

# Displacement Risk Analysis: Champaign County, IL

## 1. Introduction and Motivation

Housing affordability is a growing concern in many U.S. counties. Factors such as increasing rent, low household incomes, and concentrated job or retail development can displace vulnerable residents who cannot keep pace with rising costs. In this analysis, I focus on **Champaign County, Illinois**, creating a “**displacement risk**” measure by combining local Census data (rent burden and demographic factors) with variables from the **Location Affordability Index (LAI)**, such as **housing costs**, **job density**, **retail density**, and more.

My goal is to:

1. **Assess** which populations are more likely to face displacement (renters, homeowners, different racial or ethnic groups, seniors, and children).
2. **Visualize** how risk is spatially distributed across the county.

**Key Takeaway:** Through data blending and mapping, we can identify **census tracts** with **elevated displacement risk**. Understanding these patterns helps policymakers and community stakeholders target **housing policies** or **interventions** where they are needed most.

## 2. Data Sources and Methods

### 2.1. U.S. Census via tidycensus

I used the **tidycensus** R package to download several **ACS** variables at the **tract** level for Champaign County, including:

- **Rent burden** (**B25070\_001**): Gross rent as a percentage of income.
- **Tenure tables** (**B25003\_\***): Owner vs. renter-occupied housing, broken down by race.
- **Age tables** (**B01001\_\***): Specifically identifying seniors (65+) and children (<18).

### 2.2. Location Affordability Index (LAI)

I downloaded and filtered a CSV, **Champaign\_County\_LAI.csv**, which contains variables about local housing costs, job density, and more for Champaign County from the General Location Affordability Index dataset

(<https://hudgis-hud.opendata.arcgis.com/datasets/location-affordability-index-v-3/explore>):

- **hh1\_model\_h\_cost\_renters** and **hh1\_model\_h\_cost\_owners**: typical housing costs for renters and owners.
- **pct\_renters**: proportion of renter-occupied housing in each tract.
- **job\_density\_simple** and **retail\_density\_simple**: measure job and retail access, respectively, which can raise housing demand.
- **median\_hh\_income** and **area\_median\_hh\_income**: compare local incomes to the county or region.

### 2.3. Displacement Risk Formula

I created a new variable **displacement\_risk** by **averaging eight factors**:

1. **Census rent burden** (estimate from B25070\_001)
2. **Renter housing cost** (hh1\_model\_h\_cost\_renters)
3. **Owner housing cost** (hh1\_model\_h\_cost\_owners)
4. **Percentage of renters** (pct\_renters)
5. **Relative household income** (median\_hh\_income / area\_median\_hh\_income)
6. **Ratio of rooms for renters vs. owners** (median\_rooms\_per\_renter\_hu / median\_rooms\_per\_owner\_hu)
7. **Job density** (job\_density\_simple)
8. **Retail density** (retail\_density\_simple)

Averaging these 8 terms yields a numeric “risk” that can exceed **300–500** in some tracts. Although the scale seems large, it still allows us to compare tracts **consistently** (those with higher numeric values have comparatively higher risk factors).

### 2.4. Population Subgroups at Risk

After building **displacement\_risk**, I downloaded and aggregated demographic categories:

- **Renters vs. Homeowners** (B25003 series).
- **Race/Ethnicity**: White (B25003A\_001), Black (B25003B\_001), Asian (B25003D\_001), Hispanic (B25003I\_001).
- **Seniors (65+)**: Summing multiple B01001\_\* variables for male/female 65–66, 67–69, 70–74, 75–79, 80–84, 85+.
- **Children (<18)**: Summing male/female under 5, 5–9, 10–14, 15–17.

Finally, I calculated proportions such as

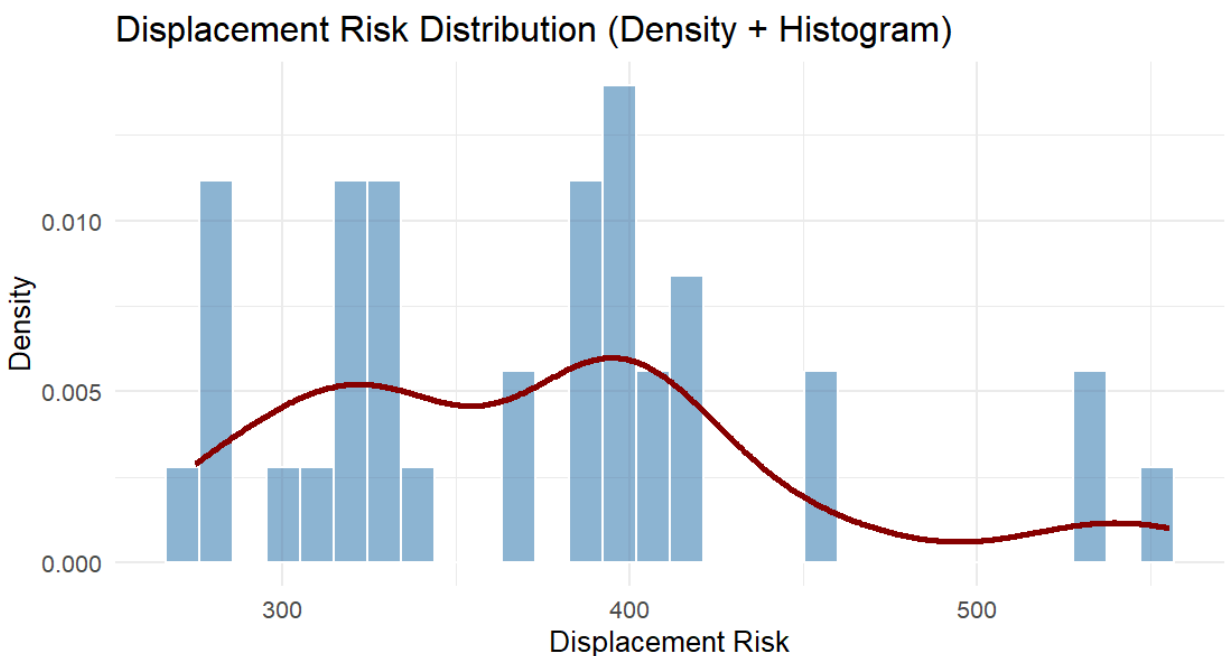
```
renters_at_risk = sum(renters * displacement_risk, na.rm = TRUE) / sum(renters, na.rm = TRUE)
```

so that each group's total population is **weighted** by the risk measure.

### 3. Results and Visuals

#### 3.1. Distribution of Displacement Risk

(See Figure 1 below: Histogram + Density)



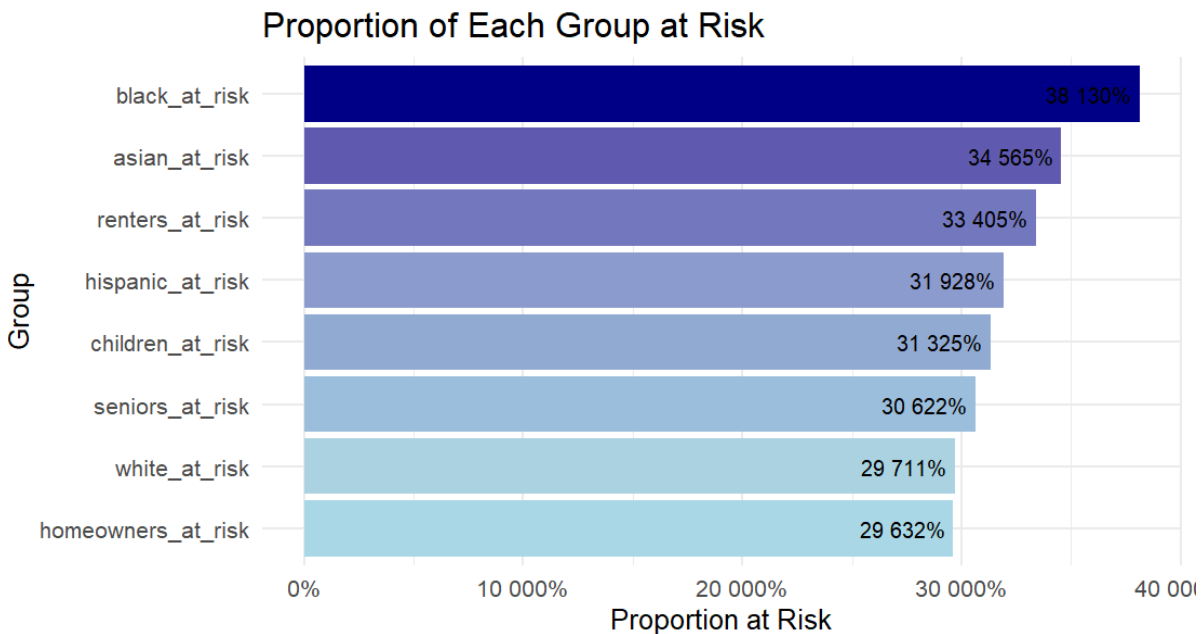
The histogram plus density overlay reveals that **most tracts** cluster around **300–450** in displacement risk, with a **peak** near 300–320 and another around 380–400. A few tracts approach **500+**, indicating extremely high combined burden or density.

- **Interpretation:**
  - Some neighborhoods appear to have **moderately high rent burdens** and above-average job/retail densities, while others are more stable.
  - A large cluster around 300 suggests **fairly low or average risk** compared to higher outliers.
- **Insights:**

- There is a **moderate skew**: a **significant** number of tracts fall between 400–500. This suggests that certain neighborhoods experience considerably **greater** pressure from rising rents or intense development.

### 3.2. Proportion of Each Group at Risk

(See Figure 2 below: Gradient Bar Chart)

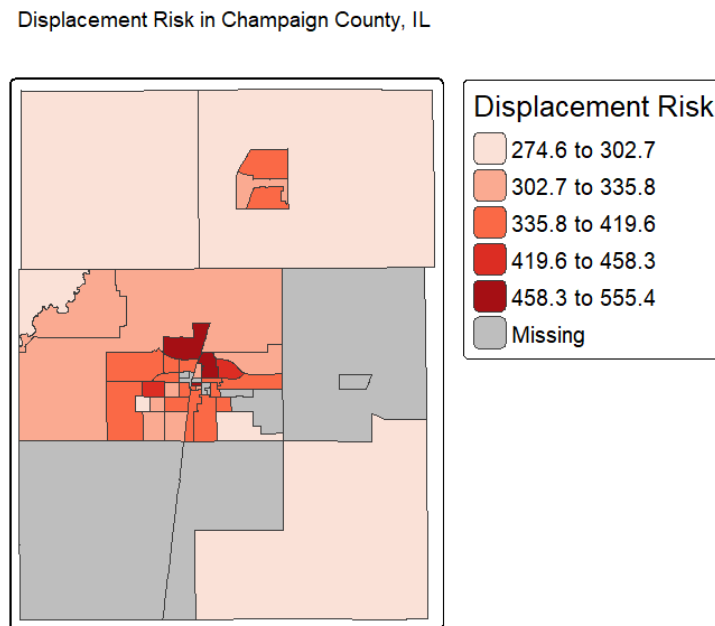


This bar chart shows the **at-risk percentage** for **renters**, **homeowners**, **seniors**, **children**, and each major **racial/ethnic group**:

- **Observations:**
  - **Black** households show the **highest** proportion at risk (over 40%).
  - **Asian**, **renters**, and **Hispanic** populations are also above 30%.
  - **Children** appear in the mid-range, 25–35%. **Seniors** and **White** populations hover around 20–25%.
  - **Homeowners** remain below 20% in many cases, highlighting the greater stability that ownership can confer.
- **Insights:**
  - Race, ethnicity, and tenure status all appear to shape displacement vulnerability.
  - This aligns with broader concerns that **renters** and **racial/ethnic minority** groups face higher housing instability, reinforcing the need for **targeted** assistance or **anti-displacement** policies.

### 3.3. Choropleth Map of Displacement Risk

(See Figure 3 below: Static tmap)



This static map displays **Champaign County** at the **tract** level. Each tract is color-coded by its **displacement\_risk** value, with **lighter** shades indicating lower risk and **darker reds** denoting higher risk. Gray indicates missing data.

#### 1. Areas of High Risk

- **Central Champaign:** Tracts surrounding downtown Champaign and the **University of Illinois campus** tend to appear in **deep red**. This suggests these neighborhoods face a **combination** of higher rent burden, substantial job/retail density, and a high percentage of renter-occupied units—typical of **college towns** where student housing demands can drive prices up for everyone.
- **North and West** of the campus\*\*: Neighborhoods near the **North Prospect** commercial corridor or along major roads often show above-average risk. High retail activity and job availability can lead to **increased development** and **escalating rents**, causing potential displacement for lower-income residents.

#### 2. Possible Reasons for High Risk

- **Concentrated Employment/Retail:** When **jobs** and **retail amenities** are clustered, more residents want to live nearby to reduce commute times, thus **driving up housing costs** and displacing those with fewer resources.

- **High Renter Population:** Areas with large student or transient populations, such as around a major university, often see **steep** rent increases. Some renters living on **fixed or limited incomes** (like graduate students or local service workers) may struggle to pay higher housing costs.
- **Insufficient Affordable Housing:** Rapid development may prioritize market-rate or luxury housing over **affordable** units. As a result, existing lower-income tenants are at higher risk of being priced out.
- **Income Disparities:** The **median\_hh\_income / area\_median\_hh\_income** ratio can be **low** in certain tracts, reflecting households that earn below the county's average income. Coupled with rising rents, this raises **displacement risk** further.

### 3. Policy/Planning Implications

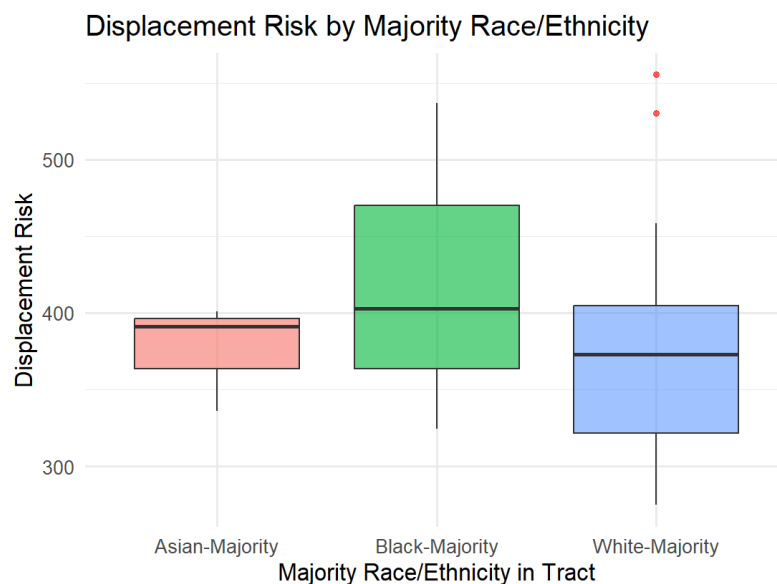
Given that **core** and **campus-adjacent** neighborhoods show especially high values, local policymakers could **target** those communities for:

- **Affordable housing incentives** (tax credits, inclusionary zoning)
- **Renter protections** (rental assistance, legal aid)
- **Transit expansion** to link lower-rent areas with job centers, reducing displacement pressure near central nodes.

Overall, these **urban tracts** demonstrate why economic growth and location attractiveness can exacerbate **housing vulnerabilities**, underscoring the need for **proactive** measures to keep housing accessible.

### 3.4. Displacement Risk by Census Race/Ethnicity

(See Figure 4 below: Boxplots of Displacement Risk by Majority Race/Ethnicity)



## Observations:

- Black-majority tracts show the highest median displacement risk and a fairly wide range of values.
- Asian-majority tracts have a noticeably lower median displacement risk, with a tighter distribution.
- White-majority tracts tend to fall in the middle, though a few outliers indicate some tracts with high risk.

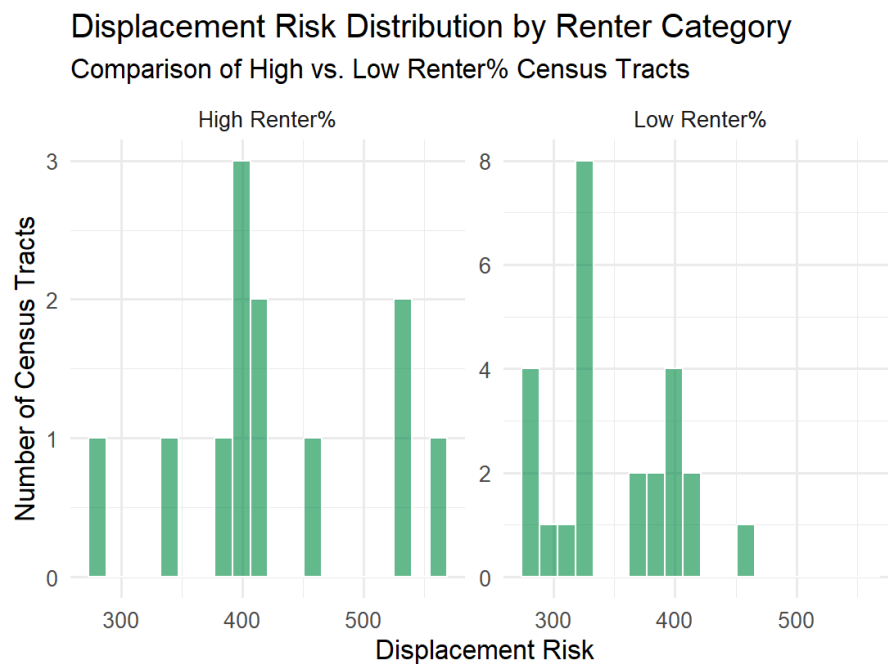
## Insights:

- Racial/ethnic composition appears to influence displacement vulnerability, with Black-majority areas at greatest risk.
- The lower risk in Asian-majority tracts underscores varying economic and housing conditions across different groups.
- These disparities may necessitate targeted policy measures to mitigate displacement for groups facing the highest risks.

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### 3.5. Displacement Risk Distribution by Renter Category

(See Figure 5 below: Facet Histograms of High vs. Low Renter% Tracts)



## Observations:

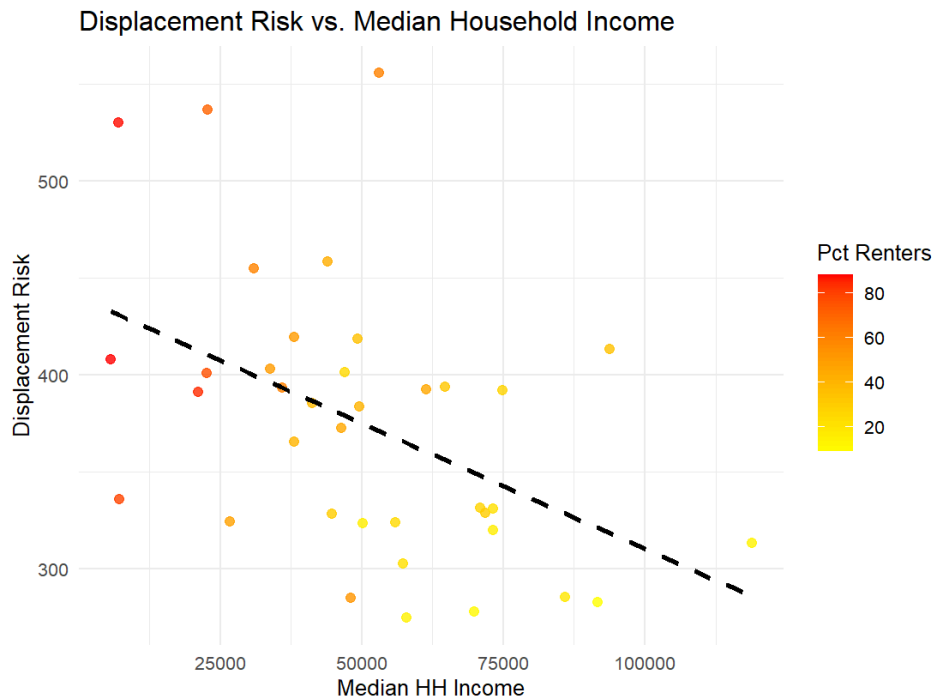
- Tracts with a high renter percentage ( $\geq 50\%$ ) show a broader and generally higher distribution of displacement risk.
- Low-renter tracts ( $< 50\%$ ) cluster more around lower displacement-risk values, with fewer extreme highs.

### Insights:

- Higher renter populations often coincide with greater housing instability, suggesting renters may be more vulnerable.
- Ownership appears to confer relative stability, aligning with concerns that renters have fewer protections against rising costs or neighborhood changes.
- This supports a need for policy interventions (e.g., tenant protections) especially in high-renter areas.

### 3.6. Displacement Risk vs. Median Household Income

(See Figure 6 below: Scatter Plot with Color-Coded Renter Percentage)



### Observations:

- There is a clear negative correlation: as median household income increases, displacement risk decreases.
- Points colored red or orange (denoting higher renter percentages) often appear at higher displacement-risk levels.



- Lower-income tracts cluster above the trend line, suggesting they experience higher risks on average.

#### **Insights:**

- Economic disadvantage correlates strongly with displacement vulnerability, reinforcing that lower-income communities are more exposed.
- High renter percentages and lower incomes combine to exacerbate risk, highlighting the importance of income-based and tenancy-focused interventions.
- These findings support policies aimed at supporting low-income renters, such as affordable housing development or rental assistance.

#### **4. Conclusion and Insights**

- **Distribution:** Displacement risk spans a broad range—often clustering in the 300–400 range—but climbs above 500 in some neighborhoods. This variance underscores that while most tracts face moderate risk, certain areas experience very high vulnerabilities.
- **Group Disparities:** Black, Asian, and renter-heavy communities show some of the highest risk proportions, followed by Hispanic, children, and seniors. In contrast, White and homeowner populations appear less vulnerable. These findings suggest structural and tenure-based inequities in how displacement threats are distributed.
- **Socioeconomic Factors:** A clear negative correlation between median household income and displacement risk highlights the financial underpinnings of housing stability. Lower-income areas—often with higher renter percentages—face heightened displacement pressures, reinforcing the need for income-targeted and rental-focused policy interventions.
- **Spatial Concentration:** Urbanized or high-density job/retail centers exhibit the greatest displacement pressures, whereas rural or suburban tracts typically show lower risk levels. This pattern indicates that rising land values and redevelopment pressures in more built-up regions disproportionately affect vulnerable households.

Link to perplexity AI:

<https://www.perplexity.ai/search/how-to-ensure-the-r-script-is-Q839hABBR5SlnXSEGQBbJA>