Using the Economic Hardship Index to Drive Student Success

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Lee College

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Problem Statement

- Institutional Effectiveness means, in part, that Student Achievement should not depend on demographics.

- SACSCOC Standard 8.1 requires disaggregating student achievement by appropriate demographics and seeking improvement to close gaps between groups, typically including gender, race and ethnicity.

- Texas Education Code Section 51.3525 (a.k.a. SB17) prohibits seeking improvement for students based on gender, race or ethnicity.

- Colleges and Universities need to create demographic measures other than gender, race and ethnicity to drive improvements.
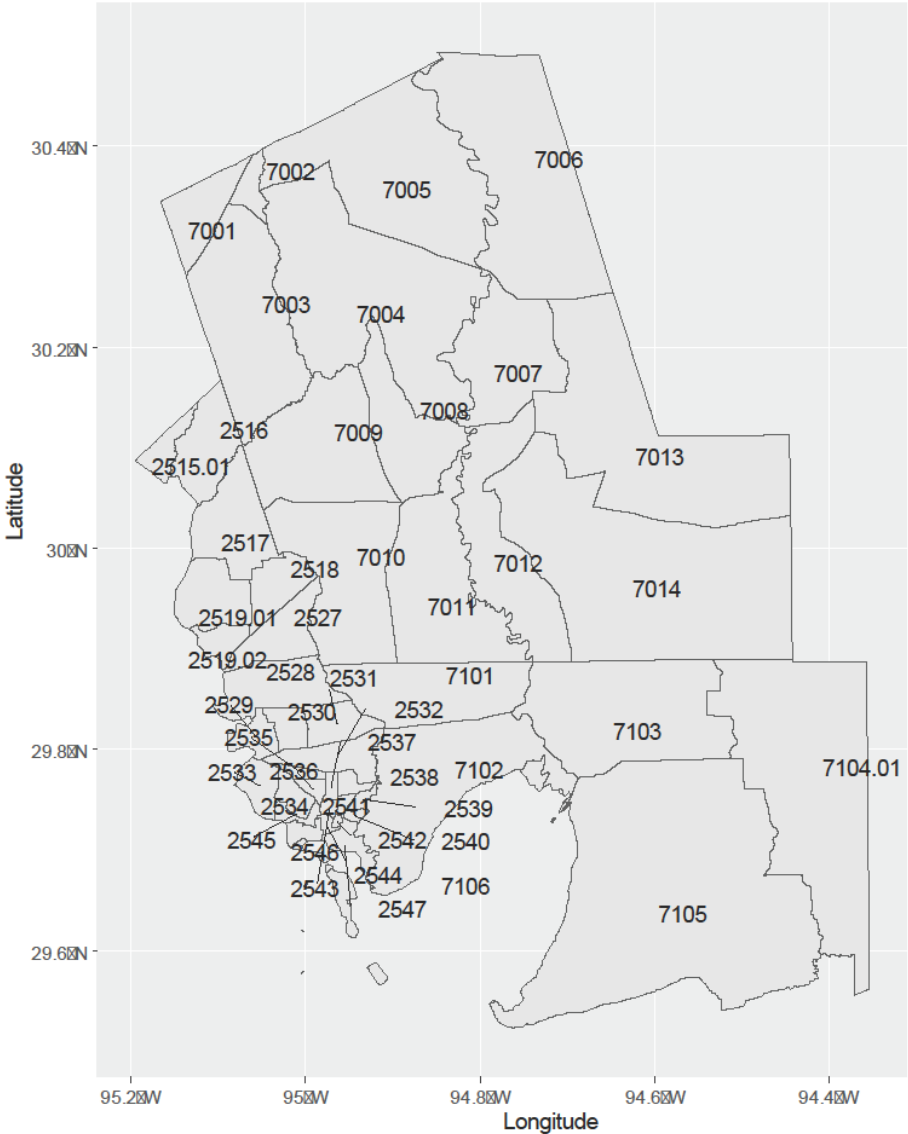
Economic Hardship Index

1. Poverty
2. Per Capita Income
3. Educational Attainment
4. Employment
5. Dependency
6. Crowded Housing

Census Tracts

- A subdivision of a county containing 1,200 to 8,000 people (optimum size is 4,000).

- Designed to be generally homogeneous with respect to population characteristics, economic status and living conditions.

- Boundaries follow visible features like roads, rivers, etc. and non-visible features like city limits.

- Texas has about 5,265 census tracts.

- Zip codes vary in size from less than 100 to more than 100,000 residents, and are not selected for the homogeneity of the residents.

Fig. 1: Census Tracts in the Lee College Service Area

Two Problems

- For each census tract, we need to compute the Economic Hardship Index.

- For each student, we need to identify their census tract.

Poverty

1. Numerator: Families with income in the past 12 months below poverty level (B17010_002).

2. Denominator: Total Families (B17010_001)

3. Calculate the poverty level for every Texas census tract.

4. Assign each census tract a value based on the percentage of census tracts with lower poverty levels, e.g., a tract in the 60th percentile has higher poverty rates than 60% of the tracts in Texas.

American Community Survey Tables

https://www.census.gov/programs-surveys/acs/data/data-tables.html

Per Capita Income

1. Value: Per capita income in the past 12 months (in 2022 inflation-adjusted dollars) (B19301_001)

2. Calculate the per capita income for every Texas census tract.

3. Assign each census tract a value based on the percentage of census tracts with higher income, e.g., a tract in the 60th percentile has lower income than 60% of the tracts in Texas.

Educational Attainment

- Numerator: Males & Females 25 years and older
  - No schooling (B15002_003 & B15002_020)
  - Nursery to 4th grade (B15002_004 & B15002_021)
  - 5th and 6th grade (B15002_005 & B15002_022)
  - 7th and 8th grade (B15002_006 & B15002_023)
  - 9th grade (B15002_007 & B15002_024)
  - 10th grade (B15002_008 & B15002_025)
  - 11th grade (B15002_009 & B15002_026)
  - 12th grade no diploma (B15002_010 & B15002_027)
- Denominator: Total population 25 years and older (B15002_001)

Employment

- Numerator: Civilian population age 25-64 unemployed but in the civilian labor force
  - Less than a high school graduate (B23006_007)
  - High school graduate (B23006_014)
  - Some college or associate degree (B23006_021)
  - Bachelor's degree or higher (B23006_028)
- Denominator: Civilian population age 25-64 in the civilian labor force
  - Less than a high school graduate (B23006_005)
  - High school graduate (B23006_012)
  - Some college or associate degree (B23006_019)
  - Bachelor's degree or higher (B23006_026)

Dependency

- Numerator: Males & Females younger than 18 or older than 64:
  - Under 5 years (B01001_003 & B01001_027)
  - 5-9 years (B01001_004 & B01001_028)
  - 10-14 years (B01001_005 & B01001_029)
  - 15-17 years (B01001_006 & B01001_030)
  - 65 & 66 years (B01001_020 & B01001_044)
  - 67-69 years (B01001_021 & B01001_045)
  - 70-74 years (B01001_022 & B01001_046)
  - 75-79 years (B01001_023 & B01001_047)
  - 80-84 years (B01001_024 & B01001_048)
  - 85 years and over (B01001_025 & B01001_049)
- Denominator: Total Population (B01001_001)

Crowded Housing

- Numerator: Owner or renter occupied housing units:
  - 1.01 to 1.50 occupants per room (B25014_005 & B25014_011)
  - 1.51 to 2.00 occupants per room (B25014_006 & B25014_012)
  - 2.01 or more occupants per room (B25014_007 & B25014_013)
- Denominator: Total occupied housing units (B25014_001)

Economic Hardship Index

1. high percentile → High Poverty
2. high percentile → Low Per Capita Income
3. high percentile → Low Rates of Educational Attainment (HS diploma)
4. high percentile → High Unemployment
5. high percentile → High Levels of Dependency
6. high percentile → High Rates of Crowded Housing

Census Tract in Baytown, TX

Vertex	Longitude	Latitude
1	-94.9546	29.73878
2	-94.9539	29.73986
3	-94.9482	29.73858
4	-94.9454	29.73952
5	-94.9417	29.74012
6	-94.9339	29.74118

Vertex	Longitude	Latitude
7	-94.9337	29.74056
8	-94.9286	29.74116
9	-94.9283	29.73875
10	-94.929	29.73706
11	-94.9323	29.73388
12	-94.9348	29.73258

Vertex	Longitude	Latitude
13	-94.9392	29.72685
14	-94.9415	29.72772
15	-94.9464	29.72905
16	-94.9574	29.73228
17	-94.9546	29.73878

Student in Baytown, TX

200 Lee Dr., Baytown TX 77520

Longitude	Latitude
-95.01465	29.73328

Geocoding Addresses

- The US Census will geocode 10,000 addresses for free
- https://geocoding.geo.census.gov/geocoder/geographies/addressbatch?form
- Smarty.com geocodes 10,000 addresses per month for $225/month
- https://www.smarty.com/products/us-rooftop-geocoding

Winding Number Algorithm

Winding #	
1 → 2	0
2 → 3	+1
3 → 4	-1
4 → 5	+1
5 → 6	-1
6 → 7	0
7 → 8	0
8 → 9	0
9 → 1	0
TOTAL	0

Student Residence

Census Tract
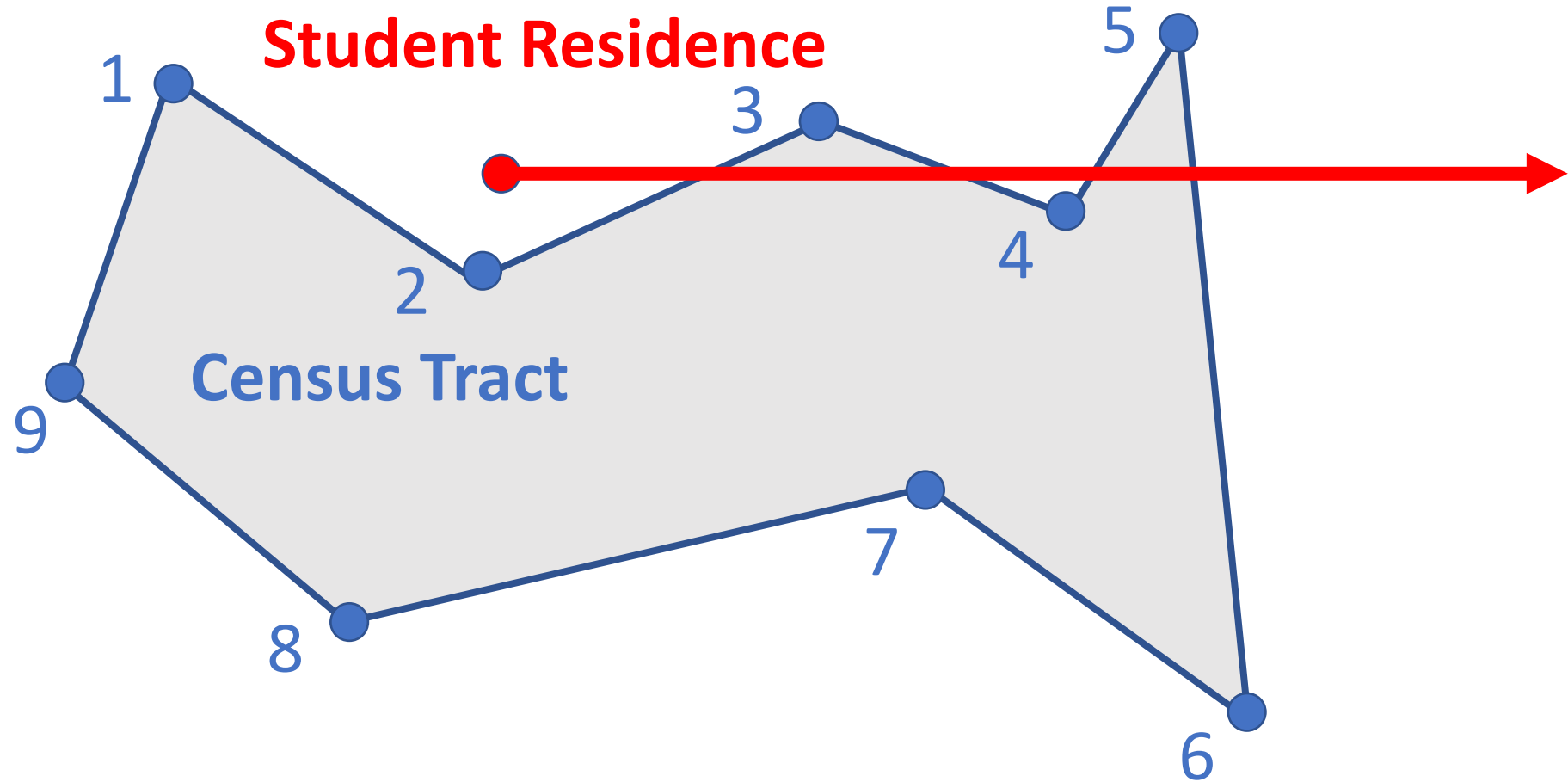
Economic Hardship Index

- Each student has an economic hardship index as long as they have a home address.

- The index is a demographic parameter that can be used to show institutional effectiveness.

- Retention and completion can be disaggregated by the index.

Other Variables

- Types of computing devices and internet connection
- Health insurance coverage status
- Geographic mobility

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Texas Association for Institutional Research

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Omni Hotel in Corpus Christi, TX