Fairfax County CommunityScape: Economic Vulnerability

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Introduction

Fairfax County and the Inova Health System seek to better understand the context in which their citizens and patients live, learn, work, and play. Both stakeholders would benefit from a **Fairfax CommunityScape**, a quantitative characterization of the county's social determinants of health and wealth.

Objective: Create an **economic vulnerability** index to identify populations at risk, promote informed policy in Fairfax County, and establish a baseline for measuring change.

Data sources

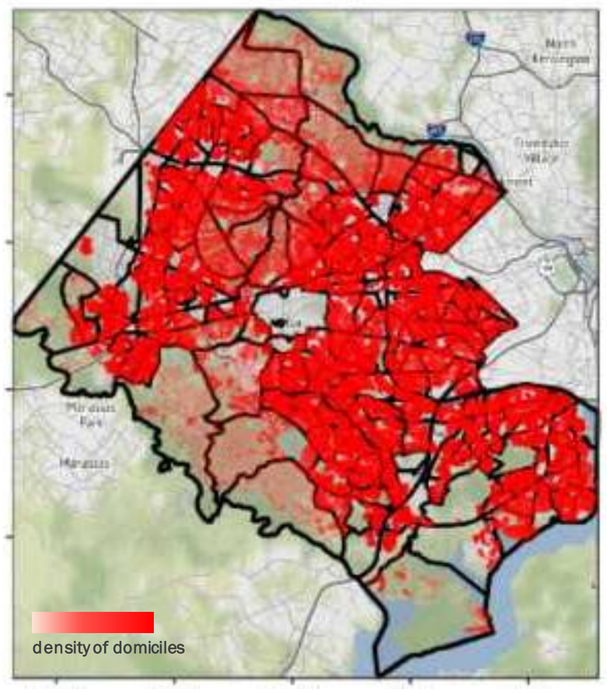
AMERICAN COMMUNITY SURVEY, U.S. CENSUS BUREAU

Demographics
Financial conditions
Employment status
Transportation

Domicile locations
Housing conditions

Measures

Location of ACS Domiciles by Fairfax Census Tract



According to the **literature**, e.g. educational attainment,[1] English proficiency,[2] and access to medical care,[3] are proxies for economic vulnerability. This information informed our variable selection.

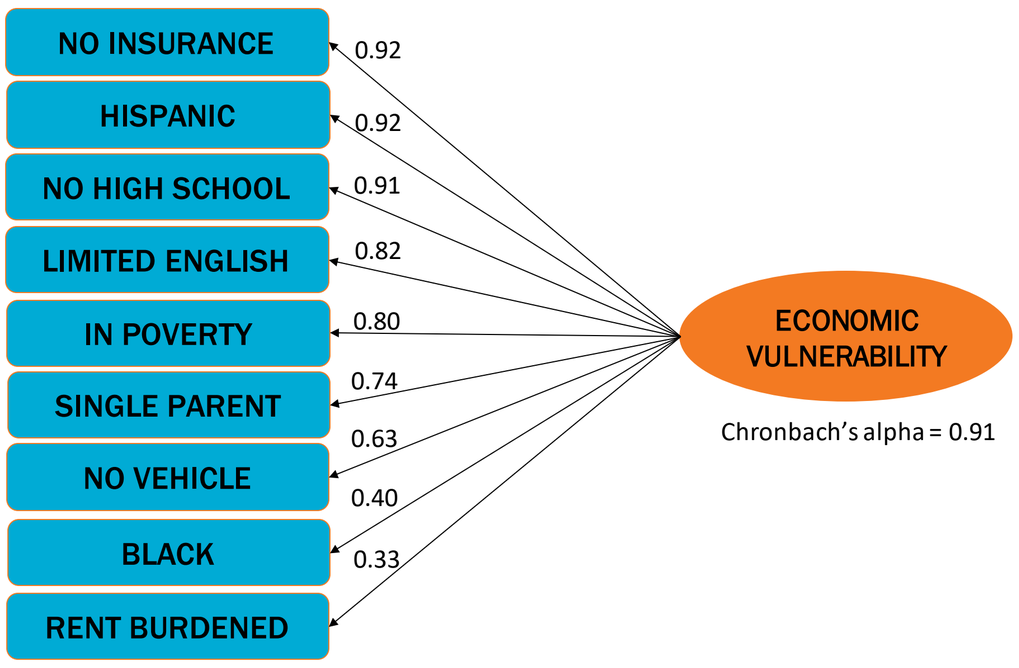
We combined American Community Survey (ACS) data with Fairfax housing stock data using a **population synthesis technique** to obtain ACS data at three geographic levels (census tract, supervisor district, high school attendance zone).

We created variables (e.g. proportions, medians as appropriate) at each geography of interest.

Composite Index Construction

INDICATORS AND LOADINGS

Proportion of geography with...



Chronbach's alpha = 0.91

Our final model uses a varimax rotation with the principal factor solution method.

Using the loadings from the model, we computed the economic vulnerability index using the following formula:

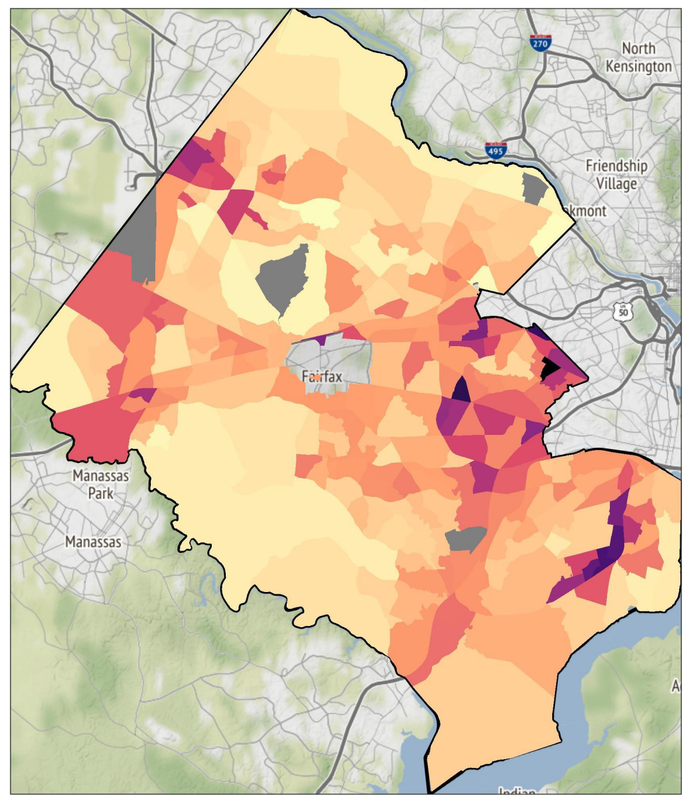
$$\mathcal{F} = \mathbf{X}^s \cdot \mathbf{F}^T \cdot \mathbf{w}.$$

$\mathcal{F}$: Index score
$\mathbf{X}^s$: Standardized design matrix (n * p)
$\mathbf{F}^T$: Matrix of factor scores (k * p)
$\mathbf{w}$: Proportion of variance explained (k * 1)

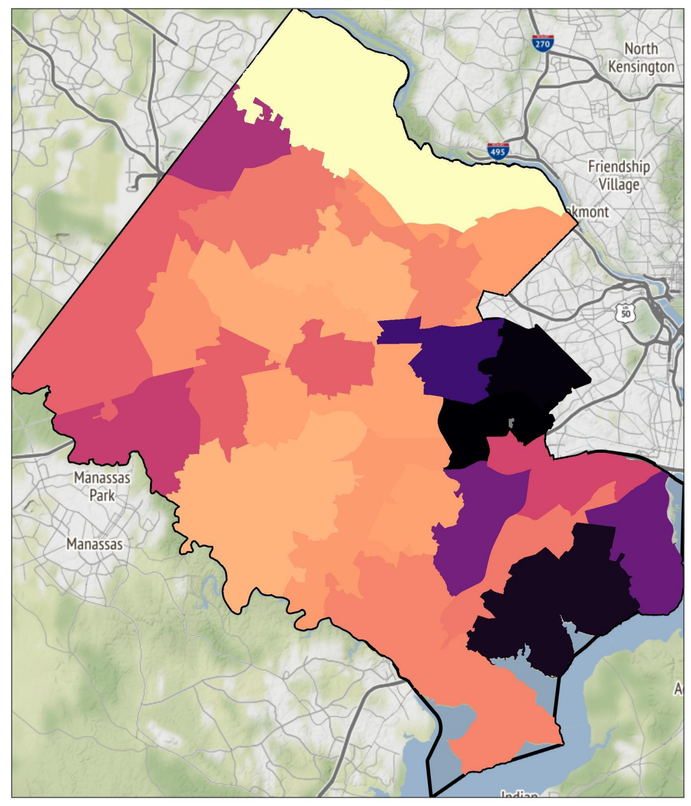
Results

Vulnerability: Low — Medium — High

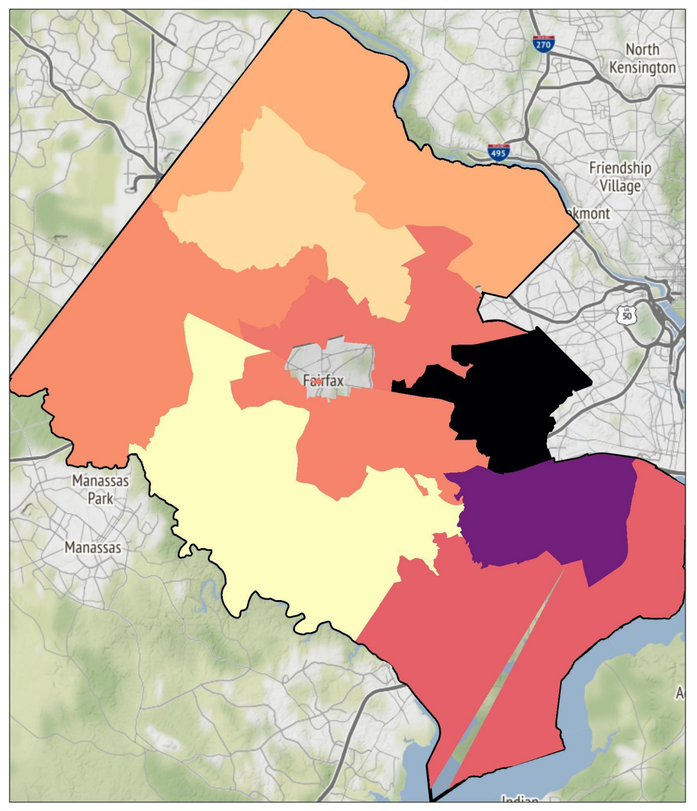
Economic Vulnerability Index by Census Tract



Economic Vulnerability Index by High School Attendance Area



Economic Vulnerability Index by Supervisor District



Regions with high levels of economic vulnerability:
Census tracts: Dulles and Arlington adjacent
High school districts: Annandale, Justice, Mt. Vernon
Supervisor districts: Mason, Lee

Future Directions

- Further **collaboration** with Inova and Fairfax County: Place citizens and patients in context.
- Index **refinement**: Develop stakeholder weights and compare results.
- Index **validation**: How can we ensure our CommunityScape reflects reality? Does the index predict citizen and patient outcomes?

FOOTNOTES
[1]Malecki, C. K., Demaray, M. K. (2006). Social support as a buffer in the relationship between socioeconomic status and academic performance. *School Psychology Quarterly, 21* (4), 375-395.
[2]Fry, R. (2008). The role of schools in the English language learner achievement gap. Washington, DC: Pew Hispanic Center.
[3]Shi, L., Lebrun, L. A., & Tsai, J. (2009). The influence of English proficiency on access to care. *Ethnicity & health*, *14*(6), 625-642.

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