

## **Data Memo**

### **Project Title:**

Economic Disparities and Resilience in Manhattan: A ZIP Code-Level Analysis

### **Prepared by:**

Harsh Chandak, Noorunnisa Sayyada, Haiyan Wang

### **Date:**

May 2025

## **1. Project Objective**

The primary objective of this analysis is to investigate **economic disparities and resilience** among Manhattan ZIP codes from **2015 to 2025**. By examining key socioeconomic indicators—including **employment trends, education levels, income distributions, rent burden, and a composite socioeconomic vulnerability score**—we aim to identify areas of persistent economic inequality and evaluate resilience across neighborhoods.

This project also aims to provide **actionable insights for policymakers and community planners** to address socioeconomic challenges, design targeted interventions, and monitor changes over time.

## **2. Data Sources and Preparation**

### **Data Sources:**

The project utilized publicly available data for Manhattan ZIP codes from data.census.org. Key data sources included:

- **Employment Data:** Civilian labor force, employed population, unemployment rate.
- **Education Data:** Population with a bachelor's degree or higher, educational attainment percentages.
- **Income Data:** Median household income, income brackets, median gross rent.
- **Housing Data:** Rent burden ratios derived from rent and income data.
- **Socioeconomic Vulnerability Data:** Composite score based on **unemployment, education, income, rent burden, and business activity (number of active licenses)**.

### **Data Challenges and Cleaning:**

### 1. **Data Integration:**

- Data was stored in separate files for each year. After identifying structural differences, we used **Tableau Prep** to combine and clean the datasets.
- Addressed inconsistencies by unifying the "**Year**" column and applying consistent naming conventions.

### 2. **Data Cleaning:**

- Managed **missing ZIP codes** in rent datasets for the years 2020–2025.
- Removed redundant columns and applied consistent formatting.
- Filled missing values with **median calculations** where appropriate to maintain data consistency.

### 3. **Data Transformation:**

- Created calculated fields to standardize metrics and for easier analysis and visualization.

## 3. **Analytical Approach and Visualization**

The analysis was structured around five key research questions to understand various aspects of economic disparity and resilience.

### **Q1: Employment Trends (2015–2025)**

**Objective:** Assess how employment has evolved across Manhattan ZIP codes over the last decade.

#### **Visualizations:**

- **Bar Chart:** Top ZIP codes with increased and decreased unemployment rates.
- **Choropleth Map:** Spatial visualization of unemployment changes.

#### **Key Findings:**

- ZIP codes such as **10069, 10027, 10040** saw significant unemployment increases.
- ZIP codes like **10034, 10030, 10100** showed notable decreases in unemployment

#### **Policy Implications:**

- Implement **job training programs** and **economic incentives** in high-unemployment areas.

### **Q2: Education and Employment Correlation**

**Objective:** Explore the link between educational attainment and employment outcomes across ZIP codes.

#### **Visualizations:**

- **Bubble Chart:** Education level versus unemployment rate.
- **Scatter Plot:** Correlation between education levels and employment rates.

#### **Key Findings:**

- High-education areas like **10021, 10023** have lower unemployment rates.
- Areas with low educational attainment, such as **10033**, show higher unemployment.

#### **Policy Implications:**

- Increase **access to higher education** and **vocational training** in at-risk areas.

### Q3: Income Trends and Employment Correlation

**Objective:** Understand how income levels and employment stability are interlinked.

**Visualizations:**

- **Heat Map:** Shows variations in median income over time.
- **Bar Chart:** Top ZIP codes by income stability.
- **Line Plot:** Tracks income changes across ZIP codes.

**Key Findings:**

- ZIP codes **10282**, **10014** exhibit high income and employment stability.
- Low-income areas, particularly **10027** and **10040**, face ongoing challenges.

**Policy Implications:**

- Address income disparities through **economic revitalization** and **wage growth initiatives**.

### Q4: Rent Burden and Housing Stress

**Objective:** Identify ZIP codes with high rent burden relative to income.

**Visualizations:**

- **Heat Map:** Rent burden over time.
- **Bar Charts:** ZIP codes with highest and lowest rent burdens.
- **Line Charts:** Trend of ZIP codes with highest and lowest rent burdens over time

**Key Findings:**

- Areas like **10029**, **10031** consistently exceed the affordability threshold (30%+).
- Low-burden areas, such as **10007**, **10013**, indicate better economic stability.

**Policy Implications:**

- Implement **affordable housing programs** and **rent control policies**.

### Q5: Socioeconomic Vulnerability Analysis

**Objective:** Develop a composite score reflecting socioeconomic risks.

**Visualizations:**

- **Choropleth Map:** Socioeconomic vulnerability scores across ZIP codes.
- **Stacked Bar Chart:** Breakdown of risk factors by ZIP code.

**Key Findings:**

- High-vulnerability areas, like **10029**, face economic strain.
- Resilient ZIP codes, such as **10024**, demonstrate stability.

**Policy Implications:**

- Focus on **economic revitalization** and **affordable housing**.

## 4. Reflection on Analytical Process

Adjustments were made from the initial plan due to data inconsistency. Using **Tableau Prep** helped standardize data effectively. Visualizations were refined based on team feedback and data availability.

## **5. Conclusion and Recommendations**

To address economic challenges, policymakers should implement **targeted economic programs** in high-vulnerability areas, focusing on **housing affordability, employment access, and educational opportunities**. Continuous monitoring and data-driven policies will foster resilience in Manhattan's most affected ZIP codes.