Using the Planning Database to Improve the Survey Process

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Disclaimer: This report is released to inform interested parties of research and to encourage discussion. Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau

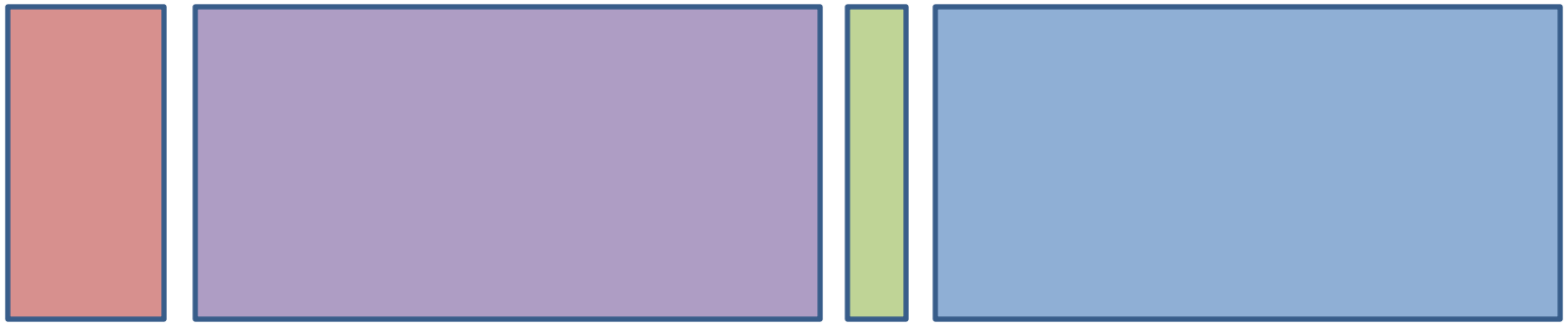
Overview

- A “greatest hits” of ACS 5 year estimates and 2010 Census variables
- Pulls together publicly available estimates in one convenient file
- Available at two levels of geography: Tract and Block Group

Contents of the 2015 PDB

- Both 5-year ACS estimates and 2010 census data
- Over 200 variables, including, but not limited to:
  - Population: gender, age, education, poverty, health insurance coverage, etc.
  - Household: language, relationship, income, etc.
  - Housing unit: tenure, number of units, etc.
  - Census operational: mailout/mailback, bilingual, etc.

The Structure



Geography Identifiers

- GIDBG (12 chars) = State (2 chars) + County (3 chars) + Tract (6 chars) + Block Group (1 char)
- GIDTR (11 chars) = State (2 chars) + County (3 chars) + Tract (6 chars)

Demographic, Socioeconomic, and Housing data.

- Order of variables is consistent. Census data first, followed by ACS estimates and ACS MOEs.
- For example, Males_CEN_2010, Males_ACS_09_13, Males_ACSMOE_09_13

Census Operational data including Mail Return Rate and Low Response Score

Percentages and MOE Percentages. Listed in the same order as their respective estimate.

- Variables identified with 'pct_' added to their variable name.
- For example, pct_Males_CEN_2010, pct_Males_ACS_09_13, pct_Males_ACSMOE_09_13

Potential Uses for the PDB in the Survey Process

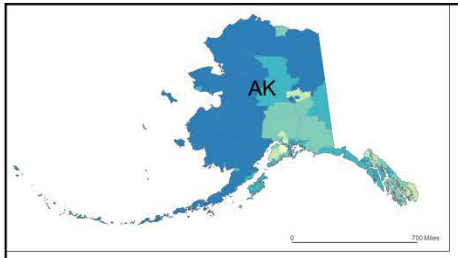
- Identify areas with a predicted high mail non-response
- Stratify a sample on key variables
- Identify areas that require Non-English materials
- Identify potential non-response bias

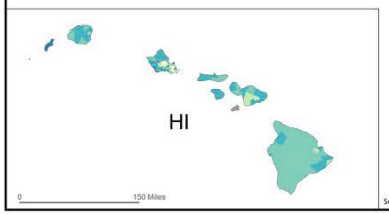
The Low Response Score (Erdman and Bates, 2014)

- Similar to the 2000 Census Hard-to-Count Score
- A model based predicted mail response score
- Uses key predictors of mail non-response including
  - Household composition (Female householders, etc)
  - Tenure (percent of Renters)
  - Other key predictors and more information can be found in (Erdman and Bates, Forthcoming 2016)
- Can be used to target areas with potential high non-response

Identifying Hard-to-Survey Populations

Low Response Score (LRS) by Census Tract





WA OR CA ID NV MT WY UT AZ CO NM ND SD NE KS OK TX MN IA MO AR LA WI IL MS MI IN KY TN AL OH WV GA FL SC NC VA PA NY MD DE NJ CT RI MA VT NH ME DC

Predicted Mail Non-Response Rate (%)

- 29.0 to 46.2
- 25.0 to 28.9
- 22.0 to 24.9
- 18.0 to 21.9
- 0.0 to 17.9
- Not Calculated*

State (or statistically equivalent entity)

County (or statistically equivalent entity)

* *Low Response Scores are not calculated for census tracts that have zero housing units or fall below a minimum threshold for qualifying addresses in 2010 Census mailback areas.*

Nationwide, 79.3 percent of households that received a 2010 Census mail questionnaire completed it and mailed it back. The resulting non-response rate of 20.7 percent was not evenly distributed across the country, but rather varied greatly by location. The Low Response Score (LRS) Ordinary Least Squares (OLS) regression model attempts to assign these variations in response rate for individual census tracts given a set of characteristics available in the U.S. Census Bureau's 2015 Planning Database. In order to predict areas that are less likely to respond, we subtract the return rate from 100 and use that as the dependent variable in calculating the LRS. In other words, the LRS, or fitted value from the OLS regression, is synonymous with "predicted mail non-response rate" as shown on this map.

More information on the U.S. Census Bureau's Planning Database and a full discussion of the LRS methodology can be found online: www.census.gov/research/data/planning_database

0 200 Miles

Source: U.S. Census Bureau 2015 Planning Database; 2010 Census Cartographic Boundary Files

United States Census Bureau

2016 Census Test Harris County Texas Demographics

- 484,358 people live in 292 block groups in the test site

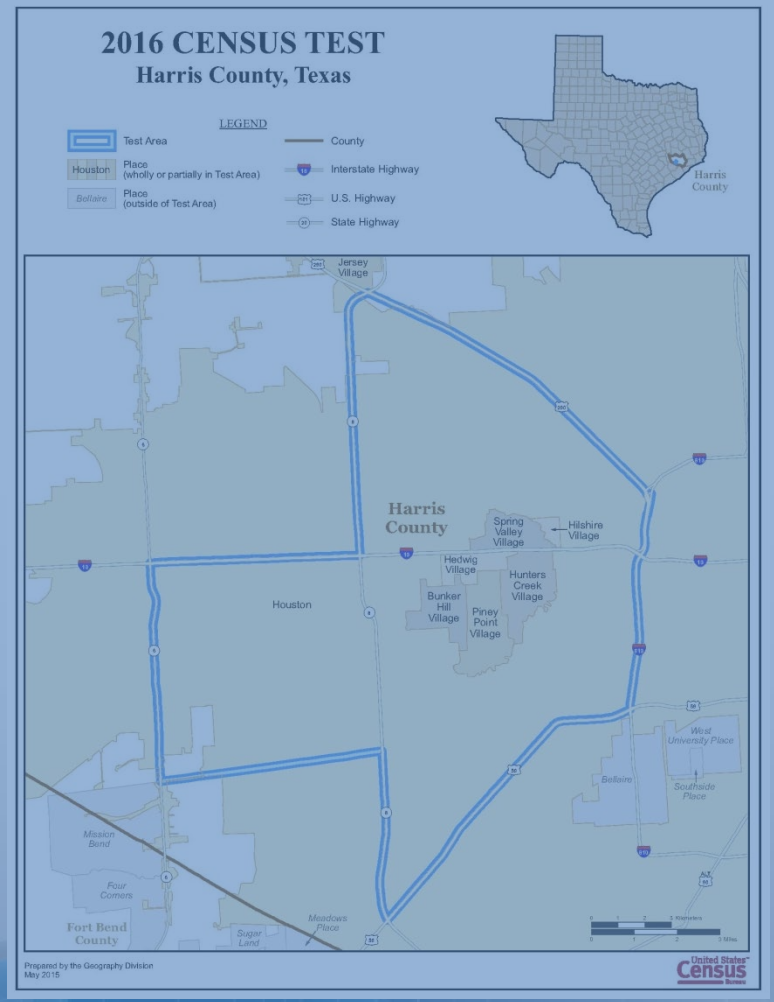
	Houston+	United States*
Households where no one over 14 speaks English "very well"	14.8%	4.6%
Population 18-24 years old	9.4%	10.0%
Renter Occupied Units	60.9%	35.1%
Population 25 and over, with less than a HS diploma	19.1%	13.9%

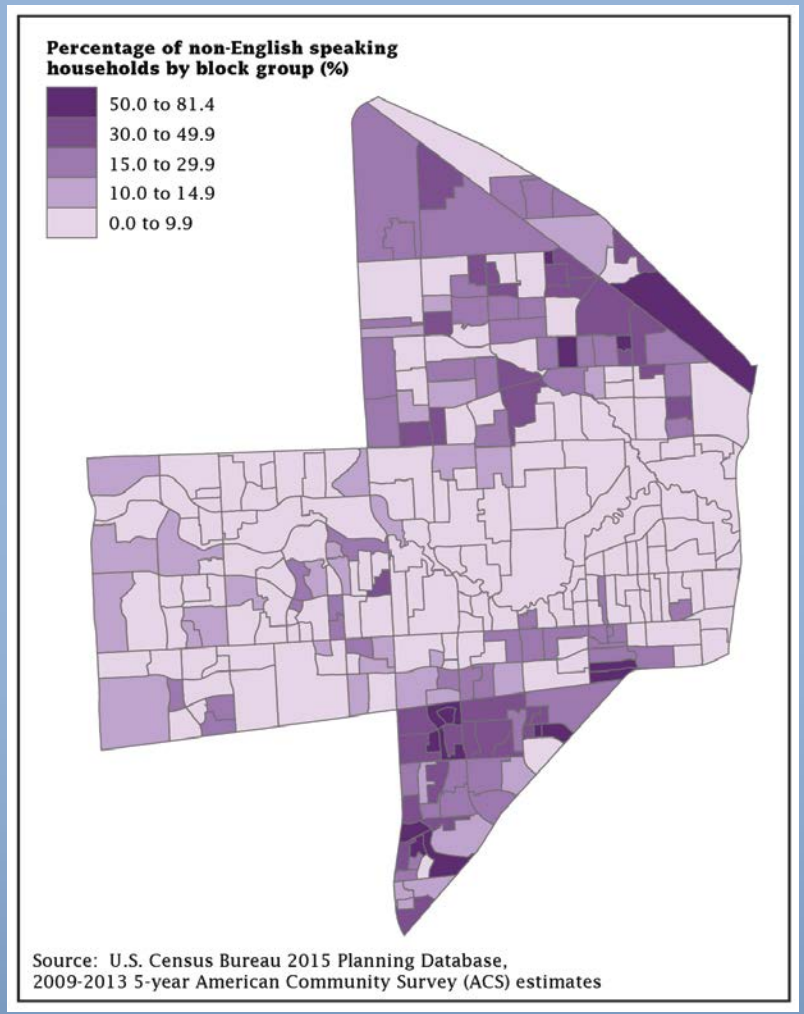
Source :+ 2015 PDB Block Group File http://www.census.gov/research/data/planning_database/2015/
*ACS 5 year 2009-2013 Estimate factfinder.census.gov

Limited English Proficiency

- Identify areas that need additional language materials
- Flag block groups or tracts that have a high percentage of housing units where no one over the age of 14 speaks English “very well”
- Identify what language is spoken in these block groups or tracts

Where are non-English speaking households located?





Limited English Proficiency Block Groups 2016 Census Harris TX Test Site

Block Group	No one speaks English "very well"	Spanish	Asian/Pacific Islander	Other
4327012	81.4% (14.3)	81.4% (14.0)	0% (2.1)	0% (2.1)
4330012	77.2% (13.4)	73.4% (13.5)	3.8% (4.1)	0% (2.3)
4327011	72.5% (11.1)	72.5% (10.9)	0% (1.6)	0% (1.6)
4335012	69.3% (10.9)	66.1% (10.7)	0% (1.7)	3.2% (4.8)
5214001	69.3% (21.1)	69.3% (20.6)	0% (3.7)	0% (3.7)

Source :+ 2015 PDB Block Group File http://www.census.gov/research/data/planning_database/2015/
*ACS 5 year 2009-2013 Estimate factfinder.census.gov

Identifying Potential Non-response Bias

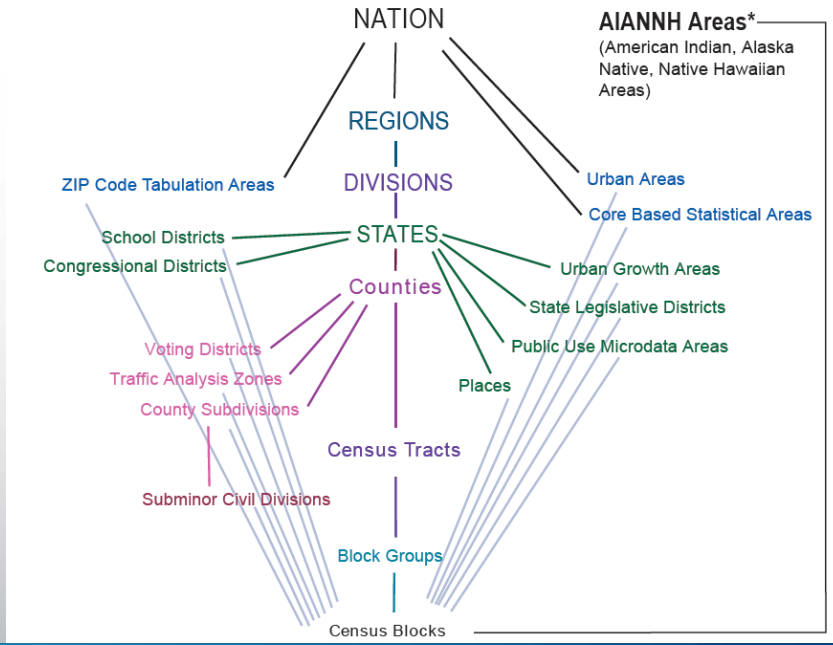
- If you know what tracts or block groups have high non-response in your survey you can estimate how non-respondents **may** differ on key demographics from respondents

	Respondent Characteristics	Sample Tract with high Non-response+
Percent living in poverty	5.3% (1.2)	59.6% (9.3)
Population 25 and over, with less than a HS diploma	19.1% (2.3)	28.5% (10.6)
Renter Occupied Units	35.1% (3.2)	86.4% (5.9)

Source :+ 2015 PDB Tract File http://www.census.gov/research/data/planning_database/2015/
ACS 5 year 2009-2013

Downloading Data to Build a Custom PDB

- ACS 5 year Estimates and 2010 Census Data are available at other geographies including
  - Zip Code Tabulation Areas
  - Congressional Districts
  - Counties
  - Other geographies as well



What are Zip Code Tabulation Areas (ZCTA)?

- Address's USPS Zip Code and ZCTA can be different!
- Generalized areal representations of United States Postal Service Zip Codes
- Only respect Census block boundaries, cross all other geographic boundaries
- Most common Zip Code within a block is assigned to all addresses in the block
- If all Zip Codes are equal, assign based on neighboring block's ZCTA

Example:
ZCTA 60565

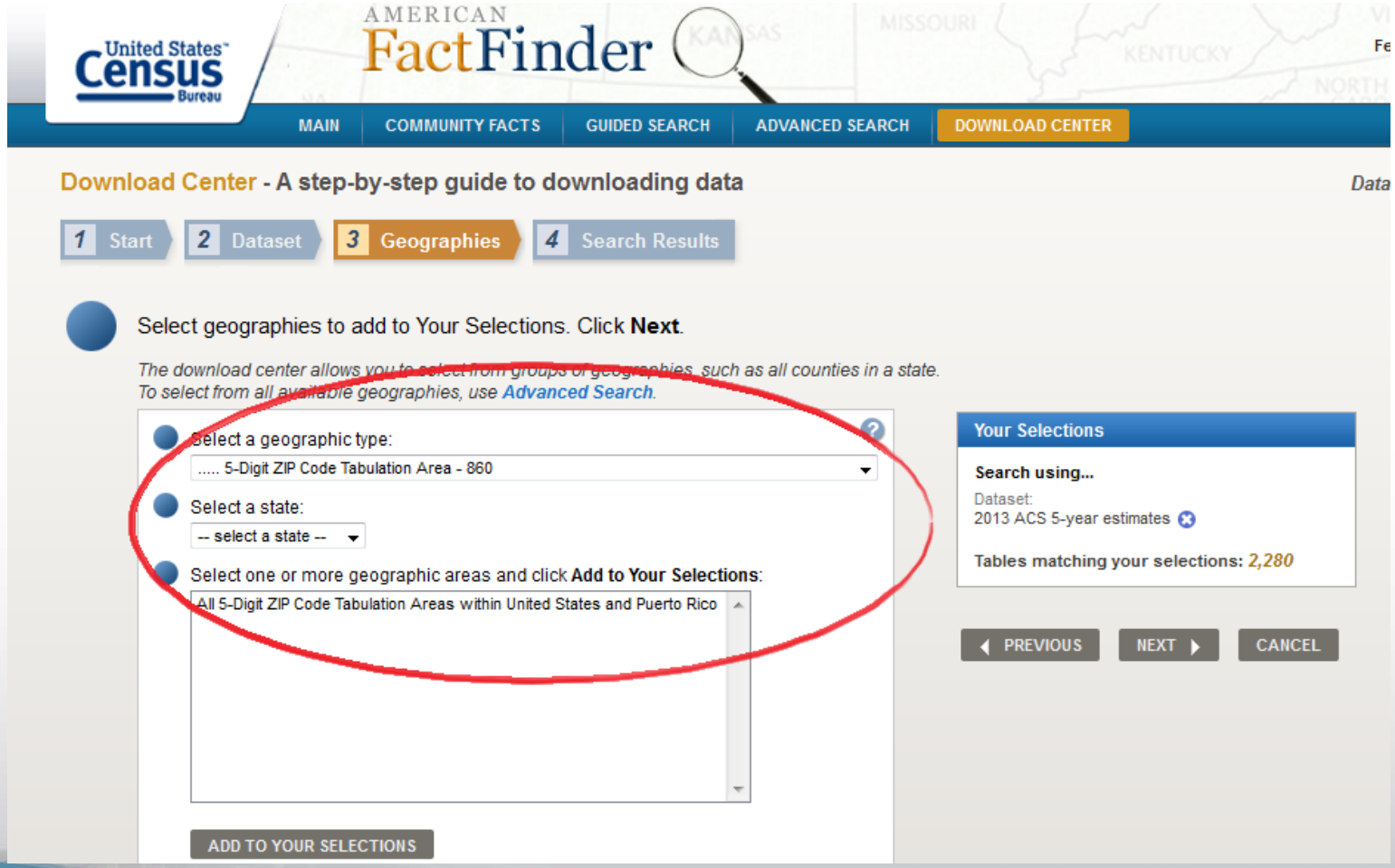
- 11 tracts that cross 2 counties are all or partially contained within this Zip Code Tabulation Area

Zipcode	County Name	TractID	Percent of pop in tract	Percent of land area in tract
60565	DuPage	846203	8.9%	7.4%
60565	Will	880118	8.9%	10.9%

Source: https: 2010 ZCTA to Tract Relationship File //www.census.gov/geo/maps-data/data/zcta_rel_download.html

How to Download (1)

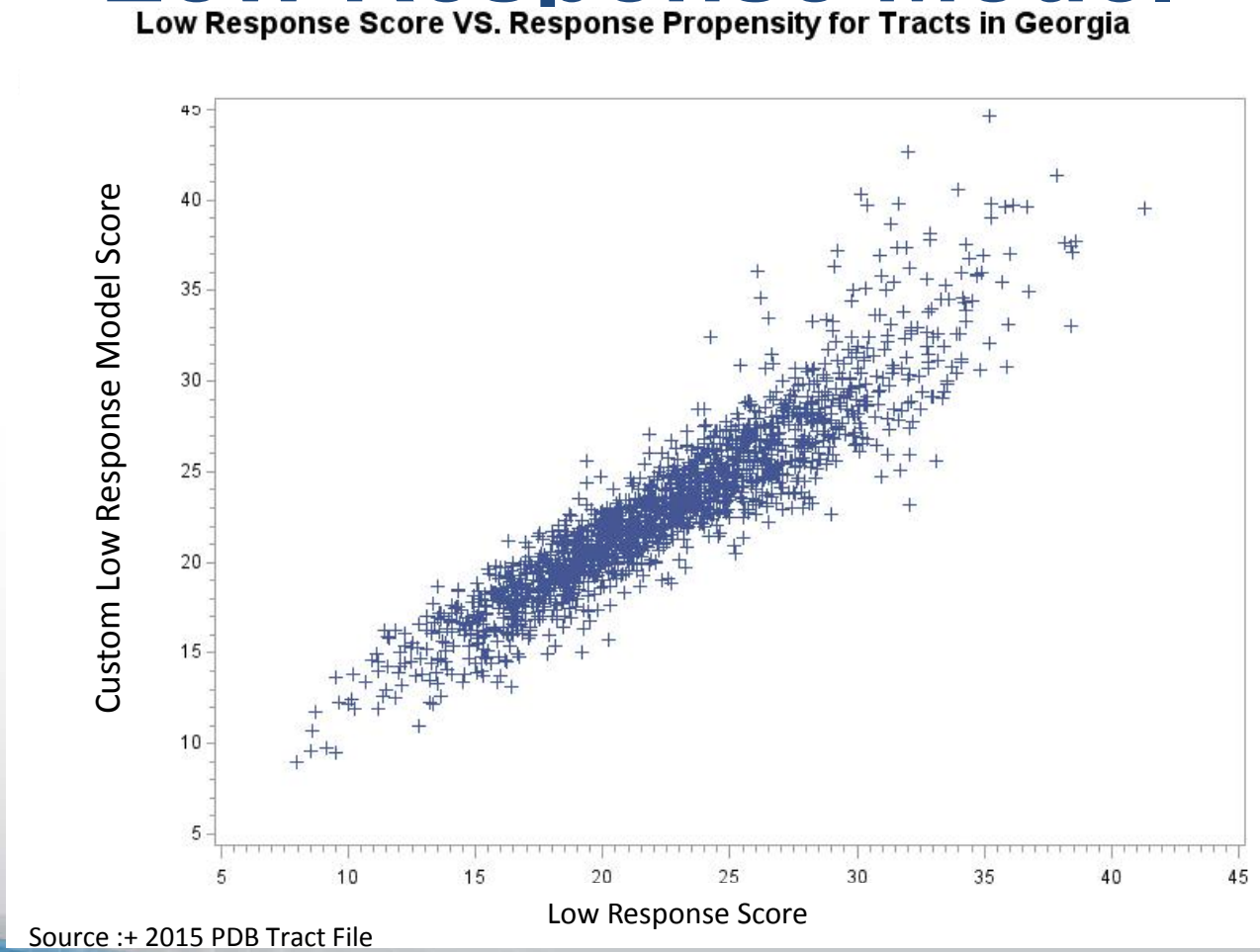
How to Download (2)



LRS Vs. Custom Low Response Model

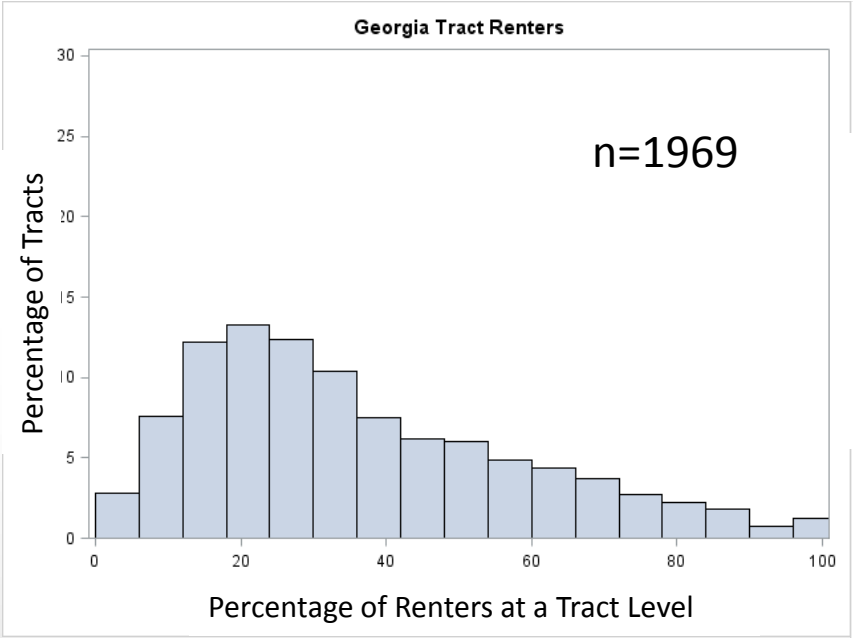
- Created an OLS model similar to Low Response Score on Georgia tract level PDB, used ACS 2009-2013 Estimates as Predictors
- Not the same as official Low Response Score
- Uses just recent ACS estimates

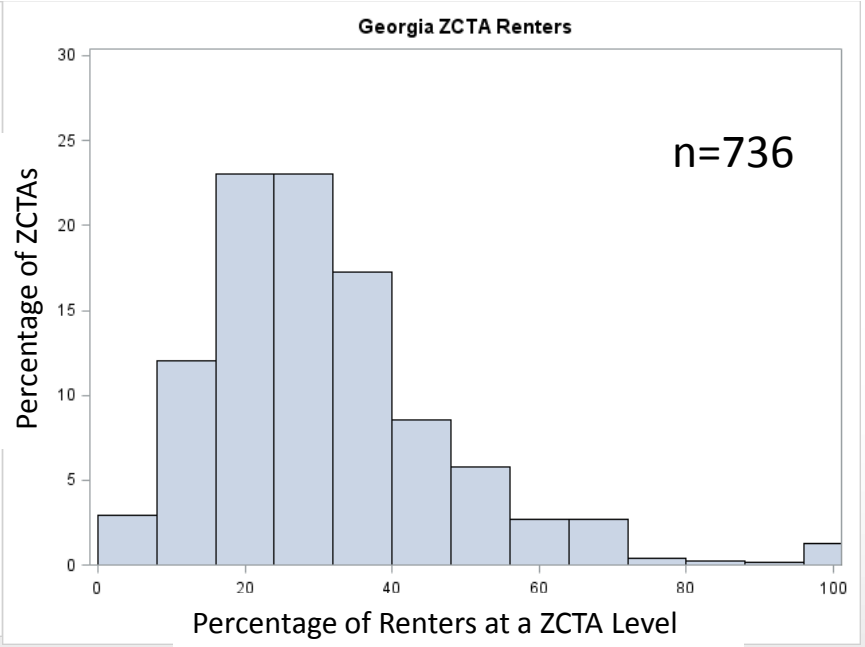
Low Response Score vs. Custom Low Response Model



Source :+ 2015 PDB Tract File
http://www.census.gov/research/data/planning_database/2015/
and ZCTA ACS 5 year 2009-2013 Estimate factfinder.census.gov

Percentage of Renters
Tract vs ZCTA Level





Source :+ 2015 PDB Tract File
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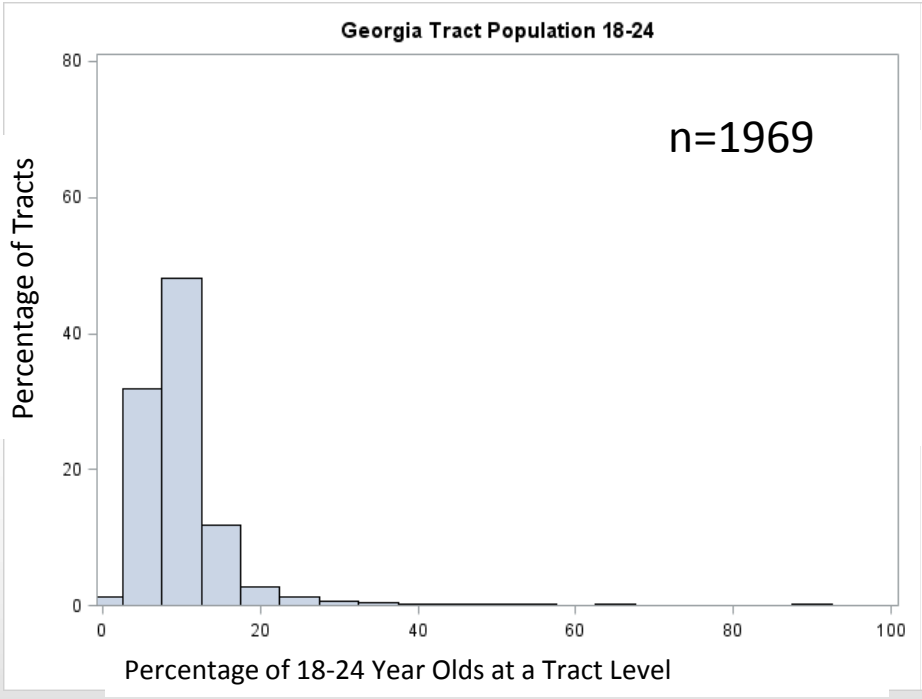
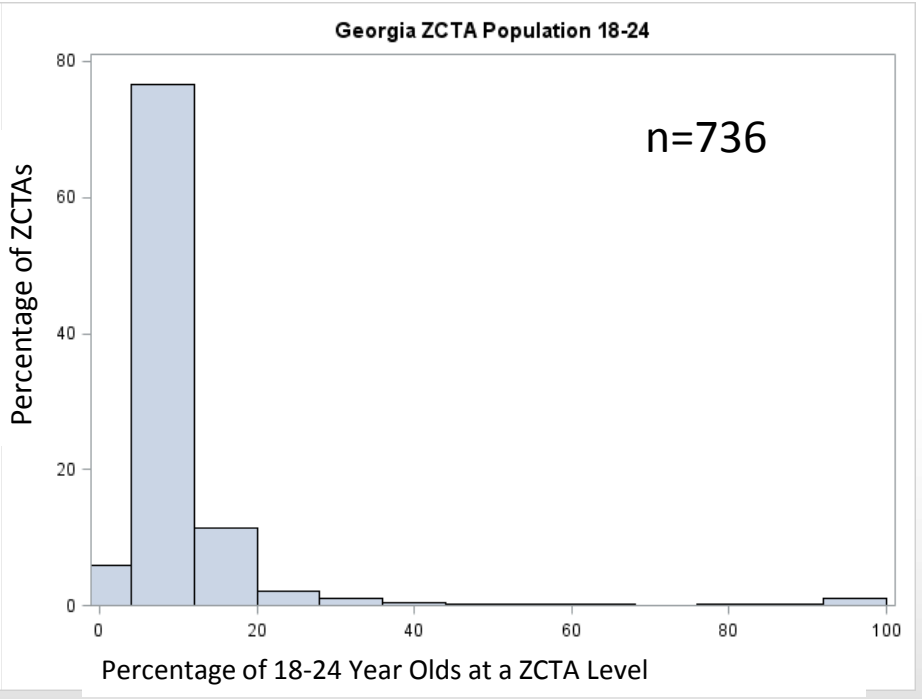
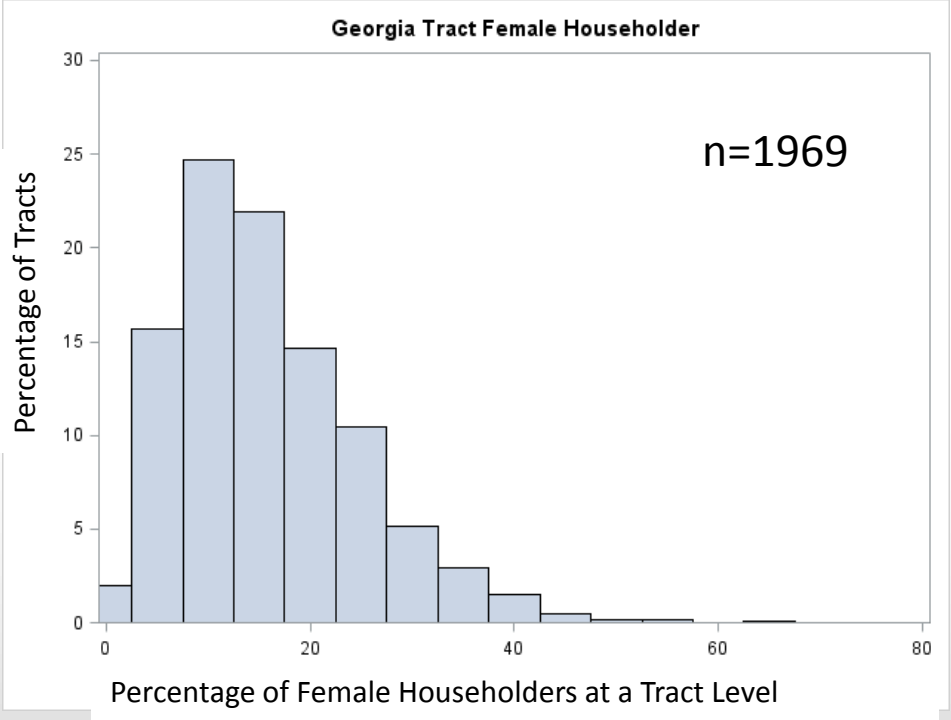
Percentage of 18-24 Year Olds Tract vs ZCTA Level

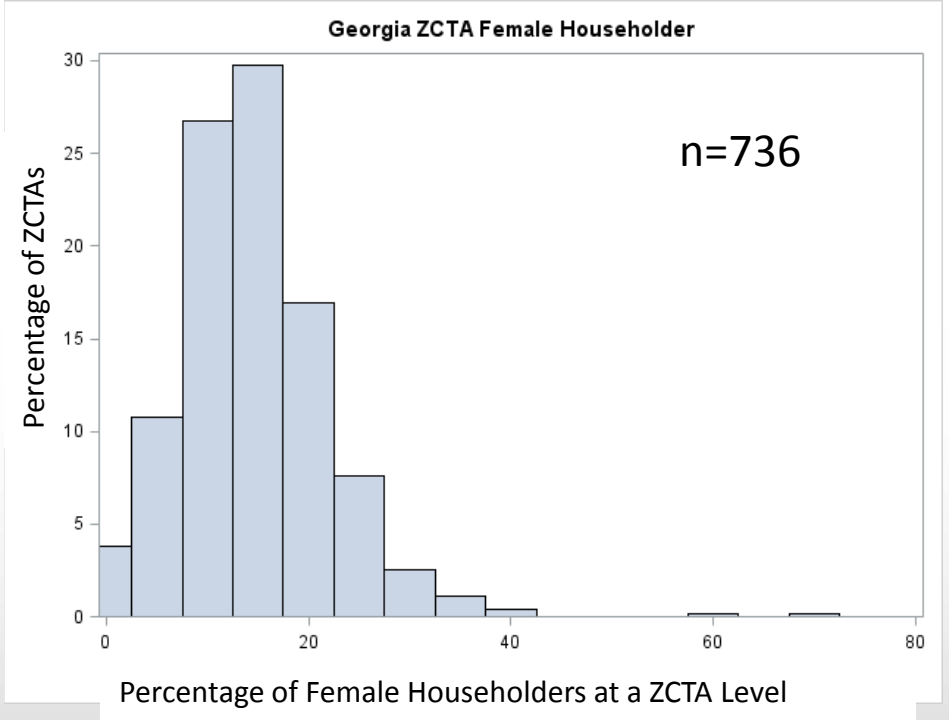




Source :+ 2015 PDB Tract File
http://www.census.gov/research/data/planning_database/2015/
and ZCTA ACS 5 year 2009-2013 Estimate factfinder.census.gov

Percentage of Female Householders
Tract vs ZCTA Level





Source :+ 2015 PDB Tract File
http://www.census.gov/research/data/planning_database/2015/
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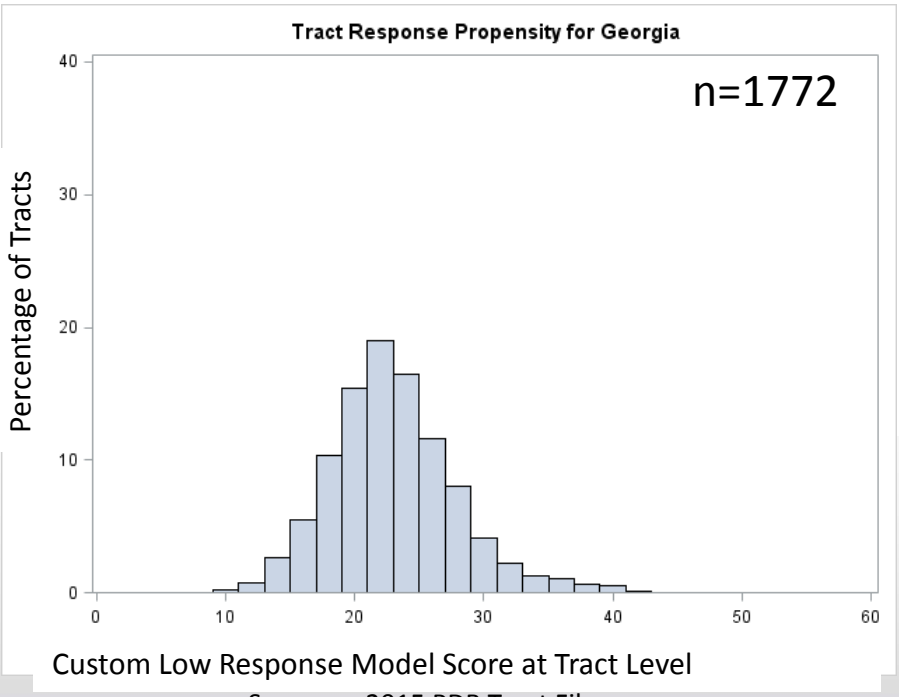
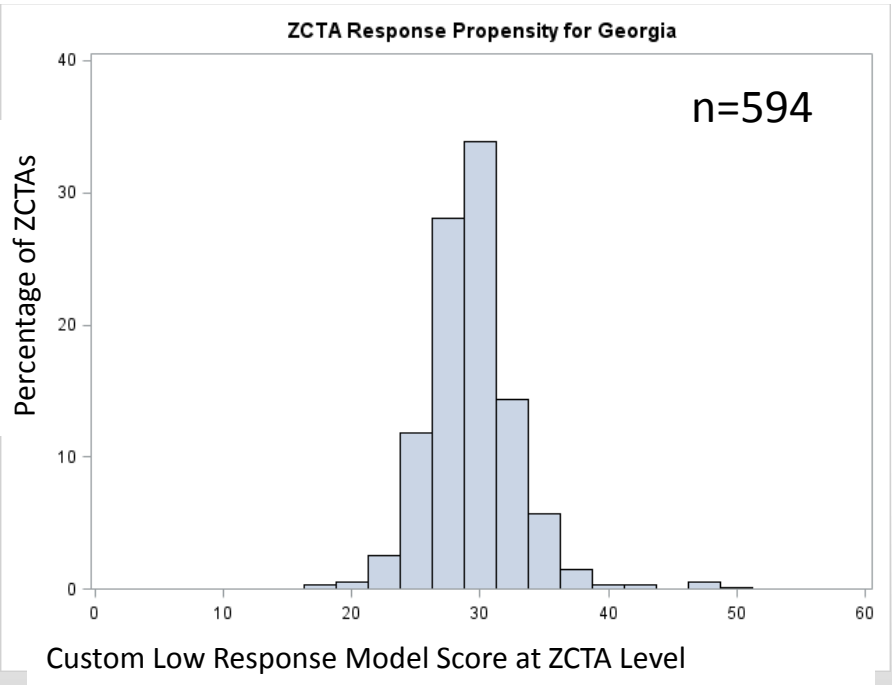
Tract Level Custom LRS Coefficients Applied to ZCTA Level



Custom Low Response Model Score at Tract Level



Custom Low Response Model Score at ZCTA Level

Source :+ 2015 PDB Tract File
http://www.census.gov/research/data/planning_database/2015/
and ZCTA ACS 5 year 2009-2013 Estimate factfinder.census.gov

Limitations

- 2010 Census Operational Data (including 2010 Mail Return Rate) is only available at tract and block group level
- Our Custom Low Response model is an approximation of Low Response Score
  - Uses only recent ACS estimates at a tract level to build coefficients
  - Does not perform well when scored on ZCTA level
  - Predicts only mail response, not other modes

Acknowledgements

- Thank you to Travis Pape and Julia Coombs for creating the code to generate the PDB
- Luke Larsen and Alina Kline for their work on the upcoming 2016 PDB
- Nancy Bates and Barb O'hare for their time and effort to bring the PDB back
- Suzanne McArdle for her work on PDB data visualizations

How to Access the PDB and Contact Info

- Available on the Census Bureau's Research @ Census page
- Link to the PDB CSV format: http://www.census.gov/research/data/planning_database/
- API format: www.census.gov/developers

Questions?

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