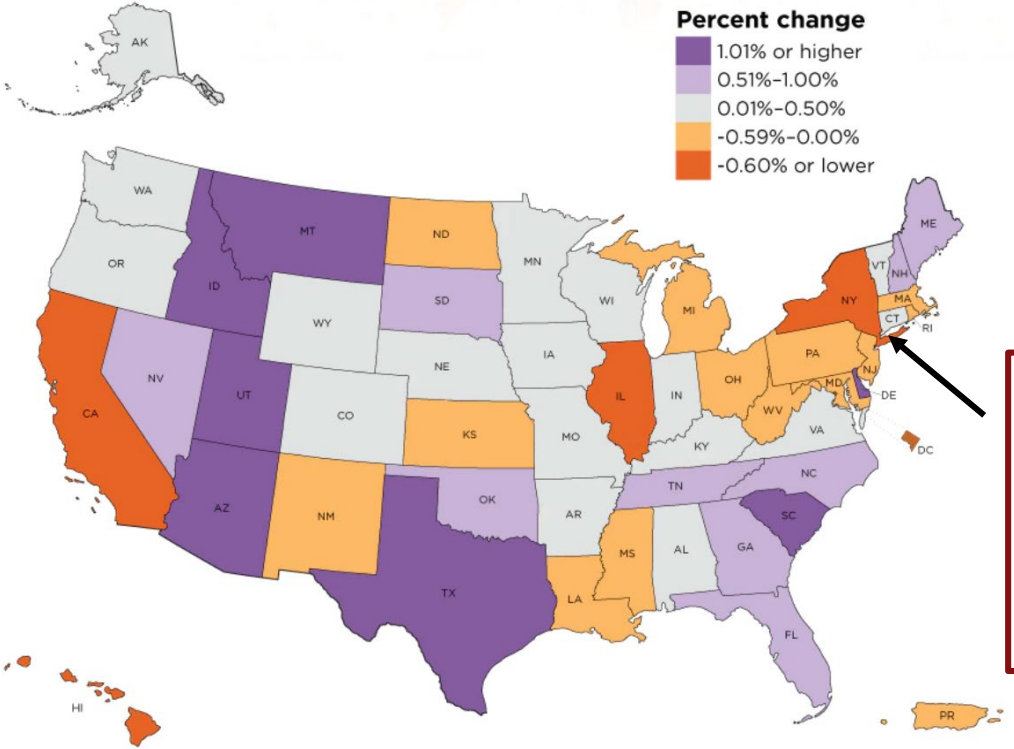
Annual Rate of Change Due to International Migration, 2011-2021



- Net international migration remained positive for the state and all economic regions
- Declines in rates of growth due to international migration for all regions
  - New York City continued to have the largest gains in population due to international migration
  - However, the rate of growth has fallen and began to converge in size to the other New York regions

Changes in the Vintage 2021 Estimates

New York and California had the two largest numeric declines from 2020-2021

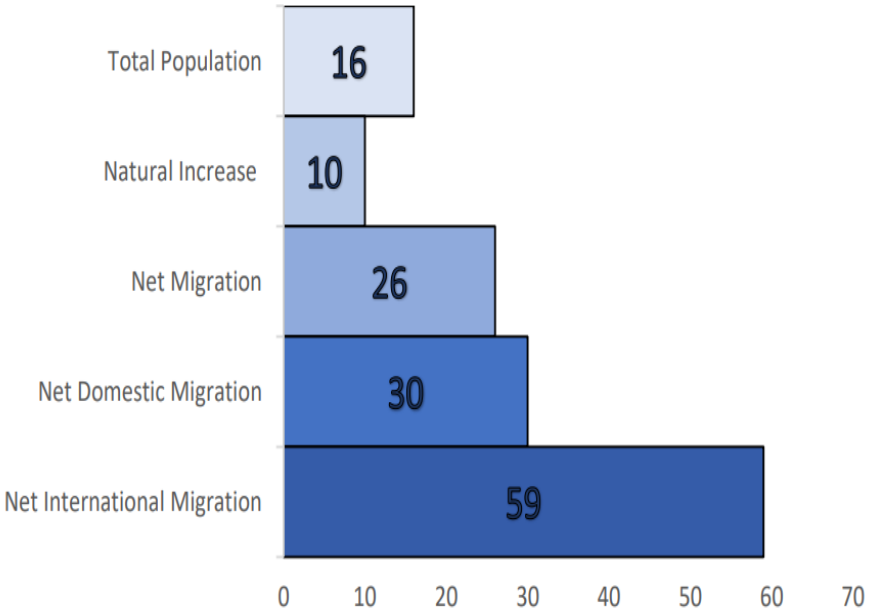


From 2020-2021, Idaho and Utah held the two largest relative increases, while Texas and Florida had the largest numeric growth

New York's population declined by 1.8% from 2020-2021, the second largest percent decline in the U.S. (After Washington D.C. -2.9%)

Findings in the 2021 Vintage for New York State

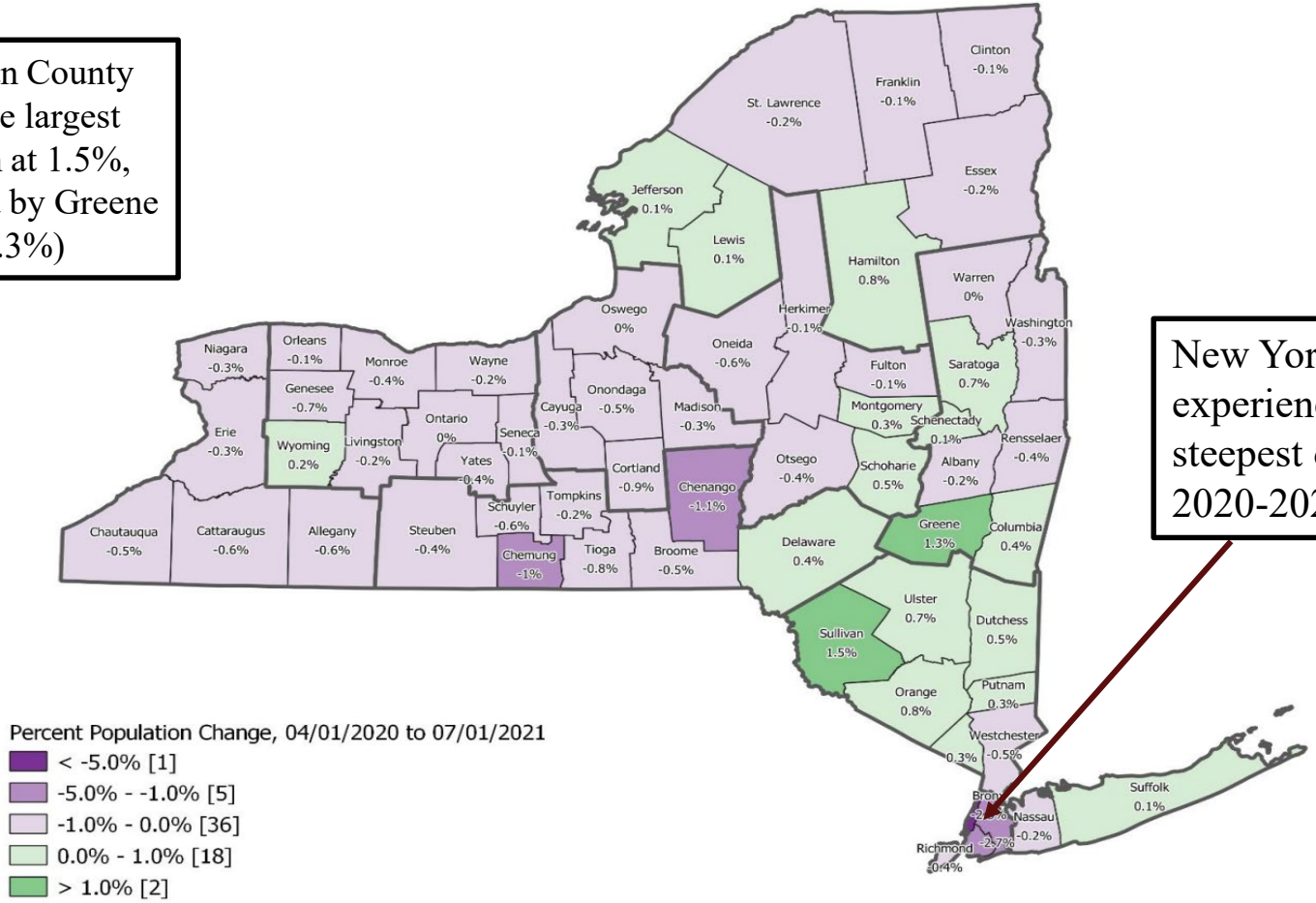
Number of Counties in New York with Positive Components of Change, April 2020- July 2021



- Only 10 of 62 Counties experienced positive natural increase (more births than deaths)
  - much smaller figure than the 2018-2019 period (28)
- Slightly less than half (30) of New York's counties showed positive net domestic migration (more people in than out)
  - Much larger than the 2018-2019 period (only 6 counties)
- All but three counties experienced positive net international migration (and those three were only slightly below 0)

Rate of Population Change, by County

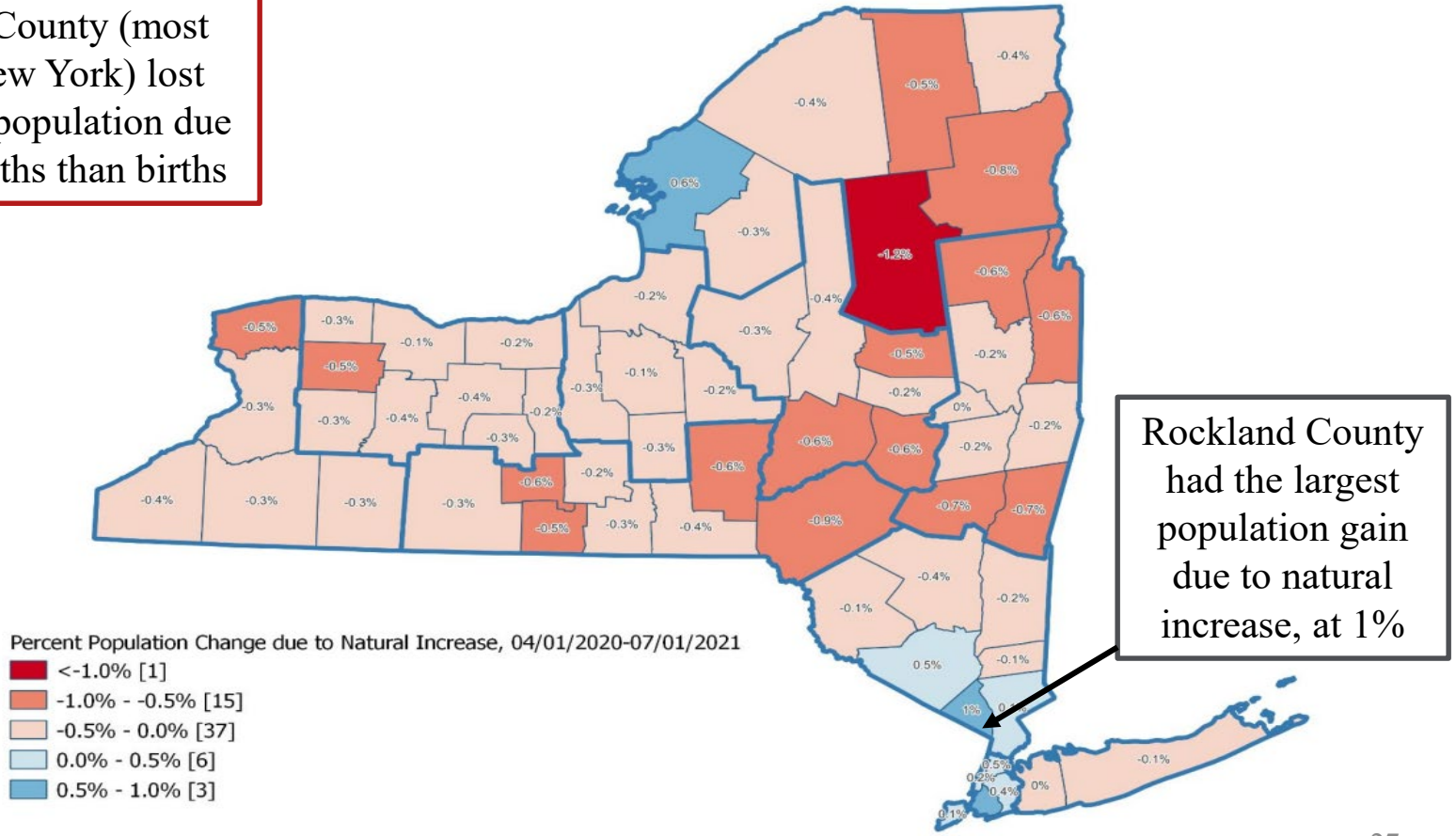
Sullivan County had the largest growth at 1.5%, followed by Greene (1.3%)



New York County experienced the steepest decline from 2020-2021, at -6.9%

Percent Population Change due to Natural Increase, by County

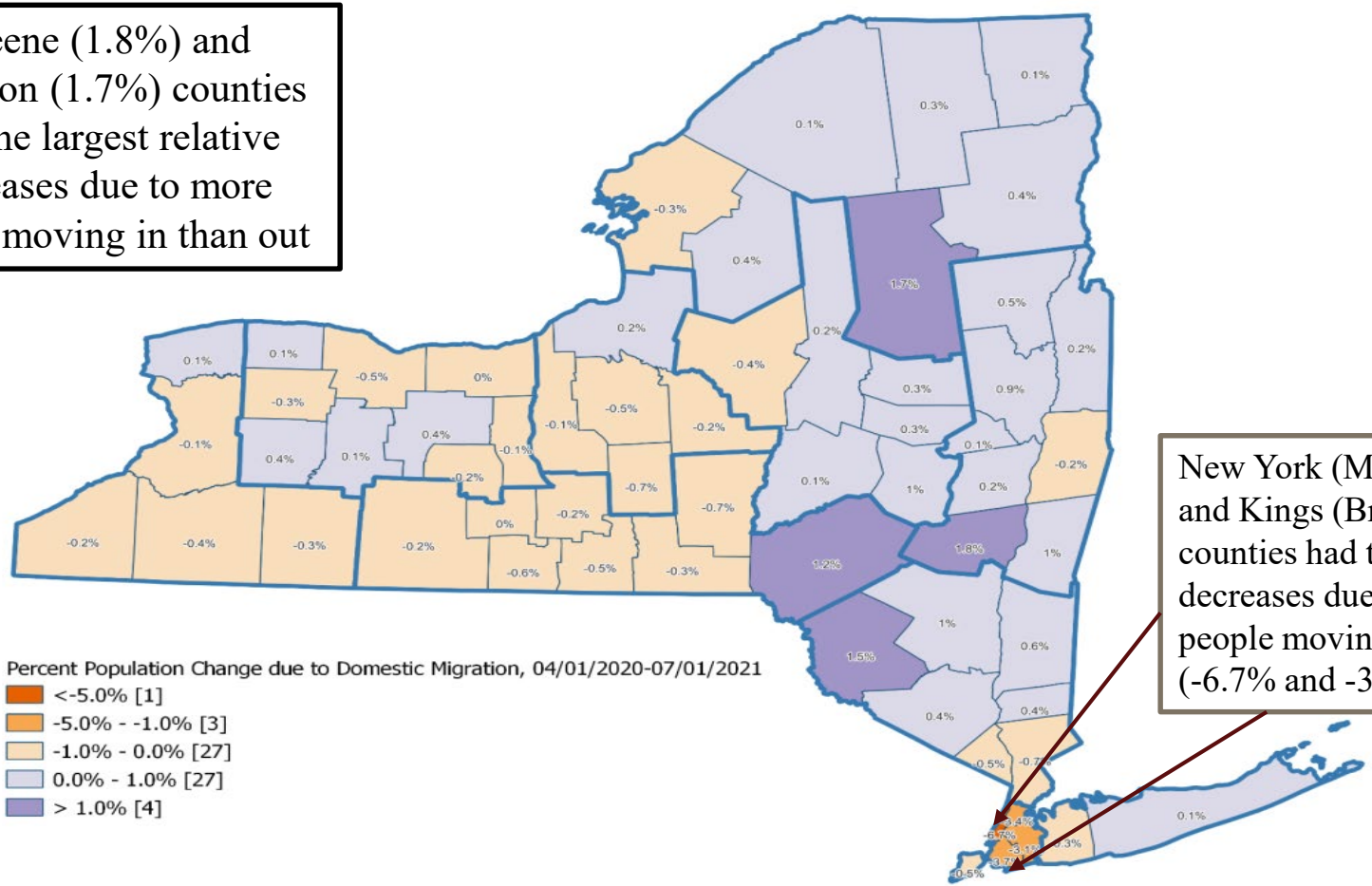
Hamilton County (most rural in New York) lost 1.2% of its population due to more deaths than births



Rockland County had the largest population gain due to natural increase, at 1%

Percent Population Change due to Domestic Migration, by County

Greene (1.8%) and Hamilton (1.7%) counties had the largest relative increases due to more people moving in than out



New York (Manhattan) and Kings (Brooklyn) counties had the largest decreases due to more people moving out than in (-6.7% and -3.7%)

Conclusions

- Vintage 2021 estimates differed from previous vintages in many key ways
  - Nationally:
    - the steady population increase since 2011 slowed
      - Smallest growth rate in over a century
    - Steep declines in both natural increase (rise in deaths, fall in births) and international migration, though both remained positive
  - New York State:
    - New York's population declined for the first time in over a decade
    - Considerable drop in natural increase, still led to population gain (positive natural increase)
    - Decline was due primarily to negative net domestic migration
    - State trends are largely driven by NYC
      - NYC area experienced negative population change due to more people leaving the area than coming in
      - Population growth due to more births than deaths

Next for the Population Estimates Program

Census Bureau PEP Release Schedule, Vintage 2022

Release Date	Product	Geography
December 20, 2022	Population Totals, Components of change, and Voting population	Nation, states, and Puerto Rico
March 16, 2023	Population Totals and Components of change	Counties and Puerto Rico municipios
April 13, 2023	Population by age and sex	Nation
May 18, 2023	Population totals	Cities and towns (incorporated places, MCD), metropolitan/micropolitan areas
May 18, 2023	Housing unit totals	Nation, states, and counties
June 22, 2023	Population by Age, sex, race, and Hispanic origin	Nation, states, and counties
June 22, 2023	Population by Age and Sex	Puerto Rico and its municipios

- Following concerns about the 2020 Census data, the Bureau formed the Base Evaluation Estimates Team (BERT)
  - Findings will inform what parts of the Census should be used in the blended base
  - Looking into pre-existing techniques, and adjustments based on coverage measures/other datasets
  - Vintage 2023 would be the first opportunity to implement any adjustments

More about the estimates:

- Vintage 2021 Results: New Vintage 2021 Population Estimates Available for the Nation, States and Puerto Rico (census.gov)
- Methodology Updates for Vintage 2021: https://www2.census.gov/about/training-workshops/2021/2021-12-10-vintage-estimates-presentation.pdf
- Population Estimates page: Population and Housing Unit Estimates (census.gov)
- Briefing on the BERT Program: Briefing on the Base Evaluation and Research Team (census.gov)

Thank You!

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References:

Rogers, Luke (2021). COVID-19, Declining Birth Rates and International Migration Resulted in Historically Small Population Gains. U.S. Census Bureau. Population Grew 0.1% in 2021, Slowest Rate Since America's Founding (census.gov)