Does Spatial Aggregation Affect Racial/Ethnic Inequities in Access to Neighborhood Opportunity?

Robert Ressler, Clemens Noelke and Dolores Acevedo-Garcia

Email: cnoelke@brandeis.edu | Twitter: @diversitydataki

May 18, 2021

diversitydatakids.org
data for a diverse and equitable future

Brandeis | THE HELLER SCHOOL
FOR SOCIAL POLICY
AND MANAGEMENT
Institute for
Child, Youth and
Family Policy

Motivation

Census tracts are widely used to measure residential contexts (neighborhood environments), but are usually unavailable in many person-level datasets
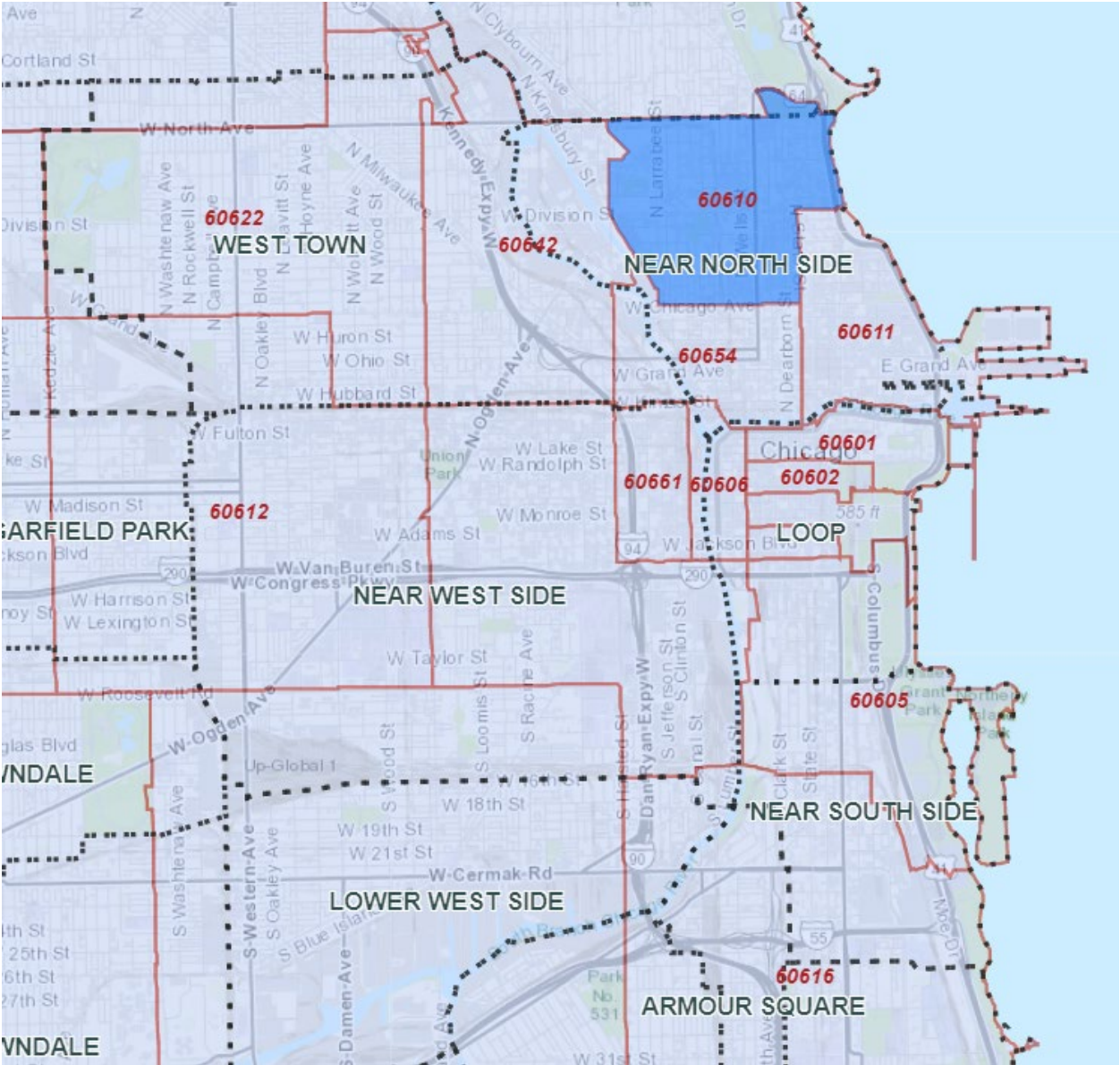
Data on **ZIP codes** is more readily available and easier to work with, but can be imprecise

Can residential contexts be reliably measured at the ZIP code level?

Do reliability issues affect children of different racial/ethnic groups in different ways?

See also previous work by Krieger et al. 2002, 2003

ZIP Code 60610

ZIP Code 60610 and component census tracts

Child Opportunity Index 2.0 Levels

Source: diversitydatakids.org, ESRI

Data

Census tract outcome data, standardized

Life expectancy, 2010-15 (CDC)

Child Opportunity Index 2.0 overall z-scores, 2015 (diversitydatakids.org)

Intergenerational mobility, 2010 (Opportunity Atlas)

Poverty rate, 2013-17 (ACS 5-year Summary Files)

Census tract population data on children aged 0-17 by race/ethnicity from ACS 5-Year Summary Files (2013-17)

ZIP code to census tract crosswalk files (HUD, Din and Wilson 2018)

Used to aggregate census tract data to ZIP code level

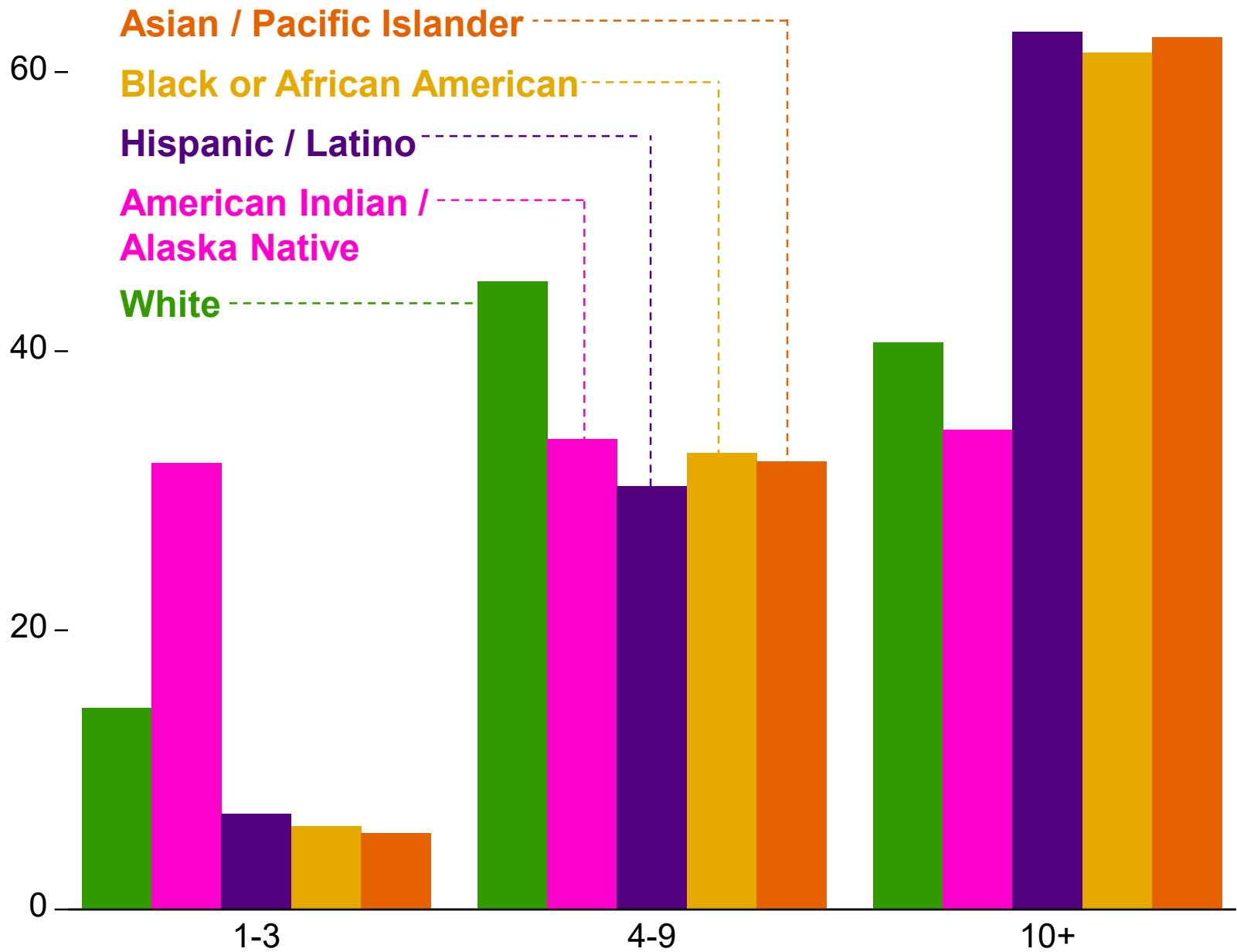65,275 census tracts with non-missing outcome data linked to 35,634 ZIP codes

Percentage of children in different size ZIP codes

ZIP CODES

Size = number of census tracts (partial and full)

1-3: 20,130 ZIP codes

4-9: 9,348 ZIP codes

10+: 4,156 ZIP codes

Chart legend:
- Asian / Pacific Islander
- Black or African American
- Hispanic / Latino
- American Indian / Alaska Native
- White

Gaps between group and overall ZIP code outcomes

For each outcome, ZIP code and racial/ethnic group

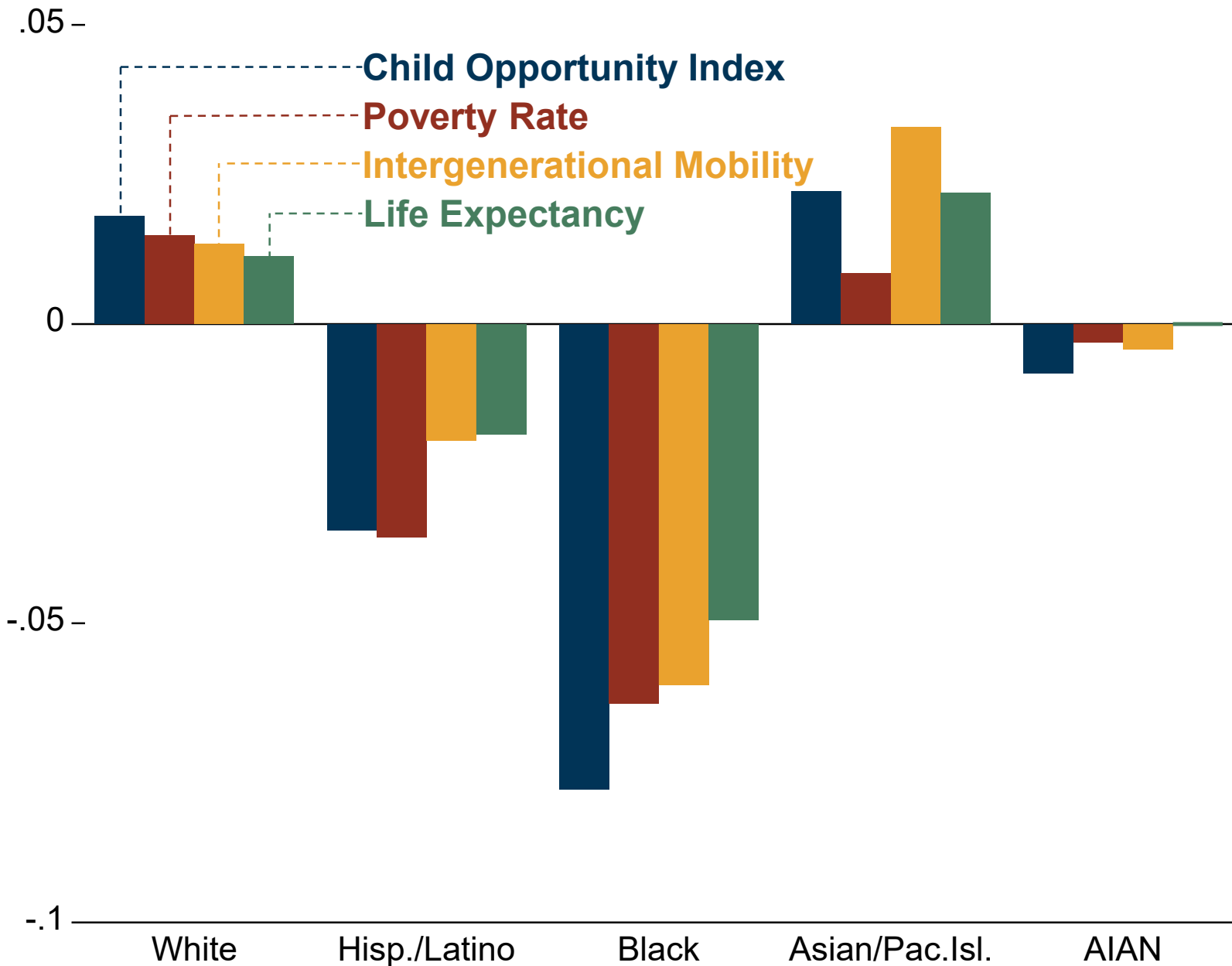Sum(proportion of ZIP code population in tract x tract outcome) across tracts for each ZIP code

= ZIP code level average neighborhood outcome for a child of a given race/ethnicity

Gap (ZIP code level) = average outcome for children of a given racial/ethnic group minus average outcome for all children

ZIP CODES

Median gap between racial/ethnic group outcome and ZIP code average outcome

35,631 ZIP Codes

Child Opportunity Index
Poverty Rate
Intergenerational Mobility
Life Expectancy

.05
0
-.05
-.1

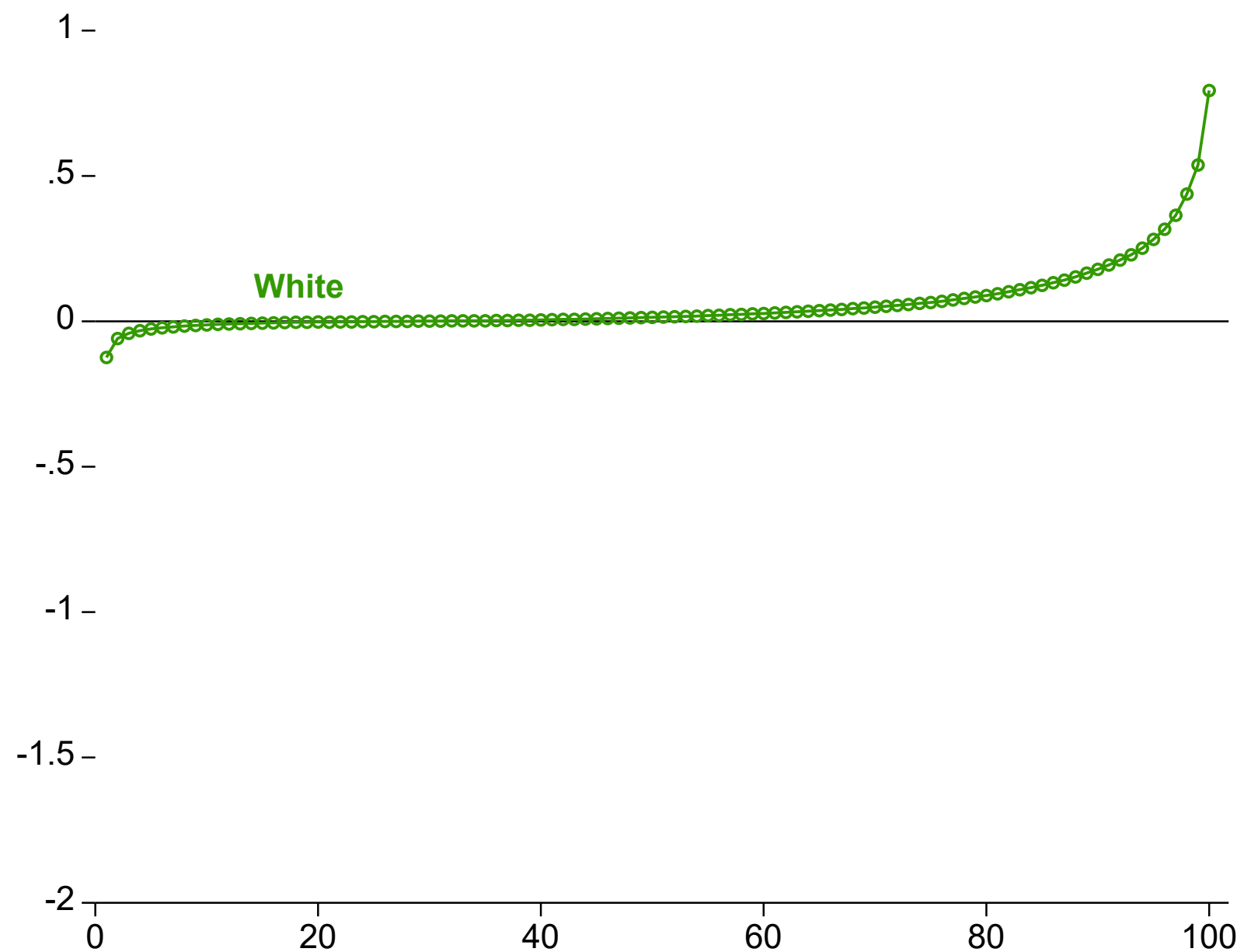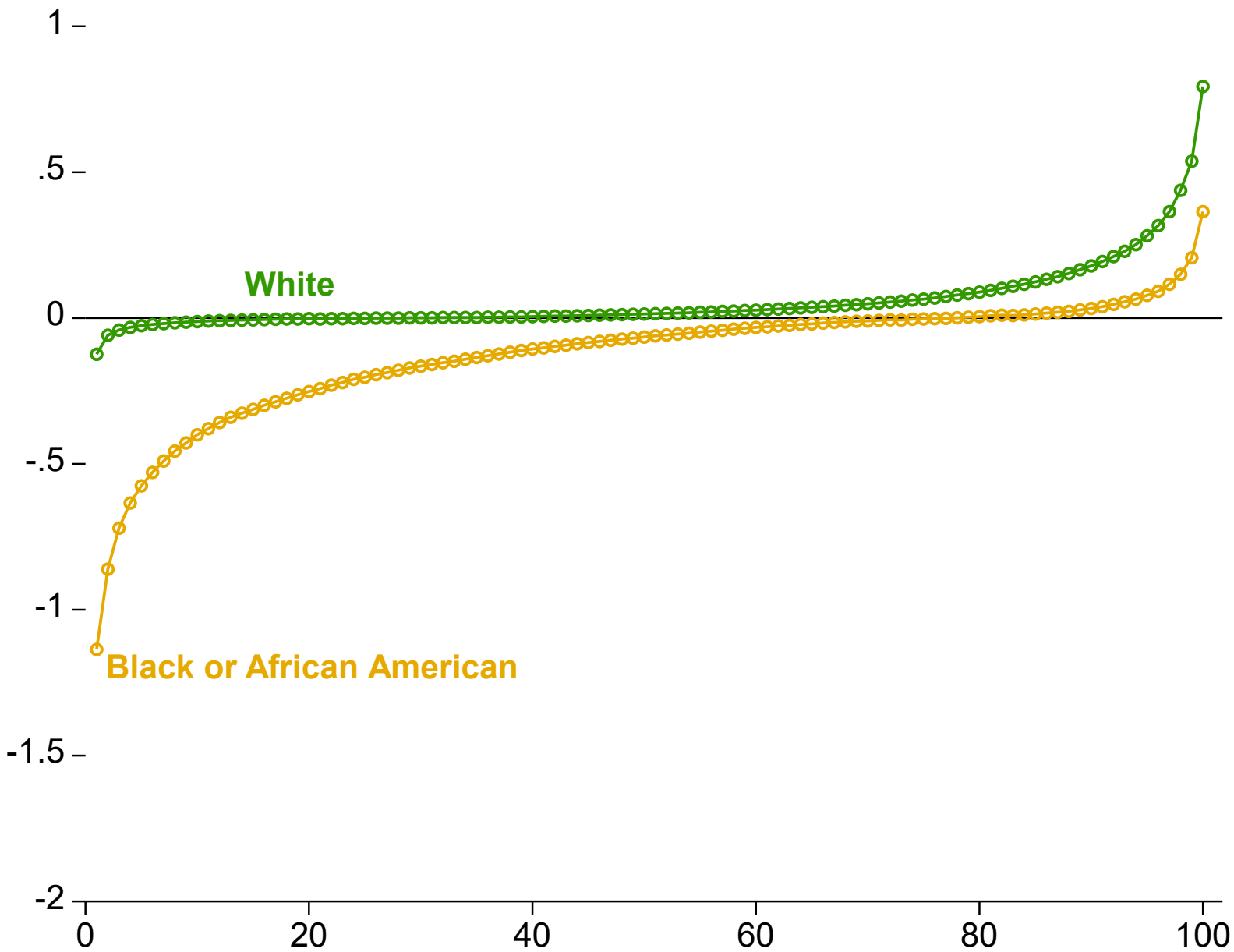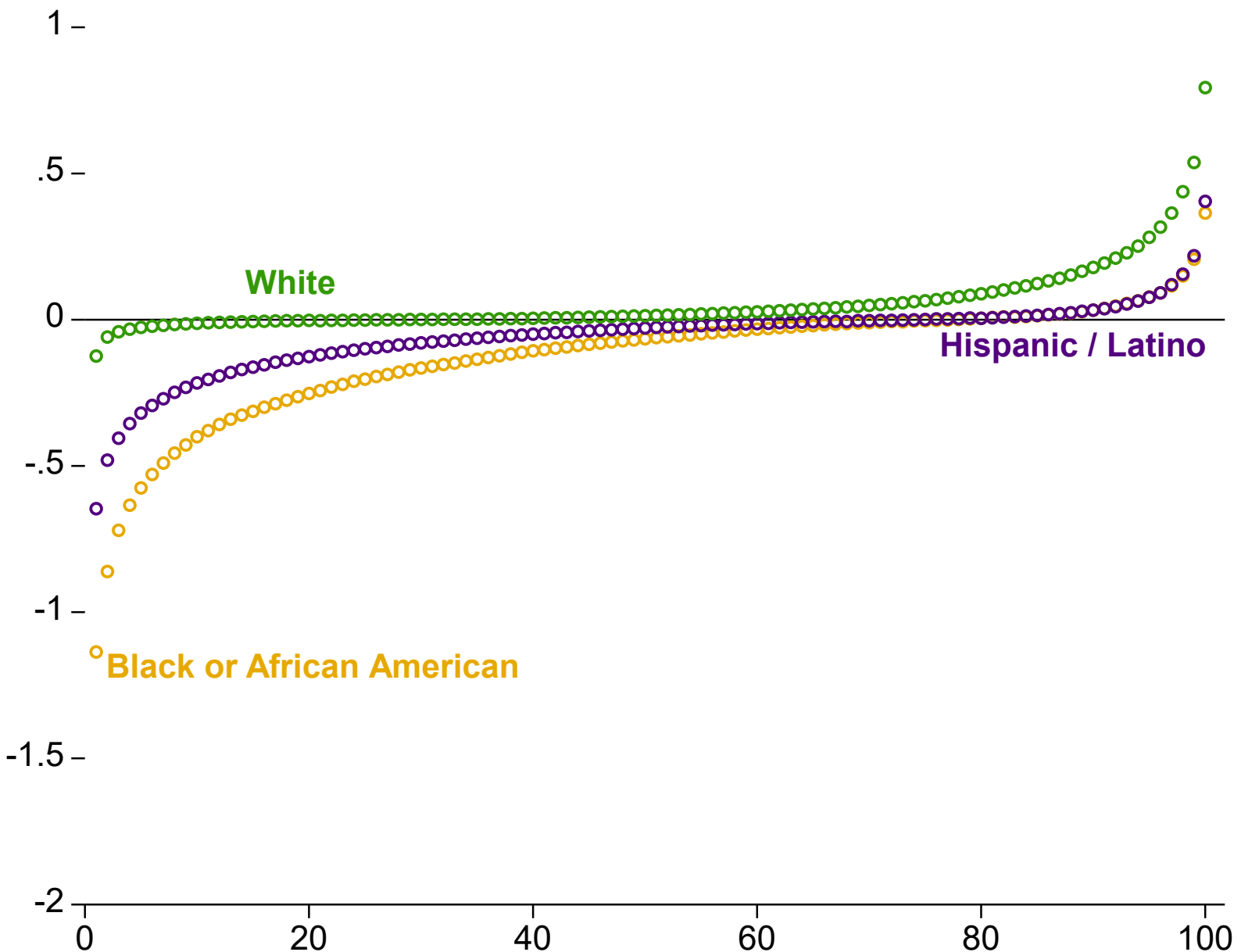White   Hisp./Latino   Black   Asian/Pac.Isl.   AIAN

Sources: ACS 2017 5-year SF, HUD USPS ZIP code crosswalk files 2015q1, CDC (life expectancy), diversitydatakids.org (Child Opportunity Index), Opportunity Atlas

Gap between White children's outcomes and ZIP code average outcomes, by percentile

35,631 ZIP Codes

diversitydata**kids**.org
data for a diverse and equitable future

9

Gap between racial/ethnic group outcomes and ZIP code average outcomes, by percentile

35,631 ZIP Codes

Gap between racial/ethnic group outcomes and ZIP code average outcomes, by percentile

35,631 ZIP Codes

diversitydatakids.org
data for a diverse and equitable future

ZIP CODES

Gap between racial/ethnic group outcomes and ZIP code average outcomes, by percentile
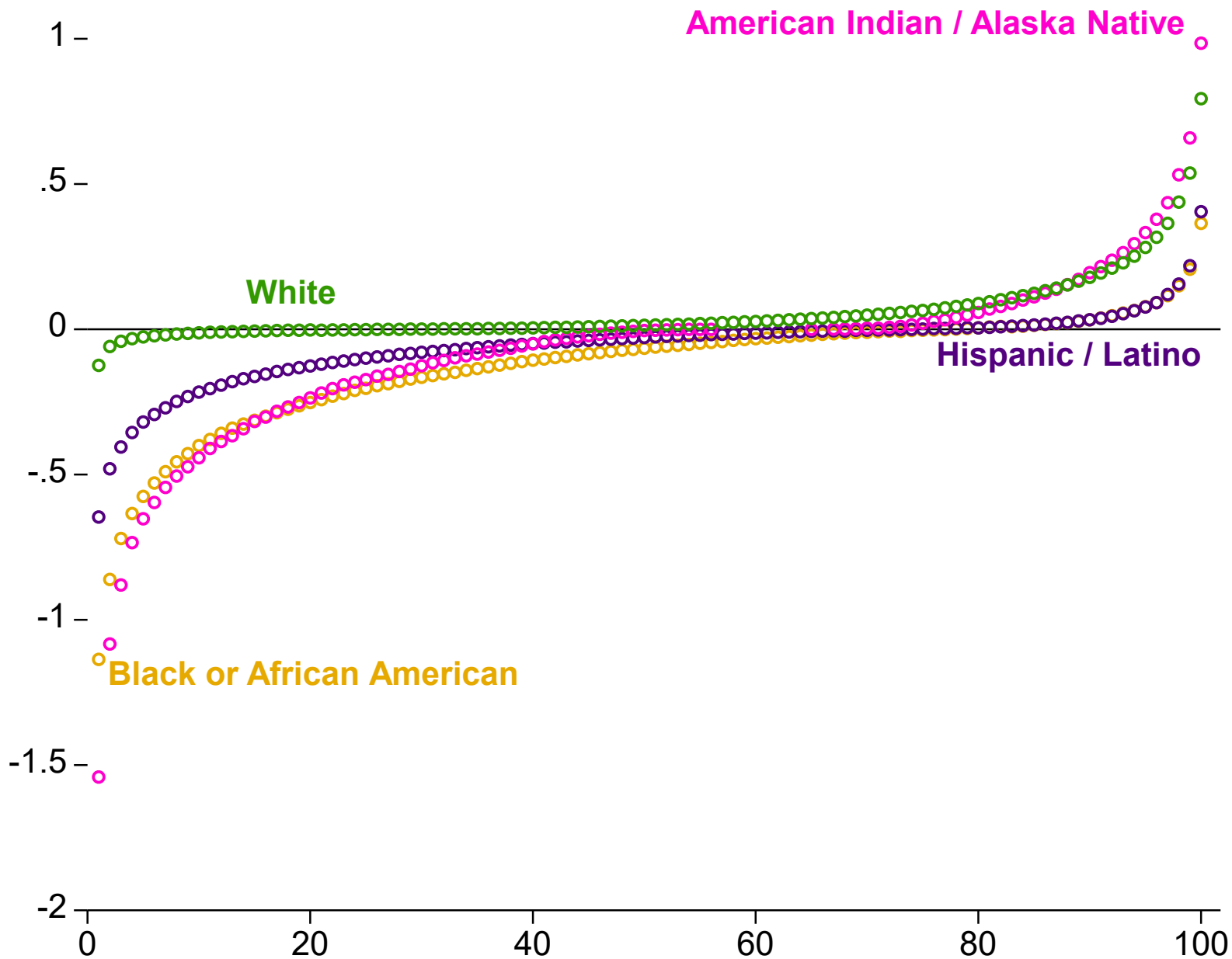
35,631 ZIP Codes

Sources: ACS 2017 5-year SF, HUD USPS ZIP code crosswalk files 2015q1, CDC (life expectancy), diversitydatakids.org (Child Opportunity Index), Opportunity Atlas

American Indian / Alaska Native

White

Hispanic / Latino

Black or African American

ZIP CODES

Gap between racial/ethnic group outcomes and ZIP code average outcomes, by percentile
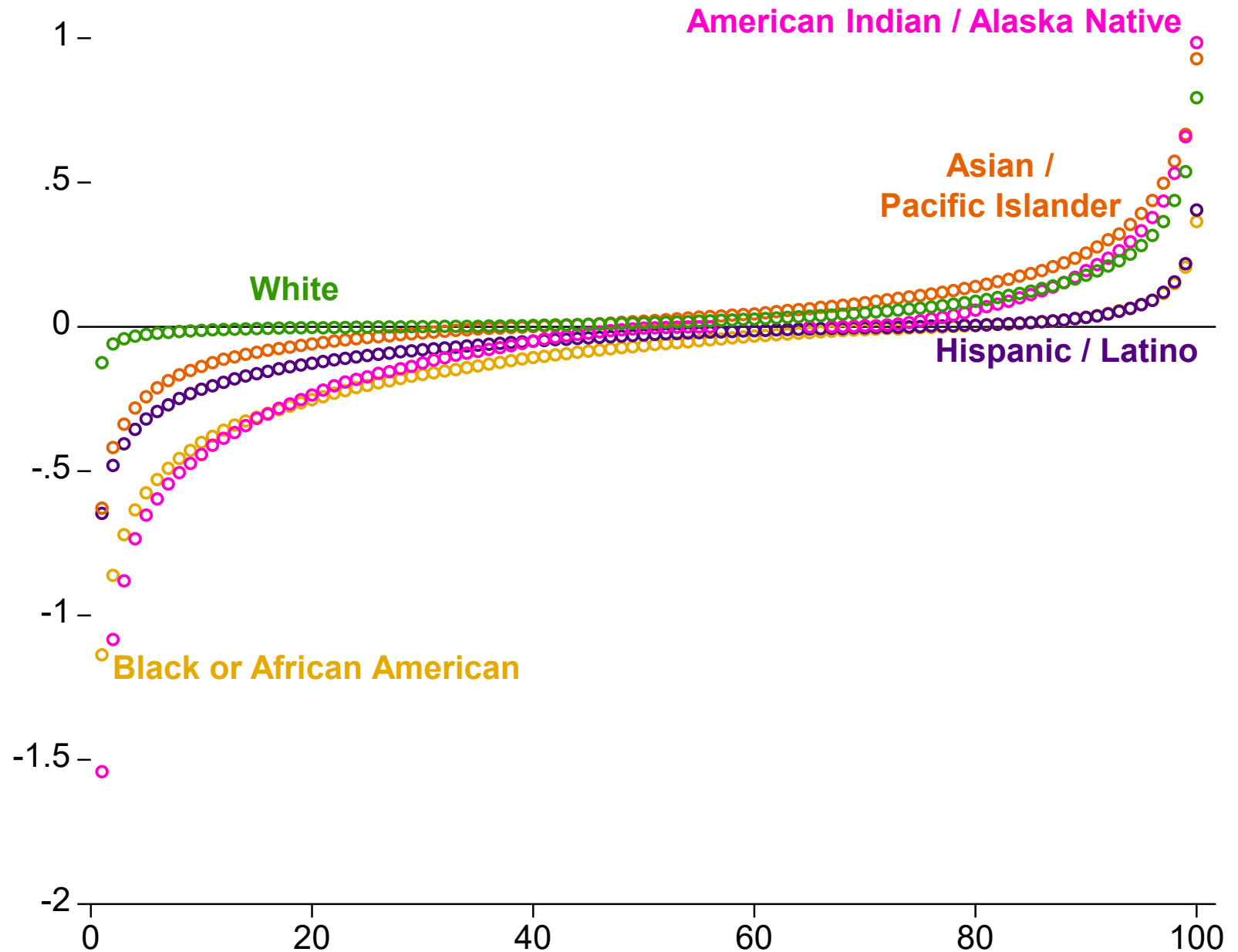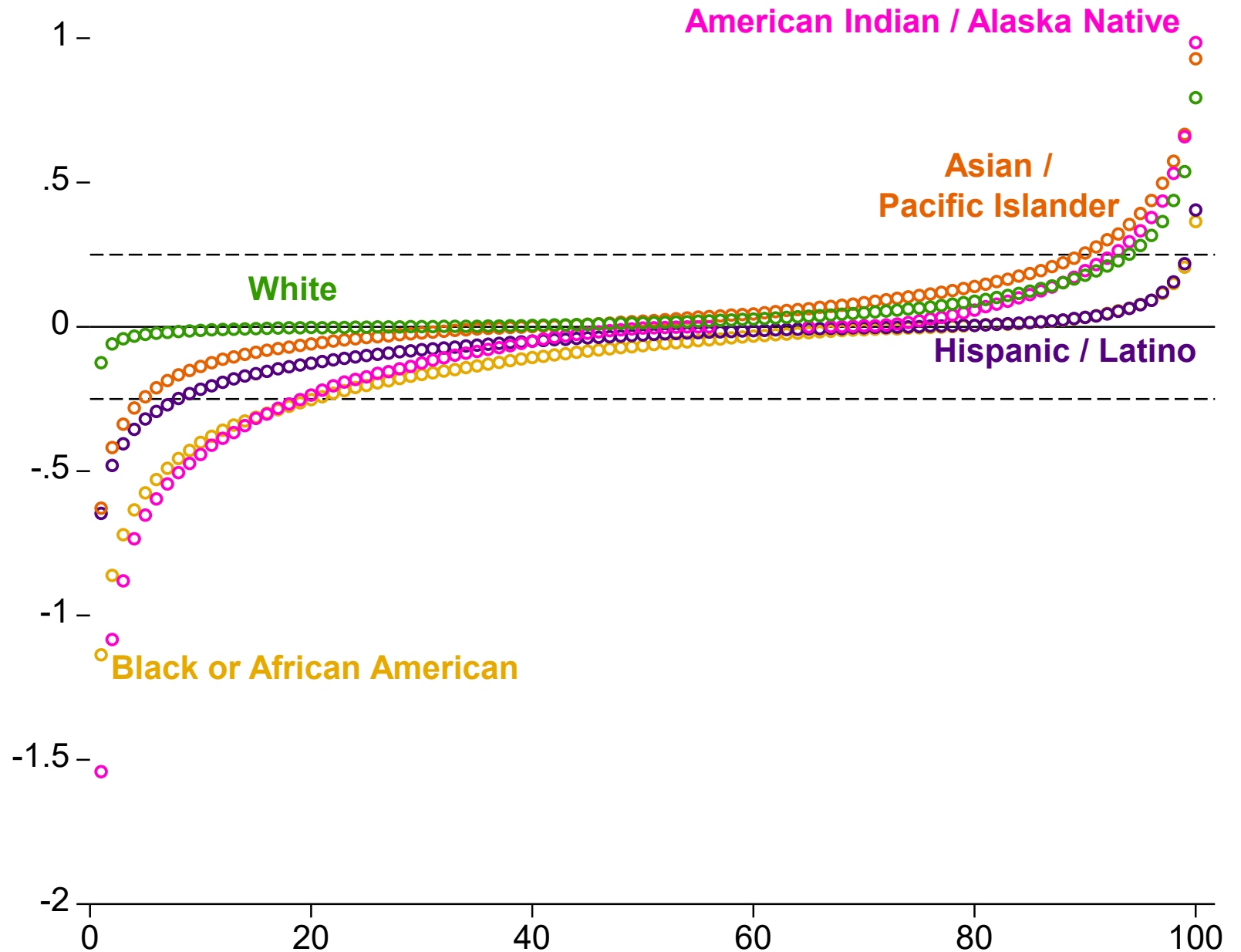
35,631 ZIP Codes

Sources: ACS 2017 5-year SF, HUD USPS ZIP code crosswalk files 2015q1, CDC (life expectancy), diversitydatakids.org (Child Opportunity Index), Opportunity Atlas

ZIP CODES

Gap between racial/ethnic group outcomes and ZIP code average outcomes, by percentile

35,631 ZIP Codes

American Indian / Alaska Native

Asian / Pacific Islander

White

Hispanic / Latino

Black or African American

Implications

ZIP estimates of neighborhood opportunity have good quality for a large majority of White children, but are compromised for non-White children, especially Black and Native American children

Can they still be used to study broader, regional patterns in access to neighborhood opportunity?

Metro-level racial/ethnic gaps

Using census tract data we

Calculated average neighborhood outcomes for each racial/ethnic group across all neighborhoods for each metro area in the 100 largest metro areas

Gap (metro-level) = average outcome for White children minus average for a given racial/ethnic group

Repeat using ZIP code data

Tract-ZIP gap (metro-level) = Gap using census tract data minus gap using ZIP code data

If racial/ethnic gaps are larger using census tract data, the Tract-ZIP gap should be positive on average
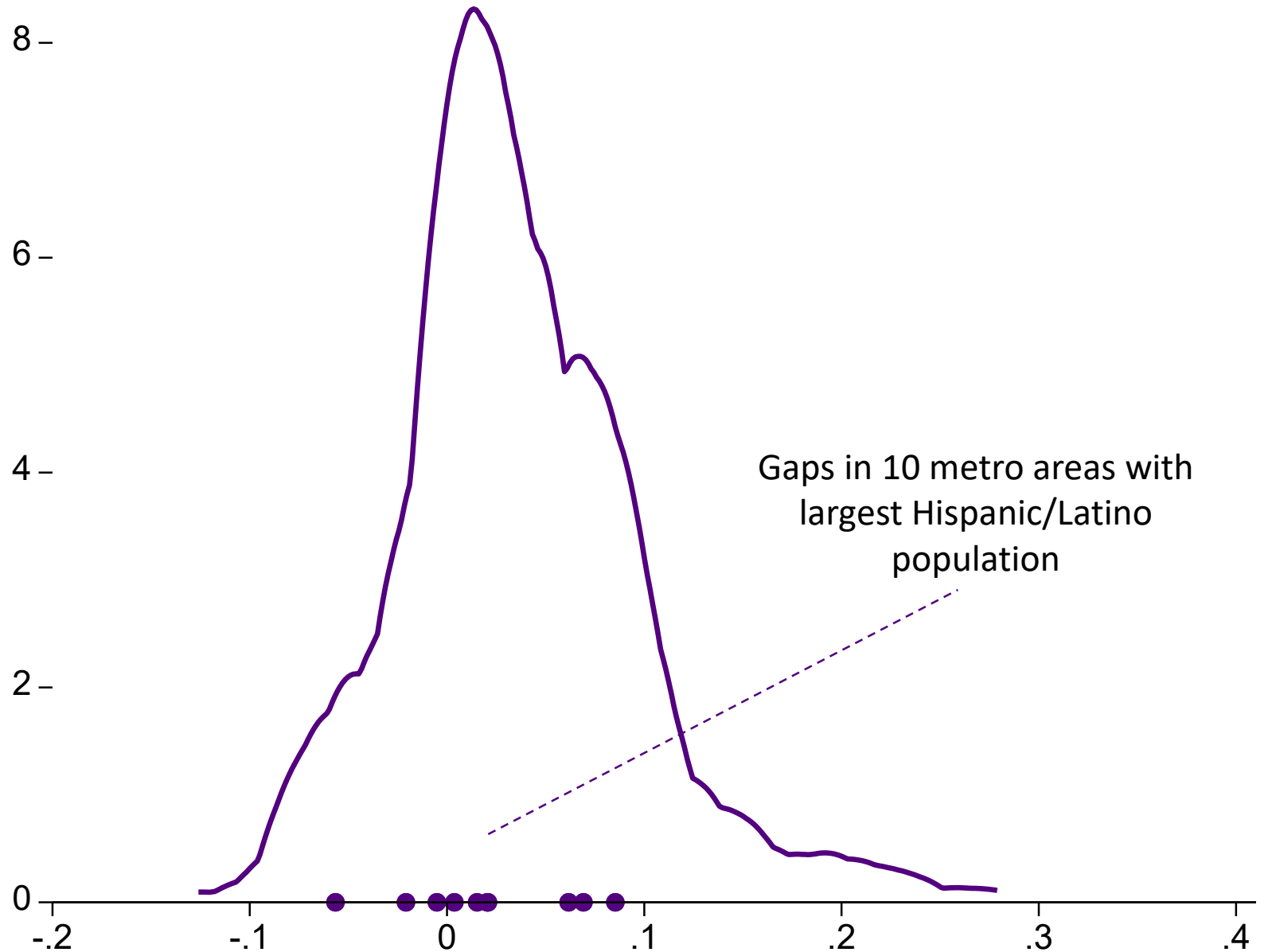
Tract-ZIP gaps (Hispanic-White)

Metro-level Hispanic-White gap using census tracts minus Hispanic-White gap using ZIP code level data for 100 largest metros

Graph displays estimated count of metro areas at a given tract-ZIP gap

The median tract-ZIP gap is .03 standard deviations

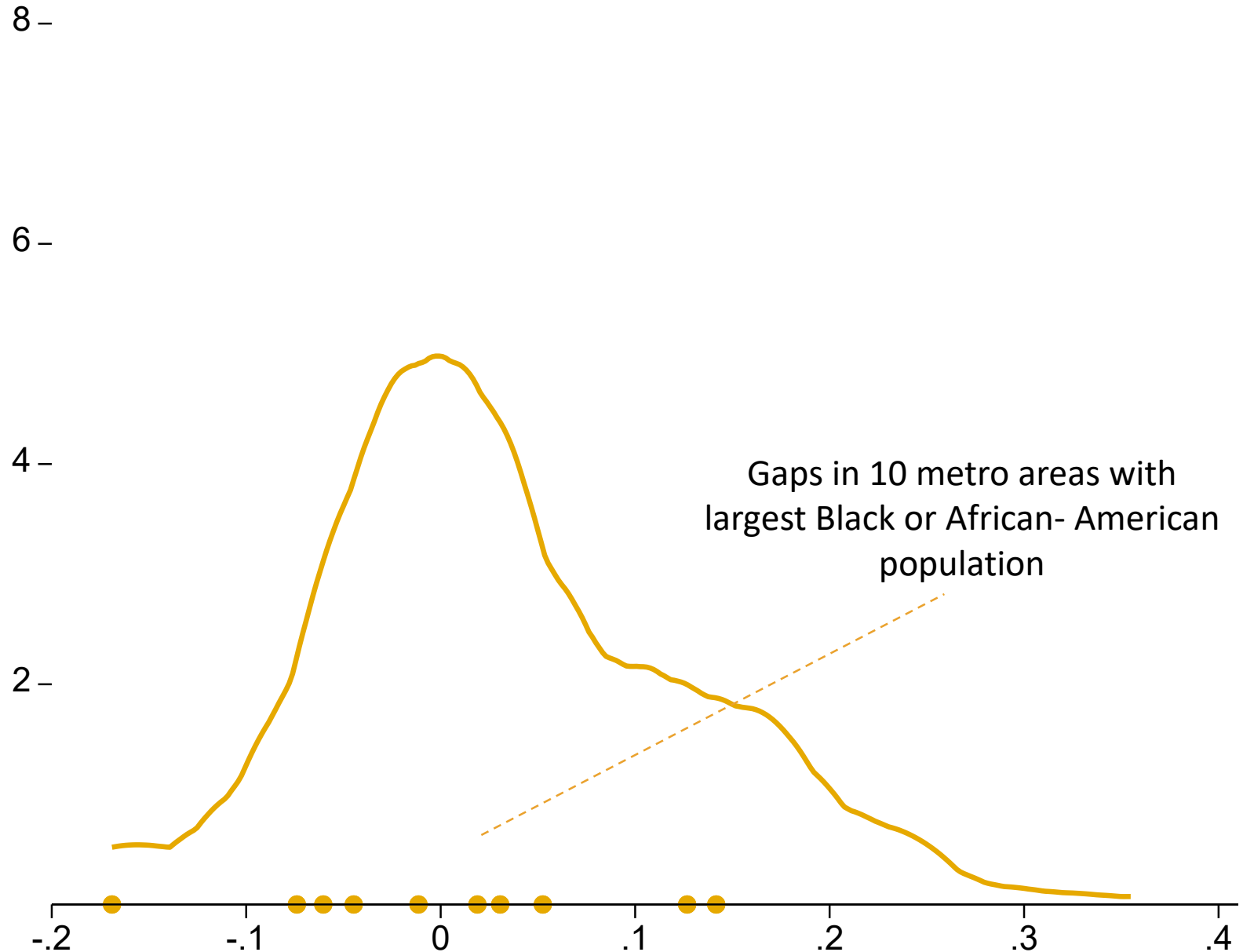Gaps in 10 metro areas with largest Hispanic/Latino population

Tract-ZIP gaps (Black-White)

Metro-level Black-White gap using census tracts minus Black-White gap using ZIP code level data for 100 largest metros

Graph displays estimated count of metro areas at a given tract-ZIP gap

The median tract-ZIP gap is .05 standard deviations

Sources: ACS 2017 5-year SF, HUD USPS ZIP code crosswalk files 2015q1, CDC (life expectancy), diversitydatakids.org (Child Opportunity Index), Opportunity Atlas

Gaps in 10 metro areas with largest Black or African- American population

diversitydatakids.org
data for a diverse and equitable future

18

If census tract data is unavailable, can I use ZIP code data instead?

YES (with important exceptions), if you plan to study broad patterns of racial/ethnic equity in access to neighborhood opportunity across a large number of ZIP codes, e.g., within large metro areas or nationally

Bias likely small if studying Asian-White, Hispanic-White, or Black-White gaps, with some exceptions. Sizeable bias for Native American-White gap

NO, if you are targeting specific ZIP codes

You risk missing potentially important target areas in heterogeneous ZIP codes, invest into high opportunity rather than low opportunity areas and exacerbate racial/ethnic inequalities

Use census tract data, e.g., on racial/ethnic composition, if census tract data on outcome is not available