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DOCUMENTATION FOR CENSUS INDICATORS

Overview

This document summarizes a catalog of indicators describing the population and housing characteristics across the Commonwealth of Massachusetts, accessed from the U.S. Census Bureau's American Community Survey (ACS) and Decennial Census and curated by the Boston Area Research Initiative. The ACS indicators are based on five-year estimates that renew yearly, beginning with 2005-2009, and cover census tracts and block groups for Census 2010 geographies. The Decennial Census indicators are based on the 2010 Decennial Census, which counts every person in the population, and cover census tracts, block groups, and blocks for Census 2010 geographies.

The database is available through the Boston Data Library's repository and map (i.e., BostonMap). It includes a series of files of the form *ACS_range_TRACT.csv* or *ACS_range_BLKGRP.csv* (e.g., *ACS_0812_BLKGRP.csv* for block group-level 2008-2012 estimates) and *DEC_CENSUS_2010_TRACT.csv*, *DEC_CENSUS_2010_BLKGRP.csv*, and *DEC_CENSUS_2010_BLK.csv* for 2010 Census indicators.

The ACS 2005-2009 tract indicators are translated from 2000 census geographies to 2010 census geographies using the Longitudinal Tract Data Base (Logan, Xu, and Stults 2014). An earlier version of the 2008-2012 census data was uploaded to BostonMap with different variable names. An appendix document translates these earlier names to the conventions utilized for all other data. In addition, a separate appendix document details which indicators are available in the 2010 Decennial Census data because the Decennial Census includes only population and housing data.

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1. Summary of Census Indicators

1.1. Description of Contents

The U.S. Census Bureau gathers information about population and housing characteristics across the country from a small percentage of the population each year, and from as much of the population as possible every ten years. This data set contains a series of indicators accessed or calculated from the decennial census and the American Community Survey (ACS; five-year estimates, e.g., 2008-2012). The indicators are provided across the Commonwealth of Massachusetts for 2010 census geographies at two levels: census block groups (*N* = 4,985) and census tracts (*N* = 1,478). Census block groups are nested within census tracts. Indicators are available for census blocks (N=157,508) for only the Decennial Census. Census blocks are nested within census block groups.

The database begins with 2005-2009 as those were the first five-year estimates released by the Census, and go through the most recent release, 2015-2019. For each set of estimates there is an independent .csv file of the naming convention *ACS_range_unit.csv* (e.g., *ACS_0812_BLKGRP.csv* for block group-level 2008-2012 estimates). Estimates beginning with 2008-2012 have also been visualized at the tract level on BostonMap. Those looking to work with the data in a spatial form can download the .shp from BostonMap. Additionally, for analyses confined to Boston one can merge the .csv with BARI's Geographical Infrastructure for the City of Boston, using BLK_ID_10 (blocks), BG_ID_10 (block groups), or CT_ID_10 (tracts) as the ID variable.

The ACS 2005-2009 tract indicators are translated from 2000 census tracts to 2010 census tracts using the Longitudinal Tract Data Base. [1]

[1] For more information, see Logan, John R., Zengwang Xu, and Brian Stults. 2014. "Interpolating US Decennial Census Tract Data from as Early as 1970 to 2010: A Longitudinal Tract Database," *The Professional Geographer 66(3): 412*–420. ACS variables were downloaded and organized with assistance from the 'acs' package in R (https://cran.r-project.org/web/packages/acs/acs.pdf), developed by Ezra Glenn. 2010 Decennial Census variables were downloaded and organized with assistance from the 'UScensus2010' package in R (https://cran.r-project.org/web/packages/UScensus2010/UScensus2010.pdf), developed by Zack W. Almquist.

1.2. Description of Variables

The database contains 55 indicators organized into 7 main categories: 1) Sex, Age, and Density; 2) Racial and Ethnic Composition; 3) Economic measures; 4) Family and Household information; 5) Highest Level of Education completed; 6) Method of Transportation to Work; 7) Housing. These are accompanied by a series of variables providing geographic context. All indicators are included for all five-year ranges at both geographic levels except where noted.

Not described under one of these categories but also included are: *TotalPop* or total population, *TotalHouseH* or total households, and *TotalHouseUnits* or total housing units.

1.2.1. Sex, Age, and Density

- *PopDen* indicates the population per square mile (population density) within the census geographical area
- *SexRatio* indicates the ratio of female to male individuals.
    - *Note:* Not calculated for census geographies with residents of only one sex.
- *AgeU18* indicates the percentage of residents ages under 18.
- *Age1834* indicates the percentage of residents with ages between 18 and 34.
- *Age3564* indicates the percentage of residents with ages between 35 and 64.
- *AgeO65* indicates the percentage of residents ages 65 and older.

1.2.2. Racial and Ethnic Composition

- *ForBorn* indicates the proportion of residents born in a foreign country.
    - *Note:* Not available for census block groups.
- *White* indicates the proportion of White Non-Hispanic residents.
- *Black* indicates the proportion of Black Non-Hispanic residents.
- *Asian* indicates the proportion of Asian Non-Hispanic residents.

- *Hispanic* indicates the proportion of Hispanic residents.
- *TwoOrMore* indicates the proportion of residents who identify as two or more races on the census.
- *EthHet* is a measure of ethnic heterogeneity.
    - Calculated using a Herfindahl index, $1-\sum s_i^2$, where s_i is the proportion of residents belonging to ethnicity i. Higher values indicate a more diverse neighborhood. This index represents the percentage of times two randomly selected people in this neighborhood would differ by race/ethnicity.
    - *Note*: Includes only White, Black, Asian, and Hispanic..

1.2.3. Economic

- *MedHouseIncome* indicates the median household income.
    - Median household incomes over $250,000 are coded as $250,001.
- *PubAssist* indicates the proportion of the population receiving public assistance.
- *GINI* is the Gini index, a commonly-used measure of income inequality.
    - Gini has a range from 0 = perfect equality to 1 = perfect inequality.
    - *Note:* Not available for census block groups.
- *FamPovPer* indicates the proportion of families with income falling below the poverty line.

- *UnempRate* indicates the proportion of residents who are unemployed (unemployment rate).
    - *Note:* Calculated based on the residential population above the age of 16. Available for census block groups, though not for the 2006-2010 and 2005-2009 estimates.

1.2.4. Family and Household

Indicators in this category that reflect proportions of the population are based on the number of households, or, when appropriate, the number of households that are families.

- *FamHousePer* indicates the proportion of households occupied by a family (children plus guardian(s)).
- *FemHeadPer* indicates the proportion of family households that are female-headed.
- *SameSexCoupPer* indicates the proportion of households with unmarried couples for which the couple is same-sex.
    - *Note:* Not available for census block groups in any releases nor tract-level releases beginning in 2015-2019.
- *GrandHeadPer* indicates the proportion of family households that are grandparent- headed.
    - *Note:* Not available for census block groups.

1.2.5. Highest Level of Education

All indicators in this category reflect proportions of the population of 25 years or older that have achieved each as their highest level of education.

- *LessThanHS* indicates the proportion of residents who have not completed a high school degree or equivalent.
- *HSGrad* indicates the proportion of residents who have completed a high school education or equivalent (e.g. GED).
- *SomeColl* indicates the proportion of residents who have completed some years of college but have not attained any college degree.

- *Bach* indicates the proportion of residents who have completed a Bachelor's Degree.
- *Master* indicates the proportion of residents who have completed a Master's Degree.
- *Prof* indicates the proportion of residents who have completed a professional degree.
- *Doc* indicates the proportion of residents who have completed a doctoral degree (e.g., PhD, MD).

1.2.6. Transport to Work

Note that for all commute time calculations, the calculation of the denominator may have changed after the creation of the map version for 2008-2012 estimates. Though results are highly consistent, for rigorous analysis of this five-year estimate please use the version in the data repository.

- *CommuteLess10* indicates the proportion of residents who have a commute of less than 10 minutes to their place of employment.
- *Commute1030* indicates the proportion of residents who have commuting time of between 10 and 29 minutes.
- *Commute3060* indicates the proportion of residents who have commuting time of between 30 and 59 minutes.
- *Commute6090* indicates the proportion of residents who have commuting time of between 60 and 89 minutes.
- *CommuteOver90* indicates the proportion of residents who have commuting time of 90 minutes or more.
- *ByAuto* indicates the proportion of residents who commute to their place of employment by car.
- *ByPubTrans* indicates the proportion of residents who commute by public transit
- *ByBike* indicates the proportion of residents who commute by bicycle.
- *ByWalk* indicates the proportion of residents who commute by walking.

1.2.7. Housing

Housing variables that reference proportions are based on the number of housing units rather than the total population. Also note that for owner- and renter-occupied measures, the calculation of the denominator for the map version for 2008-2012 estimates was over all units; thereafter it has been of the proportion of occupied units (i.e., subtracting vacant units). Though results are highly consistent, for rigorous analysis of this five-year estimate, please use the version in the data repository.

- *VacantUnitPer* indicates the proportion of vacant units.
- *RentersPer* indicates the proportion of renter households.
- *HomeOwnPer* indicates the rate of homeownership.
- *MedGrossRent* indicates the median gross rent in USD.
    - Per the coding scheme used by the Census, median rents over $2000 are coded as $2001.
- *MedHomeVal* indicates the median value of homes in a given census geography.
    - Median home values over $1,000,000 are coded as $1,000,001.
- *MedYrBuiltRaw* indicates the median year of construction for buildings in ten-year intervals.
    - *Note:* Not included in map.
- *MedYrBuilt* indicates the median year of construction for buildings in ten-year intervals.
- *MedYrMovedIn* indicates the median year of move-in for all residents.
- *MedYrRentMovedIn* indicates the median year of move-in for residents who are identified as renters.
- *MedYrOwnMovedIn* indicates the median year of move-in for residents who are identified as owners.

1.2.8. Geographic Contextual Information

- *AREA_ACRES* indicates the size of a geography in acres.
- *TOWN_ID* indicates the MASS-GIS Town-ID Code for the town which a geography is located in.
- *TOWN* indicates which town a geography is located in according to the Census.
- *MAtown* indicates which town a geography is located in according to MASS-GIS. In cases where a tract is geographically split between multiple towns, we attribute the tract to the town in which more than 50% of the tract is located. If less than 50% of the tract is located in one municipality, that tract is attributed to “Multiple Municipalities”.
- *FIPS_STCO* is a value designated by the Federal Information Processing Standard (FIPS) indicating which state a geography is located in.
- *COUNTY* indicates which county a geography is located in.

2. Appendix

2.1. Appendix A: Variable Name Change

The following table displays a translation of variable names as they have changed from the 2008-2012 census indicators uploaded to BostonMap to the variable names reported in the remainder of this document. 2008-2012 indicators accessed through the data repository have already been adjusted.

Indicator	Data Repository Variable Name	BostonMap Variable Name
Total Population	TotalPop	totalpop
Total Households	TotalHouseH	households
Total Housing Units	TotalHouseUnits	units
Pop Density	PopDen	popdens
Sex Ratio (Female to Male)	SexRatio	sexratio
Age 18 and under (percent)	AgeU18	punder18
Age 18-34 (percent)	Age1834	p18to34
Age 35-64 (percent)	Age3564	p35to64
Age 65 and over (percent)	AgeO65	p65older
Born in a foreign country	ForBorn	
White (Non-Hispanic)	White	pwhite
Black (Non-Hispanic)	Black	pblack
Asian (Non-Hispanic)	Asian	pasian
Hispanic	Hispanic	phispanic
Two or More Races	TwoOrMore	ptwomore
Ethnic Heterogeneity	EthHet	HI

Median Household Income	**MedHouseIncome**	**medincome**
Public Assistance Recipients	PubAssist	ppubassis
GINI	GINI	GINI
Family Poverty (%)	FamPovPer	pfampov
Unemployment Rate	UnempRate	punemploy
Family Households (%)	FamHousePer	pfamh
Female-Headed Households (%)	FemHeadPer	pfhh
Same Sex Couple Households (%)	SameSexCoupPer	psamesex
Grandparent-Headed Households (%)	GrandHeadPer	pgrandresp
Less than HS	LessThanHS	PlessHS
HS or Equivalent	HSGrad	pHS
Some College	SomeColl	psomecol
Bachelor Degree	Bach	pBA
Masters Degree	Master	pMA
Professional Degree	Prof	pprofd
Doctoral Degree	Doc	pdoc
Commute: <10 min	CommuteLess10	pless10
Commute: 10-30 min	Commute1030	ptenthir
Commute: 30-60 min	Commute3060	pthirsix
Commute: 60-90 min	Commute6090	psixnine
Commute: >90 min	CommuteOver90	pninemo
By Auto	ByAuto	pauto
By Public Transit	ByPubTrans	ppublic
By Bike	ByBike	pbike

By Walking	ByWalk	pwalk
Vacant Units (%)	VacantUnitPer	pvac
Renters (%)	RentersPer	prentocc
Home Owners (%)	HomeOwnPer	pownocc
Median Gross Rent	MedGrossRent	grossrent
Median Home Value	MedHomeVal	ownmedval
Median Year Built	MedYrBuiltRaw	Not included in map
Median Year Built	MedYrBuilt	medyrblt
Median Year Moved in – all residents	MedYrMovedlnraw	Not included in map
Median Year Moved in – renters	MedYrRentMovedln	Not included in map
Area in Acres	AREA_ACRES	Not included in map
Town ID	TOWN_ID	Not included in map
Town Name – CENSUS	TOWN	Not included in map
FIPS State Code	FIPS_STCO	Not included in map
County Name	COUNTY	Not included in map
???	AREA_ACR_1	Not included in map
Town Name – MASS-GIS	MAtown	Not included in map

2.2. Appendix B: 2010 Decennial Census Availability

The following table displays which indicators are available from the 2010 Decennial Census data.

Indicator	Data Repository Variable Name	Available in 2010 Census Data
Total Population	TotalPop	x
Total Households	TotalHouseH	x
Total Housing Units	TotalHouseUnits	x
Pop Density	PopDen	x
Sex Ratio (Female to Male)	SexRatio	x
Age 18 and under (percent)	AgeU18	x
Age 18-34 (percent)	Age1834	x
Age 35-64 (percent)	Age3564	x
Age 65 and over (percent)	AgeO65	x
White (Non-Hispanic)	White	x
Black (Non-Hispanic)	Black	x
Asian (Non-Hispanic)	Asian	x
Hispanic	Hispanic	x
Ethnic Heterogeneity	EthHet	x
Two or More Races	TwoOrMore	x
Foreign Born	ForeignBorn	
Median Household Income	MedHouseIncome	

Public Assistance Recipients	PubAssist	
GINI	GINI	
Family Poverty (%)	FamPovPer	
Unemployment Rate	UnempRate	
Family Households (%)	FamHousePer	x
Female-Headed Households (%)	FemHeadPer	x
Same Sex Couple Households (%)	SameSexCoupPer	x (not available by block group or block)
Grandparent-Headed Households (%)	GrandHeadPer	
Less than HS	LessThanHS	
HS or Equivalent	HSGrad	
Some College	SomeCollorAssoc	
Bachelor Degree	Bach	
Masters Degree	Master	
Professional Degree	Prof	
Doctoral Degree	Doc	
By Car	ByCar	
By Public Transit	ByPubTrans	
By Bike	ByBike	
By Walking	ByWalk	
Commute: <10 min	CommuteLess10	
Commute: 10-30 min	Commute1030	

Commute: 30-60 min	Commute3060	
Commute: 60-90 min	Commute6090	
Commute: >90 min	CommuteOver90	
Vacant Units (%)	VacantUnitPer	x
Renters (%)	RentersPer	x
Home Owners (%)	HomeOwnPer	x
Median Gross Rent	MedGrossRent	
Median Year Built	MedYrBuilt	
Median Home Value	MedHomeVal	
Median Year Moved in – all residents	MedYrMovedln	
Median Year Moved in – renters	MedYrRentMovedln	