

A Statewide Socioeconomic Tier Model for Texas School-Age Residents: Methodology and Results

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Executive Summary

A five-tier socioeconomic status (SES) classification model for Texas school-age residents was developed, based on previous efforts by Chicago Public Schools (CPS), the Dallas Independent School District (DISD), and the San Antonio Independent School District.

- In contrast to previous models that encompassed single school districts, the current model encompassed the entire Statewide school-age population, as estimated by the most recent American Community Survey (ACS) 5-year estimates (2012-2016).
- Household income, home ownership, household composition, and educational attainment data from ACS were used to construct a composite SES score for each of the 15,286 Texas block groups that contained family households and for which the most recent 5-year ACS provided a median household income estimate.
- The Texas school-age population of approximately 7 million residents was apportioned into five SES tiers based on the SES score of the census block group in which the population resided.
- Each SES tier contained 20 percent of the school-age population, or approximately 1.4 million individuals.
- This model was used to create a sortable Excel spreadsheet containing point estimates of socioeconomic indicators, the school-age population, and the SES tier classification for each of the 15,262 Texas block groups included in the model.

1.

Introduction

Chicago Public Schools (CPS) originally developed a SES tier methodology to increase opportunities for students to attend selective schools and to increase diversity in the student body. Schools that enroll students with this methodology typically use the lottery of a point-based system and create unique learning environments that foster competition. The model originally developed by CPS was based on six factors: household income, home ownership, household composition, educational attainment, English proficiency, and school performance. Subsequent models developed by the Dallas Independent School District and the San Antonio Independent School District (SAISD) omitted the latter two factors. The current model mirrors the methodology developed by Mohammed Choudhury at SAISD but extends it to cover the Statewide school-age population.

The 2016 American Community Survey (ACS) 5-year estimates contain the most recent and most comprehensive socioeconomic data from the Census Bureau at the census tract and block group levels. However, these data are not for the year 2016; they are estimates for the 5-year period 2012-2016, centered on mid-2014. As per the Census Bureau, "The primary advantage of using multiyear estimates is the increased statistical reliability of the data for less populated areas and small population subgroups."¹

Commercial vendors offer data products with more up-to-date estimates. For example, [ESRI](#) (used by DISD), [STI](#) (used by CPS), and [ProximityOne](#) (another popular vendor) offer yearly estimates of socioeconomic variables at the census tract and block group levels, with 2017-2018 as the most recent year available. However, these yearly estimates are extrapolations based on ACS data. Commercial vendors also add value by providing a customized data table containing all the required variables calculated at the tract or block group level. Calculating the necessary data elements from the raw ACS data is slightly more labor intensive, because the required socioeconomic and educational variables are spread among multiple tables. These tables must be downloaded from the ACS Website, merged, and summarized. The necessary average, rate, and percent variables must be computed. However, there is a cost associated with using data products from commercial vendors, whereas the ACS data are available free of charge.

2. Methodology

Data Source

Following Mohammed Choudhury's methodology, the current model is based on the 2016 ACS 5-year estimates. 2016 ACS 5-year table and column numbers for available variables that were used to compute the Socioeconomic Tiers are shown in Table 1.²

Table 1. 2016 ACS 5-year Estimates: Variables Used to Calculate Socioeconomic Tiers

Table Number	Short Description	Column Number	Short Description
B09018	Population Under 18	B09001001	Total
B11001	Household Type	B11001001	Family Households
		B11001004	Other Family
		B11001005	Male Householder, No Wife Present
		B11001006	Female Householder, No Husband Present
B19013	Median Household Income	B19013001	Median Household Income
B25003	Tenure	B25003002	Owner Occupied
		B25003003	Renter Occupied
B15003	Educational Attainment	B15003001	Population 25 years and over
		B15003002	No Schooling Completed
		B15003003	Nursery School
		B15003004	Kindergarten
		B15003005	1st Grade
		B15003006	2nd Grade
		B15003007	3rd Grade
		B15003008	4th Grade
		B15003009	5th Grade
		B15003010	6th Grade
		B15003011	7th Grade
		B15003012	8th Grade
		B15003013	9th Grade
		B15003014	10th Grade
		B15003015	11th Grade
		B15003016	12th Grade, No Diploma
		B15003017	Regular High School Diploma
		B15003018	GED or Alternative Credential
		B15003019	Some College, Less than 1 Year
		B15003020	Some College, 1 or More Years, No Degree

Table 1. 2016 ACS 5-year Estimates: Variables Used to Calculate Socioeconomic Tiers

	B15003021	Associate's Degree
	B15003022	Bachelor's Degree
	B15003023	Master's Degree
	B15003024	Professional School Degree
	B15003025	Doctorate Degree
GEOID	ex: 484530001011 (Block Group 1, Tract 1.01, Travis County, Texas)	

Calculation Method

The relevant ACS 5-year tables as shown above were downloaded from the Census website and imported into SAS. Each table contained 15,811 records corresponding to the 15,811 Census Block Groups in Texas. The SAS data files were merged using the Geo_ID variable (a unique identifier for each Block Group) which links the ACS data tables. The needed variables were renamed and labeled for ease of analysis. SES Tiers were developed with the goal of having 20% of the school-age population in each Tier. From the ACS 5-year estimate data, there were 7.1 million school-age individuals residing in Texas as of mid-year 2014. Thus, approximately 1.4 million school-age residents were placed in each Tier. The SES score was calculated by ranking the following metrics:

- (1) Median Household Income by Block Group, from highest to lowest.
There were 520 Block Groups with missing Median Household Income. Due to the missing data, an SES score was not calculated for these block groups.
- (2) The Home Ownership rate by Block Group (calculated as owner-occupied housing units/total housing units), from highest to lowest. There were 84 block groups that contained no residential housing units as per the most recent ACS. As SES score was not calculated for these block groups.
- (3) The percentage of Single-Parent Households (calculated as single-parent households/total family households), from lowest to highest. There were 94 block groups in which no family households resided. An SES score was not calculated for these block groups.
- (4) An Education Score, as described by SAISD and CPS, representing the educational attainment level of the area. First, the percentage of the population over the age of 25 was determined for each of 5 educational attainment categories: Less than a HS Diploma, HS Diploma or GED, Some College (including Associates Degrees), Bachelor's Degree, and Advanced Degree. These categories reflect the educational levels of individuals residing in the block group. Higher educational attainment was given more weight. The percentages were multiplied by the following numbers:

- Less than a HS Diploma – 0.2
- HS Diploma or GED – 0.4

- Some College – 0.6
- Bachelor’s Degree – 0.8
- Advanced Degree – 1.0

Results were added to get a block group Education Score from 0.2 to 1.0. The Education Score was then ranked from highest to lowest. There were 46 block groups in which no individuals 25 or older resided. An SES score was not calculated for these block groups.*

Each of the four variables were ranked and assigned a percentile score from 0 to 1. A unique percentile score was calculated for each percentage score, such that two block groups sharing the same percentage score on a given indicator received the same percentile score for that indicator. The scores were then added to create an overall Socioeconomic Score falling between 0 and 4, using the following calculation:

Total Socioeconomic Score = Median Household Income Score
 + Home Ownership Score
 + Single-Parent Family Score
 + Education Score

After calculating a total socioeconomic score for each of 15,286 block groups with complete data, they were then ranked in order from lowest to highest. Census block groups were then placed into Tier 1 (the lowest score) until approximately 20% (~1,402,432) of school-age residents were in that tier. Once approximately 20% of students were in Tier 1, the same process was followed until approximately 20% of students were in Tier 2, and so on for Tiers 3 through 5. The resulting quintile split was as even as possible given the distribution of scores and the number of school-age residents in each census block group.

* As is to be expected, there was considerable overlap among block groups with missing median income estimates, no family households, no housing units, and/or no 25-and-older residents. The total number of block groups excluded due to a missing or zero value on one or more of these variables was 525 (containing 102,191 school-age residents).

3. Results

The SES score ranges corresponding to each Tier were as follows:

Tier 5: Greater than 3.0130487100055 (2,511 Block Groups)
 Tier 4: Between 2.3437366388869 and 3.0130487100055 (3,153 Block Groups)
 Tier 3: Between 1.7323566742539 and 2.3437366388868 (3,299 Block Groups)
 Tier 2: Between 1.1329322262470 and 1.7323566742538 (3,203 Block Groups)
 Tier 1: Less than 1.1329322262470 (3,120 Block Groups)

The exact numbers of school-age residents assigned to each tier are shown in Table 2.

Table 2. Texas Census Block Groups and School-Age Residents by Calculated SES Tier (ACS 2016 5-yr Estimates)

SES Tier	Block Groups		School-age residents	
	<i>N</i>	%	<i>N</i>	%
Tier 5	2,511	16.4%	1,403,267	20.0%
Tier 4	3,153	20.6%	1,402,534	20.0%
Tier 3	3,299	21.6%	1,401,823	20.0%
Tier 2	3,203	21.0%	1,402,545	20.0%
Tier 1	3,120	20.4%	1,401,991	20.0%
Total	15,286	100.0%	7,012,160	100.0%

Table 3 provides summary statistics of an average area in each Tier.

Table 3. Mean Indicators for Texas Census Block Groups by Calculated SES Tier (ACS 2016 5-yr Estimates)

SES Tier	Median Household Income	% Home Ownership	% Single-Parent Households	Educational Score %	Total Socio-economic Score	Number of school-age residents
Tier 5	\$114,358	89%	11%	70%	3.4	559

Tier 4	\$68,724	75%	19%	60%	2.7	445
Tier 3	\$52,944	64%	27%	54%	2.0	425
Tier 2	\$40,507	54%	37%	48%	1.4	438
Tier 1	\$28,705	37%	53%	42%	0.8	449

4. Conclusion

Because the tier methodology presented here is based on a statewide norm, it may have limited usefulness in counties with little variation in SES at the block group level. In addition, arguably there is a range of factors that make a meaningful contribution to SES diversity, but that are not included in this model. Such factors may include school performance, language proficiency, race and ethnicity, health disparities, computer ownership, and internet access. Future research is needed to examine the contribution of these and other factors to SES in school-age populations.

5. Next Steps

Continue analysis with district mapping. Any changes to analysis and tiering methodology will follow the direction of leadership.

¹ <https://www.census.gov/data/developers/data-sets/acs-5year.html>

² ACS Data Tables were downloaded here:
https://factfinder.census.gov/faces/nav/jsf/pages/download_center.xhtml