



# The 2017 Opportunity Index: Technical Supplement

## Introduction

The Opportunity Index is a composite measure that draws upon important economic, educational, health and civic indicators of opportunity. The Index was launched in 2011 and has since been updated annually. It provides insight into the multidimensional nature of opportunity in the United States. In addition, its detailed geographic breakdown measures opportunity for individual states and counties, and is designed to aid policymakers and other local stakeholders as they work to increase opportunity in our nation.

For the 2017 Opportunity Index, we introduced several changes from previous releases. We revamped the dimensions of opportunity to better reflect the importance of health, as well as the distinct contributions of community indicators.

We are debuting several indicators this year to create a more comprehensive measure of opportunity, and to respond to the unavailability of some data sources used in prior reports. This document describes the rationale for updates to the dimensions and indicators of opportunity, details the structure and data sources for the 2017 Opportunity Index and provides an overview of the Opportunity Index methodology.

## Changes to the 2017 Opportunity Index

Since 2011, the Opportunity Index has been a valuable data resource for summarizing statistics on opportunity across three dimensions: Economy, Education and Community. The 2017 Opportunity Index includes a Health dimension and updated the three existing dimensions by adding new indicators and removing others for which data is no longer available. The four dimensions of opportunity in the 2017 Index are:

- Economy
- Education
- Health
- Community

Each dimension includes three to seven indicators—the specific measurements used to quantify opportunity.

One important use of the Opportunity Index is to track progress over time across indicators, dimensions and overall opportunity. However, updates to the 2017 Index make direct comparisons with previous years of the Index inadvisable. To allow for examination of recent trends, and to provide a check on the reliability of the new Index composition, we recalculated the 2016 Opportunity Index using the structure of the 2017 Index.

The following table shows the structure of the 2017 Opportunity Index. New indicators or indicators with new data sources are presented in *italics*.

2017 Opportunity Index Indicators		
DIMENSION	INDICATOR	DESCRIPTION
Economy	JOBS	Unemployment rate (percentage of the population ages 16 and older who are not working but available for and seeking work)
	WAGES	Median household income (in 2010 dollars)
	POVERTY	Percentage of the population below the federal poverty level (the amount of pretax cash income considered adequate for an individual or family to meet basic needs)
	INCOME INEQUALITY	80/20 ratio (ratio of household income at the 80th percentile to that at the 20th percentile)
	ACCESS TO BANKING SERVICES	Number of banking institutions (commercial banks, savings institutions and credit unions) per 10,000 residents
	AFFORDABLE HOUSING	Percentage of households spending less than 30 percent of their income on housing-related costs
	BROADBAND INTERNET SUBSCRIPTION	Percentage of households with subscriptions to broadband internet service
Education	PRESCHOOL ENROLLMENT	Percentage of 3- and 4-year-olds attending preschool
	HIGH SCHOOL GRADUATION	On-time high school graduation rate (percentage of freshmen who graduate in four years)
	POSTSECONDARY EDUCATION	Percentage of adults ages 25 and older with an associate degree or higher
Health	LOW BIRTH WEIGHT	Percentage of infants born weighing less than 5.5 pounds
	HEALTH INSURANCE COVERAGE	Percentage of the population (under age 65) without health insurance coverage
	DEATHS RELATED TO ALCOHOL/DRUG USE AND SUICIDE	Deaths attributed to alcohol or drug poisoning, or suicide (age-adjusted rate per 100,000 population)
Community	VOLUNTEERING	Percentage of adults (ages 18 and older) who reported they volunteered during the previous year <b>[national and state-level only]</b>
	VOTER REGISTRATION	Percentage of adults ages 18 and older who are registered to vote <b>[national and state-level only]</b>
	YOUTH DISCONNECTION	Percentage of youth (ages 16–24) not in school and not working
	VIOLENT CRIME	Incidents of violent crime reported to law enforcement agencies (per 100,000 population)
	ACCESS TO PRIMARY HEALTH CARE	Number of primary care physicians (per 100,000 population)
	ACCESS TO HEALTHY FOOD	Number of grocery stores and produce vendors (per 10,000 population)
	INCARCERATION	Number of people incarcerated in jail or prison (per 100,000 population 18 and older) <b>[national and state-level only]</b>

## 2017 Opportunity Index Data Sources

The indicators that comprise the 2017 Opportunity Index are derived from a number of sources - Census Bureau data and statistics compiled by reputable nonprofit organizations.

### **Economy**

**Indicator:** Unemployment rate

**Definition:** The total number of people without jobs who actively looked for work within the preceding four weeks and were available to take a job, as a percentage of the total number in the labor force (those working or unemployed).

**Source:** Bureau of Labor Statistics, Local Area Unemployment Statistics and news releases (<http://www.bls.gov/lau/>)

**Note:** Rates in the 2017 Opportunity Index refer to April 2017 and are not seasonally adjusted.

**Indicator:** Median household income

**Definition:** The income level that falls at the midpoint of the total distribution of households, ranked from richest to poorest. Household income includes work earnings from jobs or self employment, as well as income from interest, dividends, rent, Social Security, pension payments, unemployment compensation, cash welfare benefits and other forms of money regularly received by any member of the household.

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** Because income is not distributed evenly across households, the average (mean) is much higher than the median, and thus the median is generally considered to give a fairer picture of income for a “typical” household. In the 2017 Opportunity Index, median household income data at the state level refer to 2015; for counties, data refer to 2011–2015. To facilitate year-to-year comparisons, income figures presented in the Opportunity Index are adjusted for inflation so they can be expressed in 2010 dollars.

**Indicator:** Poverty rate

**Definition:** Percentage of people of all ages living with family incomes below the federal poverty line.

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** The federal poverty line is the amount of pretax cash income considered adequate for an individual or family to meet basic needs. It is updated annually for inflation, based on Consumer Price Index changes, and is adjusted for family size and composition. In 2015, a four-person family with two children would be considered to live in poverty if it had income less than \$24,046. Poverty rate data in the 2017 Opportunity Index for states and the nation refer to 2015; county data refer to 2011–2015.

**Indicator:** 80/20 ratio (ratio of household income at the 80th percentile of income to that of the 20th percentile)

**Definition:** The 80/20 ratio is a measure of income inequality describing the disparity in income between the household at the 80th percentile of income and the household at the 20th percentile. The 80/20 ratio for the United States is 4.9, meaning that the wealthiest fifth of households (those at the 80th percentile) have incomes nearly five times higher than those of households in the poorest fifth (the 20th percentile).

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** 80/20 ratio data in the 2017 Opportunity Index for states and the nation refer to 2015 income; data for counties use 2011–2015 income.

**Indicator:** Number of banking institutions (commercial banks, savings institutions and credit unions) per 10,000 residents

**Definition:** The number of commercial banks, savings institutions and credit unions per 10,000 residents.

**Source:** Child Trends' analysis of data from the U.S. Census Bureau, County Business Patterns (<https://www.census.gov/programs-surveys/cbp.html>) and Population Estimates (<https://www.census.gov/programs-surveys/popest.html>).

**Note:** Banking institutions included in this indicator include those under the following NAICS codes: 522110, 522120 and 522130. In the 2017 Opportunity Index, data for this indicator refer to 2015.

**Indicator:** Households spending less than 30 percent of household income on housing-related costs

**Definition:** The percentage of households spending less than 30 percent of their income on rent and utilities (for households who rent), or on mortgage payments and other housing-related costs, such as real estate taxes or condo fees (for those who own homes).

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** A widely accepted cut-off for housing affordability is housing-related costs that are no more than 30 percent of household income. Housing units for which costs and/or household income could not be determined are excluded from the calculation. For the nation and states, data refer to 2015; data for counties refer to 2011–2015.

**Indicator:** Broadband internet subscription

**Definition:** The percentage of households with subscriptions to broadband internet service (including both cable and DSL internet).

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>)

**Note:** This indicator is new to the 2017 Opportunity Index, replacing the percentage of households with high-speed internet—for which data are no longer collected. Broadband internet data in the 2017 Opportunity Index are from 2015. In the updated 2016 Index, data refer to 2014.

## **Education**

**Indicator:** Preschool enrollment

**Definition:** The percentage of children ages three and four enrolled in public or private nursery school, preschool or kindergarten.

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** Data on preschool enrollment for states and the nation refer to 2015; data for counties refer to 2011–2015.

**Indicator:** On-time high school graduation rate

**Definition:** The percentage of high school freshmen who graduate after four years of high school.

**Source:** National and state data are from ED Facts' Adjusted Cohort

Graduation Rate (ACGR) (<https://www2.ed.gov/about/inits/ed/edfacts/data-files/index.html>); county data are taken from the Robert Wood Johnson Foundation's County Health Rankings' analysis of school district-level ACGR data from the EDFacts site (<http://www.countyhealthrankings.org/resources/2017-chr-measures-data-sources-and-years>).

**Note:** The ACGR is calculated as “the number of students who graduate in four years with a regular high school diploma, divided by the number of students who form the adjusted cohort of the graduating class. From the beginning of 9th grade (or the earliest high school grade), students who are entering that grade for the first time make up a cohort that is ‘adjusted’ by adding any students who subsequently transfer into the cohort and subtracting any students who subsequently transfer out, emigrate to another country or die.”<sup>1</sup> Data for this indicator refer to the 2014–2015 school year.

Prior to 2015, the Opportunity Index used a different measure, the Average Freshmen Graduation Rate, that is not comparable to the ACGR. The Department of Education stopped updating the Average Freshman Graduation Rate in 2012, adopting the ACGR as their preference, which is the indicator used in the Index since 2015.

**Indicator:** Associate degree or higher

**Definition:** The percentage of adults ages 25 and older who have completed an associate degree or higher.

**Source:** U.S. Census Bureau, American Community Survey (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).

**Note:** Data for states and the nation refer to 2015; county-level data refer to 2011–2015.

## **Health**

**Indicator:** Low birth weight

**Definition:** The percentage of live births where the infant weighed less than 2,500 grams (approximately 5 lbs., 8 oz.).

**Source:** CDC WONDER (<https://wonder.cdc.gov/natality-current.html>)

**Note:** This indicator is new to the 2017 Opportunity Index. Data for states and the nation refer to 2015; data for counties refer to 2011–2015. The updated 2016 Index also includes this indicator; data for states and the

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<sup>1</sup> U.S. Department of Education. (2015). *Regulatory Four-Year Adjusted Cohort Graduation Rates - School Year 2013-14, EDFacts Data Documentation*. Washington, DC: U.S. Department of Education. Retrieved from <http://www.ed.gov/edfacts>.

nation refer to 2014; data for counties refer to 2010–2014.

**Indicator:** Health insurance

**Definition:** The percentage of the population under age 65 not covered by health insurance.

**Source:** American Community Survey

(<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>)

**Note:** This indicator is new to the 2017 Opportunity Index. Data for states and the nation refer to 2015; data for counties refer to 2011–2015. The updated 2016 Index also includes this indicator; data for states and the nation refer to 2014; data for counties refer to 2010–2014.

**Indicator:** Deaths related to alcohol/drug use or suicide (rate per 100,000)

**Definition:** The age-adjusted number of deaths, per 100,000 population, due to poisoning from drugs (including recreational and prescription drugs), or alcohol, or suicide.

**Source:** CDC WONDER (<https://wonder.cdc.gov/ucd-icd10.html>)

**Note:** This indicator is new to the 2017 Opportunity Index. The calculation includes several reported underlying causes of death compiled by CDC Wonder. The following ICD-10 codes are included: X40-X45, X60-X84 and Y10-Y15. Age adjusting accounts for localities differing in their age composition. Data for states and the nation refer to 2015; data for counties refer to 2011–2015. The updated 2016 Index also includes this indicator; data for states and the nation refer to 2014; data for counties refer to 2010–2014.

## **Community**

**Indicator:** Volunteering

**Definition:** The percentage of adults ages 18 and older who performed volunteer work through or for an organization at any time in the previous year.

**Source:** Child Trends' analysis of data from the U.S. Census Bureau, Current Population Survey and Volunteering Supplement. Due to sample-size limitations of the survey data, this indicator is calculated at the national and state levels only.

**Note:** Two years of survey responses were pooled to increase the sample available for analysis. This makes for more stable estimates.



This indicator was updated slightly for the 2017 Opportunity Index and draws from two survey questions: “Since September 1 of last year, have you done any volunteer activities through or for an organization?” and “Sometimes people don’t think of activities they do infrequently or activities they do for children’s schools or youth organizations as volunteer activities. Since September 1 of last year, have you done any of these types of volunteer activities?” Data in the 2017 Opportunity Index refer to 2014–2015. The updated 2016 Index also draws from these survey questions; data refer to 2013–2014.

Prior to 2016, this indicator relied on the single question, “Since September 1 of last year, have you done any volunteer activities through or for an organization?”

**Indicator:** Voter registration rate

**Definition:** The percentage of the adult population registered to vote.

**Source:** U.S. Census Bureau, Voting and Registration

(<https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-580.html>)

**Note:** This indicator is new to the 2017 Opportunity Index. Historically, voter registration is higher in presidential election years than in midterm election years. This indicator will be updated biannually so that each update provides a rolling average that includes the most recent presidential election year and midterm election year. Data in the 2017 Opportunity Index are the average of registration rates for 2014 and 2016. The updated 2016 Index also includes this indicator; data are the average of registration rates in 2012 and 2014. Because counties and congressional districts frequently follow different borders, this indicator is calculated at the national and state levels only.

**Indicator:** Youth not in school and not working

**Definition:** The percentage of the population ages 16 to 24 who are not enrolled in school and not working or not currently seeking employment.

**Source:** Child Trends’ analysis of data from the U.S. Census Bureau, American Community Survey, PUMS Microdata

(<https://www.census.gov/programs-surveys/acs/data/pums.html>) and custom tabulations for county and county equivalents provided by special arrangement with the U.S. Census Bureau.

**Note:** Data in the 2017 Opportunity Index for states and the nation refer to

2015; data for counties refer to 2011–2015.

**Indicator:** Violent crime rate

**Definition:** Total number of violent crimes reported to local law enforcement agencies, per 100,000 people. Violent crimes include homicide, rape, robbery and assault.

**Source:** State and national data are from the U.S. Department of Justice, Federal Bureau of Investigation Uniform Crime Reporting, Crime in the U.S. (<https://ucr.fbi.gov/crime-in-the-u.s/>); county data from the County Health Rankings analysis of data from the U.S. Department of Justice, Federal Bureau of Investigation Criminal Justice Information Services. County Health Rankings is a project of the University of Wisconsin Population Health Institute in collaboration with the Robert Wood Johnson Foundation. Crime data are based on report data provided by nearly 17,000 law enforcement agencies (LEAs) across the United States. Due to the number of reporting agencies, there is a reporting lag; not all LEAs report and some data reported may be incomplete.

**Note:** Data in the 2017 Opportunity Index for states and the nation refer to 2015; data for counties refer to 2012–2014.

**Indicator:** Primary care physicians

**Definition:** Number of primary care physicians per 100,000 population.

**Source:** Bureau of Health Workforce, Area Health Resources Files (<https://datawarehouse.hrsa.gov/data/datadownload.aspx>)

**Note:** This indicator is new to the 2017 Opportunity Index, replacing an indicator calculated as the number of doctors per 100,000 population. Data in the 2017 Opportunity Index refer to 2015. The updated 2016 Index also includes this indicator; data refer to 2014. State and national statistics for this indicator are derived from the county-level Area Health Resources Files. The number of primary care physicians includes non-federal physicians who are not currently in a residency program and who are younger than age 75.

**Indicator:** Grocery stores and produce vendors

**Definition:** The number of supermarkets, grocery stores and produce stands per 10,000 residents.

**Source:** Child Trends' analysis of data from the U.S. Census Bureau, County Business Patterns and Population Estimates Program (<http://www.census.gov/econ/cbp/index.html> and

<http://www.census.gov/popest/>).

**Note:** NAICS codes 445110 and 445230 are used to gather the number of supermarkets, grocery stores and produce stands. Data in the 2017 Opportunity Index refer to 2015.

**Indicator:** Incarceration rate

**Definition:** The number of people incarcerated in jails or prisons per 100,000 residents ages 18 and older.

**Source:** Bureau of Justice Statistics, Correctional Populations in the United States (<https://www.bjs.gov/index.cfm?ty=tp&tid=11>).

**Note:** This indicator is new to the 2017 Opportunity Index. Data are available at the national and state level only. Data in the 2017 Opportunity Index refer to 2015. The updated 2016 Opportunity Index also includes this indicator; data refer to 2014.

# Opportunity Index Methodology

The Opportunity Index draws upon statistics from a variety of sources, including the U.S. Census Bureau, U.S. Department of Labor Statistics and the U.S. Department of Justice. Calculating Opportunity Scores for states and grades for counties entails three steps:

- 1. Rescaling indicators
- 2. Calculating dimension scores
- 3. Calculating Opportunity Scores and Grades

## Rescaling Indicators

The diverse indicators that comprise the Opportunity Index include percentages, rates and dollar values. To include them in a composite measure such as the Opportunity Index, we transform each of these statistics to enable comparisons on a common scale. The Opportunity Index uses a simple rescaling procedure based on the minimum and maximum values obtained for each indicator.<sup>2</sup>

Each state or county’s performance on an indicator is compared with the highest and lowest scores obtained on that indicator, excluding outliers (extreme values).<sup>3</sup> The following formula is used to calculate a value from 0 to 100 for each indicator:

$$\text{Observed value rescaled} = \left( \frac{\text{Observed value} - \text{Lowest value}}{\text{Highest value} - \text{Lowest value}} \right) \times 100$$

The indicators in the Opportunity Index vary in their directionality. For example, median household income is an indicator for which higher values are more desirable, but the unemployment rate is better when lower.

<sup>2</sup> The natural logs of the data for median household income and violent crime are used in this process to normalize their highly skewed data distributions.

<sup>3</sup> The maximum and minimum values for each indicator are based on an examination of variance and skewness. For indicators with long tails on either or both sides of the normal distribution curve, maximum and minimum values are set to fall within the long tails, with values outside of this range treated as equivalent to the minimum or maximum in the rescaling process.

For negative indicators,<sup>4</sup> the rescaling procedure also standardizes their directionality:

$$\text{Observed value rescaled} = 1 - \left( \frac{\text{Observed value} - \text{Lowest value}}{\text{Highest value} - \text{Lowest value}} \right) \times 100$$

This way, for all indicators, higher values are more desirable. The highest and lowest values for each indicator are presented below:

Economy

INDICATOR	DESCRIPTION	LOWEST VALUE	HIGHEST VALUE
JOB	Unemployment rate (percentage of the population ages 16 and older who are not working and are seeking work and available to work)	0.0	16.0
WAGES	Median household income (in 2010 dollars)	\$19,000	\$95,000
POVERTY	Percentage of the population below the federal poverty level	2.0	30.0
INCOME INEQUALITY	80/20 ratio (ratio of household income at the 80th percentile to that at the 20th percentile)	2.0	7.0
ACCESS TO BANKING SERVICES	Number of banking institutions (commercial banks, savings institutions and credit unions) per 10,000 residents	0.0	10.5
AFFORDABLE HOUSING	Percentage of households spending less than 30 percent of their income on housing-related costs	40.0	95.0
BROADBAND INTERNET SUBSCRIPTION	Percentage of households with subscriptions to broadband internet service	50.0	100.0

<sup>4</sup> Negative indicators are the following: unemployment, poverty level, income inequality, low birth weight, lack of health insurance, deaths from drugs/alcohol or suicide, youth disconnection, violent crime and incarceration.

## Education

INDICATOR	DESCRIPTION	LOWEST VALUE	HIGHEST VALUE
PRESCHOOL ENROLLMENT	Percentage of 3- and 4-year-olds attending preschool	0.0	100.0
HIGH SCHOOL GRADUATION	On-time high school graduation rate (percentage of freshmen who graduate in four years)	55.0	100.0
POSTSECONDARY EDUCATION	Percentage of adults ages 25 and older with an associate's degree or higher	0.0	75.0

## Health

INDICATOR	DESCRIPTION	LOWEST VALUE	HIGHEST VALUE
LOW BIRTH WEIGHT	Percentage of infants born weighing less than 5.5 pounds	4.0	11.5
HEALTH INSURANCE COVERAGE	Percentage of the population (under age 65) without health insurance coverage	0.0	30.0
DEATHS RELATED TO ALCOHOL/DRUG USE AND SUICIDE	Deaths attributed to alcohol or drug poisoning, or suicide (age-adjusted rate per 100,000 population)	0.0	60.0

## Community

INDICATOR	DESCRIPTION	LOWEST VALUE	HIGHEST VALUE
VOLUNTEERING	Percentage of adults (ages 18 and older) who reported volunteering during the previous year <b>[national and state-level only]</b>	0.0	65.0
VOTER REGISTRATION	Percentage of the population ages 18 and older who are registered to vote <b>[national and state-level only]</b>	35.0	90.0
YOUTH DISCONNECTION	Percentage of youth ages 16–24 not in school and not working	0.0	30.0
VIOLENT CRIME	Incidents of violent crime reported to law enforcement agencies (per 100,000 population)	0.0	12.0
ACCESS TO PRIMARY HEALTH CARE	Number of primary care physicians (per 100,000 population)	0.0	175.0
ACCESS TO HEALTHY FOOD	Number of grocery stores and produce vendors (per 10,000 population)	0.0	6.3
INCARCERATION	Number of people incarcerated in jail or prison (per 100,000 population ages 15–64) <b>[national and state-level only]</b>	300.0	1500.0

## Calculating Dimension Scores

At the state level, the Opportunity Index is made up of 20 indicators across the four dimensions (Economy, Education, Health and Community). In each dimension, the rescaled values for indicators are averaged to create dimension-level Opportunity Scores, also ranging from 1 to 100. Because data for some indicators are not available at the county level,<sup>5</sup> the county Opportunity Index is made up of 17 indicators. As with states, indicators in each dimension are averaged to create dimension-level Opportunity Scores ranging from 0 to 100.

## Calculating Opportunity Scores and Grades

Each state also has an overall Opportunity Score that summarizes performance across the four Index dimensions. To calculate these, a state's four dimension scores are averaged with equal weighting. Final Opportunity Scores are again represented as values from 0 to 100; these values are used to rank the 50 states and the District of Columbia on the Opportunity Index. To create overall county Opportunity Scores, the four dimension scores are again averaged and weighted equally. Counties are also assigned Opportunity Grades that correspond to their scores, ranging from A+ to F.

In 2011, Opportunity Grade cut-off points were based on the distribution of raw, final numerical outcomes of the 2011 Opportunity Index for counties and county equivalents; groupings were done by standard deviations above or below the average. The same cut-off points were used to assign Opportunity Grades for the 2012 to 2016 indices, allowing comparison across years.

However, in 2017, it was necessary to recalculate the relationship between final numerical values and Opportunity Grade assignments because of the significant update to the dimensions and indicators comprising the Opportunity Index. New cut-off points for assigning grades were based on the distribution of numerical scores of the updated Opportunity Index in 2016 for counties and county equivalents. Grades in the 2017 Index were also assigned according to these new cut-off points. Thus, it is valid to compare county grades between the updated 2016 and 2017 indices. However, Opportunity Grades from 2011 to 2015 were based on the 2011 cut-off points. Because of this, county grades from 2011 to 2015 (or from

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<sup>5</sup> These indicators are volunteering, voter registration and incarceration rate, all within the Community dimension.

the original 2016 Index) should not be compared with those from the updated 2016 Index or 2017 Index.

The assignment of county-level Opportunity Grades based on the standardized scores is summarized in the table below.

Opportunity Grade	Minimum Standardized Score (rounded)	Maximum Standardized Score (rounded)
A+	80.0	100.0
A	67.5	79.9
A-	64.0	67.4
B+	60.5	63.9
B	57.1	60.4
B-	53.6	57.0
C+	50.1	53.5
C	46.6	50.0
C-	43.1	46.5
D+	39.6	43.0
D	36.2	39.7
D-	32.7	36.1
F	0.0	32.6

**Data Notes**

Given the large number of geographic areas and the many indicators that comprise the Opportunity Index, it is not surprising that there are instances of missing data. If a county is missing data for more than two indicators, or for two or more indicators within the same dimension, then an Opportunity Grade is not calculated for that county.<sup>6</sup> If a county is missing data for one or two indicators, with a maximum of one missing indicator per dimension, then the rescaled state average is substituted for the missing data point. Of a total of 3,142 counties and county equivalents, 1,085 counties were excluded from the 2017 Opportunity Index due to missing or unreliable data. Missing data was highest for the low birth weight and broadband internet indicators.

Most indicators in the Opportunity Index are based on survey data; thus, they are statistical estimates and may be subject to sampling and non-sampling error. Therefore, differences in dimension scores, Opportunity Scores and Opportunity Grades between different geographic areas and

<sup>6</sup> For a county missing data for two or more indicators in the same dimension, a Dimension Score for that dimension is not calculated.



across different years are not necessarily statistically significant, and comparisons should be made with caution.

## Correlations and Internal Consistency

### Correlations

The updates included in the 2017 Opportunity Index call for a re-examination of how well its component indicators “hang together” as a single measure of opportunity. One way to do this is to examine the correlation between each rescaled indicator and the overall Opportunity Score.<sup>7</sup> Correlation values can range between -1.0 and 1.0.

In 2017, the indicators most closely related to overall opportunity were the incarceration rate (at the state level only), with a correlation of 0.82, and the percentage of the population with an associate degree or higher, with a correlation of 0.78. The indicator least closely related to overall opportunity was the percentage of households spending less than 30 percent of their income on housing costs; this indicator was negatively associated with overall opportunity.

All of the dimension scores were strongly related to overall opportunity; Health had the strongest correlation, at 0.84. Other notable findings were strong correlations between Health and Economy (0.60), between Health and Community (0.51), between Health and Education (0.50) and between Education and Community (0.55). Detailed results from correlation analyses are presented below.

Dimension Score Correlations: All Dimensions and Overall Opportunity Score					
	Dimension Scores				Opportunity Score
	Economy	Education	Health	Community	
<b>Economy</b>	-	0.50	0.60	0.43	0.79
<b>Education</b>	0.50	-	0.50	0.55	0.78
<b>Health</b>	0.60	0.50	-	0.51	0.84
<b>Community</b>	0.43	0.55	0.51	-	0.78

<sup>7</sup> Analyses of correlation and internal consistency used rescaled values at the county level, due to the relatively low number of states. For this reason, the volunteering, voter registration and incarceration indicators, which are measured for states only, are not included in these analyses.

Economy Dimension Correlations		
Indicator	Economy Dimension Score	Opportunity Score
Jobs	0.59	0.50
Wages	0.72	0.77
Poverty	0.90	0.76
Income inequality	0.72	0.41
Access to banking services	0.56	0.29
Affordable housing	0.48	-0.07
Broadband internet subscription	0.62	0.63

Education Dimension Correlations		
Indicator	Education Dimension Score	Opportunity Score
Preschool enrollment	0.61	0.38
High school graduation	0.60	0.32
Postsecondary education	0.55	0.78

Health Dimension Correlations		
Indicator	Health Dimension Score	Opportunity Score
Low birth weight	0.67	0.58
Health insurance	0.82	0.67
Deaths related to alcohol/drug use or suicide	0.66	0.44

Community Dimension Correlations		
Indicator	Community Dimension Score	Opportunity Score
Volunteering <sup>a</sup>	0.58	0.58
Voter registration <sup>a</sup>	0.38	0.19
Youth disconnection	0.73	0.77
Violent crime	0.34	0.31
Access to primary health care	0.57	0.54
Access to healthy food	0.57	0.08
Incarceration <sup>a</sup>	0.89	0.82

<sup>a</sup> Because these indicators were gathered at the state level only, these correlations are calculated with states rather than counties.

**Internal Consistency**

Another way to analyze the performance of a composite measure like the Opportunity Index is by calculating its internal consistency. Internal consistency reflects the correlations among the various items that make up a measure. When a composite measure has high internal consistency, its component items are closely related. When a composite measure has low internal consistency, there is more variation among items.

Including many items in analyses of internal consistency can inflate results; therefore, we conducted analyses for each dimension separately, as well as for the overall Index. Metrics of reliability (internal consistency) for the overall Opportunity Index, and for each of the four dimensions in the 2017 Index, are shown in the table below, along with results calculated from the original and updated 2016 indices.

These data show that the reliability of the updated 2016 Index (0.68) is similar to what was found for the original 2016 Index (0.66). As expected (since its indicators were unchanged), reliability for the Education dimension remained the same, albeit weak by social science standards. In the Economy dimension, reliability was lower than in the original 2016 Index (0.58 versus 0.69, respectively), although still acceptable. The Health and Community dimensions cannot be compared with the original Index, but of the two, Community appears to have stronger reliability. Subsequent research may identify sets of indicators that more adequately represent these constructs.

Comparing internal consistency between 2016 and 2017 on the updated Index, improvements are driven primarily by a subset of indicators, with others remaining unchanged or declining. While internal consistency can increase even when the component indicators move in different directions, tracking outcomes across a broad scope of indicators is an important part of what makes the Index a useful measure.

Internal Consistency (Cronbach's alpha)			
Dimension	2017	2016 (Updated)	2016 (Original)
<b>Economy</b>	0.76	0.58	0.69
<b>Education</b>	0.27	0.22	0.22
<b>Health</b>	0.35	0.38	N/A
<b>Community</b>	0.30	0.60	0.66
<b>Overall Index</b>	0.71	0.68	0.66



In summary, the dimensions of the 2017 Index maintain acceptable levels of internal consistency, although these values do vary across the two years shown. As we accumulate more years of data, we may gain greater insight into what may be driving this variation.

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