Woods & Poole Economics, Inc.2010-2020 County Intercensal Estimates

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Methodology

Generating County Intercensal Estimates

We followed previously published Census methodologies for generating county intercensal estimates for 2000-2010[1] in order that these estimates might be more closely aligned with anticipated Census Bureau intercensal data for 2010-2020 that may be released in coming month.

The method we used in these county level 2010-2020 intercensal estimates, which should yield results similar to expected Census Bureau intercensal data for 2010-2020, involved distributing the error of closure geometrically across the decade using the equation (**1**).

$$\textbf{(1)}\quad p_t = p'_t \left(\frac{p_{3653}}{p'_{3653}}\right)^{\frac{t}{3653}}$$

Where:

t is the number of days since April 1, 2010
p_t is the intercensal population estimate at time t
p'_t is the postcensal population estimate at time t
p_{3653} is the April 1, 2020 census count
p'_{3653} is the April 1, 2020 postcensal estimate based on the 2010 Census

As was done in calculating the 2000-2010 intercensal data, we used a linear interpolation method (equation (**2**)) for specific characteristics (age, sex, and bridged race) when any of the following conditions were met:

- $p'_t = 0$ for any t in between April 1, 2010 and April 1, 2020
- $p'_{3653} = 0$ or $p'_{3653} = 1$
- $p_{3653} = 0$ or $p_{3653} = 1$
- $p'_{3653} < \frac{p_{3653}}{2}$

$$\textbf{(2)}\quad p_t = \left(p_{3653} \times \frac{t}{3653}\right) + \left(p_0 \times \left(\frac{(3653-t)}{3653}\right)\right)$$

Where:

t is the number of days since April 1, 2010
p_t is the intercensal population estimate at time t
p_{3653} is the April 1, 2020 census count
p_0 is the April 1, 2010 census count

Also in keeping with previously published Census methodology for the 2000-2010 intercensal data, we generated our estimates sequentially at different geographic levels:

1. Annual national estimates by characteristic were produced

[1] https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/intercensal/2000-2010-intercensal-estimates-methodology.pdf

2. Annual county totals were produced and controlled to the sum of the national characteristics
3. Annual state characteristics were produced and controlled to both the sum of the county totals (the state total) and the national characteristics
4. Annual county characteristics were produced and controlled to the county totals and the state characteristics

We used a proportional method, among other methods, to distribute the rounding error in the estimates, resulting in controlled whole-number estimates.

April 1, 2020 County Estimates Base

We used Vintage 2022 county bridged-race single-year-of-age estimates base from Census Bureau estimates as our April 1, 2020 census counts for calculating the error of closure, and hence the county intercensal population estimates.

An adjustment was made to Vintage 2022 Census bridged-race single-year-of-age data for Connecticut to distribute population estimates for the nine Connecticut planning regions (which sum to the Connecticut state total) to the eight Connecticut counties (which also sum to the Connecticut state total) used in Vintage 2020 postcensal estimates. To estimate Vintage 2022 Connecticut county data for April 1, 2020 we calculated the proportion of the state total of each bridged-race, gender, single-year-of-age characteristic in each county from Vintage 2021 for April 1, 2020 and applied those proportions to the Vintage 2022 Connecticut state total for April 1, 2020 as in equation (**3**). These estimates for each characteristic for the eight counties were controlled to the state total for April 1, 2020.

$$\textbf{(3)}\ p'_{county\ v2022} = \frac{p'_{county\ v2021}}{p'_{state\ total\ v2021}} \times p'_{state\ total\ v2022}$$

Where:

- $p'_{county\ v2022}$ is the Vintage 2022 characteristic estimate for a particular county
- $p'_{county\ v2021}$ is the corresponding Vintage 2021 county characteristic estimate
- $p'_{state\ total\ v2021}$ is the state total across all characteristics and counties for Vintage 2021
- $p'_{state\ total\ v2022}$ is the state total across all characteristics and counties for Vintage 2022

In addition, to provide time series consistency, we created Census Vintage 2022 Connecticut county postcensal population estimates by characteristic for Connecticut for July 1, 2020, July 1, 2021, and July 1, 2022. The method for estimating Vintage 2022 county data using Vintage 2021 county proportions and Vintage 2022 state total data for April 1, 2020 was replicated exactly for July 1, 2020 and July 1, 2021. We used a simple demographic cohort model using Vintage 2021, 2020, and 2021 county data to create characteristic proportions for 2022 and applied those proportions to Vintage 2022 July 1, 2022 Connecticut state totals.

April 1, 2010 County Estimates Base

For the county April 1, 2010 estimates base we used the Vintage 2020 postcensal bridged-race single-year-of-age data from the National Center for Health Statistics (NCHS).

April 1, 2020 Vintage 2020 Postcensal County Population

Vintage 2020 postcensal county bridged-race single-year-of-age estimates for April 1, 2020 were not available from NCHS or Census Bureau and were estimated by Woods & Poole. Census Bureau postcensal Vintage 2020 county estimates for April 1, 2020 by gender and 5-year age cohort[2] were used as the control total for our April 1, 2020 county estimates by bridged race, gender, and single year of age. We based our bridged-race postcensal estimates for July 1, 2019 and July 1, 2020 from NCHS, controlled to the Census totals.

For each characteristic, we generated preliminary April 1, 2020 postcensal estimates following equation (**4**). We then controlled the estimated characteristic data to county Vintage 2020 5-year age cohort by gender population for April 1, 2020 from the Census Bureau.

$$(\mathbf{4})\ p'_{1Apr20} = \frac{1}{4}p'_{1Jul19} + \frac{3}{4}p'_{1Jul20}$$

Where:

- p'_{1Apr20} is the postcensal population estimate for 4/1/20
- p'_{1Jul19} is the postcensal population estimate for 7/1/19
- p'_{1Jul20} is the postcensal population estimate for 7/1/20

[2] https://www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates/2020-evaluation-estimates/2010s-county-detail.html

File Layout

Location	Field size	Item and Code Outline	Format
1-8	8	Vintage Estimate vintage	Numeric
9-10	2	FIPS State code	Numeric
11-13	3	FIPS county code	Numeric
14-15	2	Age (0, 1, 2, ..., 85 years and over)	Numeric
16	1	Sex 1=male 2=female	Numeric
17	1	Race 1=White 2=Black or African American 3=American Indian or Alaska Native 4=Asian or Pacific Islander	Numeric
18	1	Hispanic origin 1=not Hispanic or Latino 2=Hispanic or Latino	Numeric
19-26	8	Population estimate for July 1, 2010	Numeric
27-34	8	Population estimate for July 1, 2011	Numeric
35-42	8	Population estimate for July 1, 2012	Numeric
43-50	8	Population estimate for July 1, 2013	Numeric
51-58	8	Population estimate for July 1, 2014	Numeric
59-66	8	Population estimate for July 1, 2015	Numeric
67-74	8	Population estimate for July 1, 2016	Numeric
75-82	8	Population estimate for July 1, 2017	Numeric
83-90	8	Population estimate for July 1, 2018	Numeric
91-98	8	Population estimate for July 1, 2019	Numeric