



Breaking down Crime: New York

Uncovering Patterns: Insights from NYPD Crime Data Analysis Using Advanced Excel Techniques

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Problem Statement

The NYPD aims to utilize the 2024 arrest data to enhance public safety, optimize resource allocation, and improve operational efficiency. By analyzing arrest patterns, the department seeks to identify trends in criminal activity to support proactive policing and develop community-focused policies.

The data, sourced from NYPD Arrest Data (Year-to-Date) on NYC Open Data, includes key attributes such as arrest details (date, borough, offense type), perpetrator demographics (age, sex, race), jurisdiction type (NYPD vs. non-NYPD), and offense categories (felony, misdemeanor, violation).

These insights will enable the NYPD to better understand crime dynamics and drive informed decision-making.

Key Questions to Answer

1. Arrest Trends

- What is the trend in the number of arrests over time (daily and monthly)?
- Are there specific days of the week with higher arrest rates?

2. Demographics Analysis

- What is the distribution of arrests by perpetrator race and sex?
- How do arrests vary by age group and offense level?

3. Offence Breakdown

- What are the top 5 most common offence descriptions?
- How do specific offences vary across boroughs?

4. Jurisdiction and Arrest Analysis

- What percentage of arrests are handled by NYPD versus non-NYPD jurisdictions?
- How does the level of offence vary by jurisdiction type?

5. Time-Based Patterns

- Are there any time-based patterns (e.g., weekday vs. weekend arrests)?
- Do certain boroughs have higher arrest rates on weekends?

Data Collection and Preparation

- **Data Source:**
 - Retrieved from NYC Open Data: [NYPD Arrest Data Year-to-Date](#).
 - Accessed via API endpoint and imported into Excel using **OData** in Power Query.
- **Data Preparation in Power Query:**
 - **Column Operations:**
 - Added custom columns based on logic.
 - Split and reordered columns for better organization.
 - Removed unnecessary columns.
 - **Date and Time Formatting:**
 - Split arrest_date into separate date and time columns using delimiters.
 - Updated arrest_date data type to **Date**.
- **Custom Columns Added:**
 - **Arrest Borough:** Converted arrest_borough codes to borough names (e.g., "B" → "Bronx").
 - **Perpetrator Sex:** Transformed perp_sex codes to readable values ("M" → "Male", "F" → "Female").
 - **Level of Offense:** Categorized law_cat_cd into "Felony," "Misdemeanor," or "Violation."
- **Final Adjustments:**
 - Renamed columns for improved readability.
 - Loaded the cleaned and prepared data back into Excel for analysis.

Arrest Trends

- **Monthly Trends:**

- **August** was the peak month for arrests in the **Bronx**, **Manhattan**, and **Queens** with the Bronx and Manhattan recording over **5,000** arrests each.
- **Brooklyn** saw the highest arrests in **May (6,476)**, while **Staten Island** had a steady average of around **900** arrests each month from January to September.

- **Days with Highest Arrest Activity:**

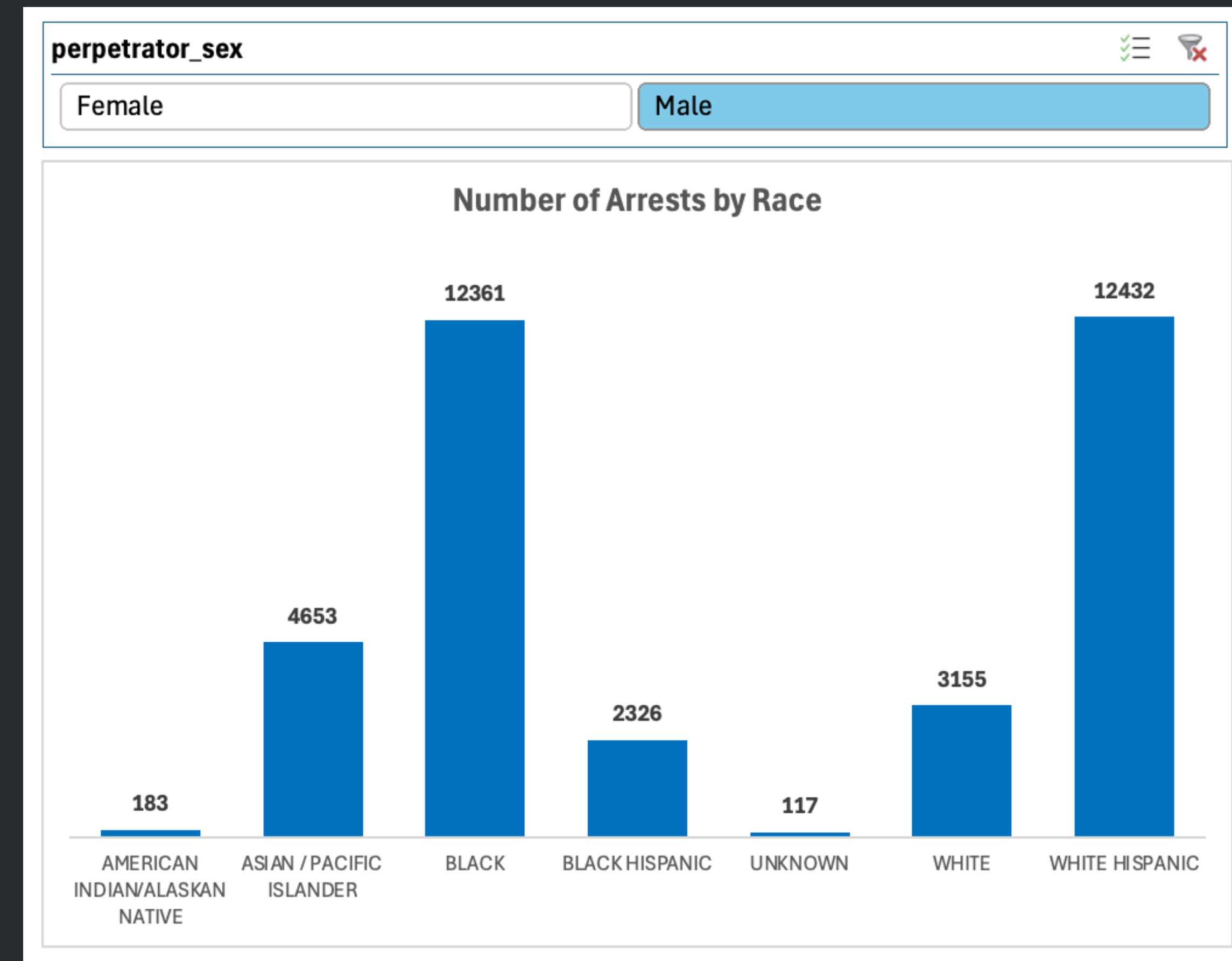
- **Wednesdays** stood out as the busiest day in **Bronx**, **Brooklyn**, and **Manhattan**.
- **Queens** had higher arrests on **Tuesdays**, **Wednesdays**, and **Thursdays**.
- **Staten Island** saw its peak on **Wednesdays** and **Thursdays**.
- Interestingly, **weekends** had fewer arrests compared to weekdays, with **Wednesday to Friday** consistently showing the highest activity.



Demographic Analysis

Arrest Distribution by Perpetrator Race and Sex:

- **Male Arrests:**
 - **White Hispanic** and **Black** individuals account for the largest portion of male arrests, with **12,432** and **12,361** arrests respectively. These two groups make up more than half of all male arrests.
 - **American Indian/Alaskan Native** and **unknown race** are the least represented among male arrests.
- **Female Arrests:**
 - Similar to males, **Black** and **White Hispanic** individuals lead in female arrests with **2,820** and **2,662** arrests, but the total number of females arrested is much lower than males.
 - **Males** dominate across all racial categories, showing a consistent trend where males are arrested far more frequently than females.



Demographic Analysis

| Age Group | Felony | Misdemeanor | Violation |
|-----------|--------|-------------|-----------|
| <18 | 74.00% | 25.96% | 0.04% |
| 18-24 | 45.87% | 52.70% | 1.43% |
| 25-44 | 41.05% | 56.91% | 2.04% |
| 45-64 | 39.07% | 59.18% | 1.74% |
| 65+ | 38.59% | 60.29% | 1.12% |
| | | | |

Arrest Distribution by Age Group and Offense Level:

- **Under 18:** Predominantly **Felonies**.
- **18-24:** Mostly **Misdemeanors**, with some **Felonies**.
- **25-44:** **Misdemeanors** lead, followed by **Felonies**.
- **45-64:** Similar trend—**Misdemeanors** most common.
- **65+:** **Misdemeanors** top the list, followed by **Felonies**

Interestingly, across all age groups, **Violation offenses** are the least common, suggesting that most arrests involve more serious charges rather than minor infractions.

Offence Breakdown

Top 5 Offenses Across New York City:

1. Assault 3 & Related Offenses – 14.78%

Most common offense, highlighting concerns around public safety.

2. Petit Larceny – 10.18%

A significant portion of arrests tied to petty theft.

3. Felony Assault – 8.81%

Notable portion of violent crimes, emphasizing assault severity.

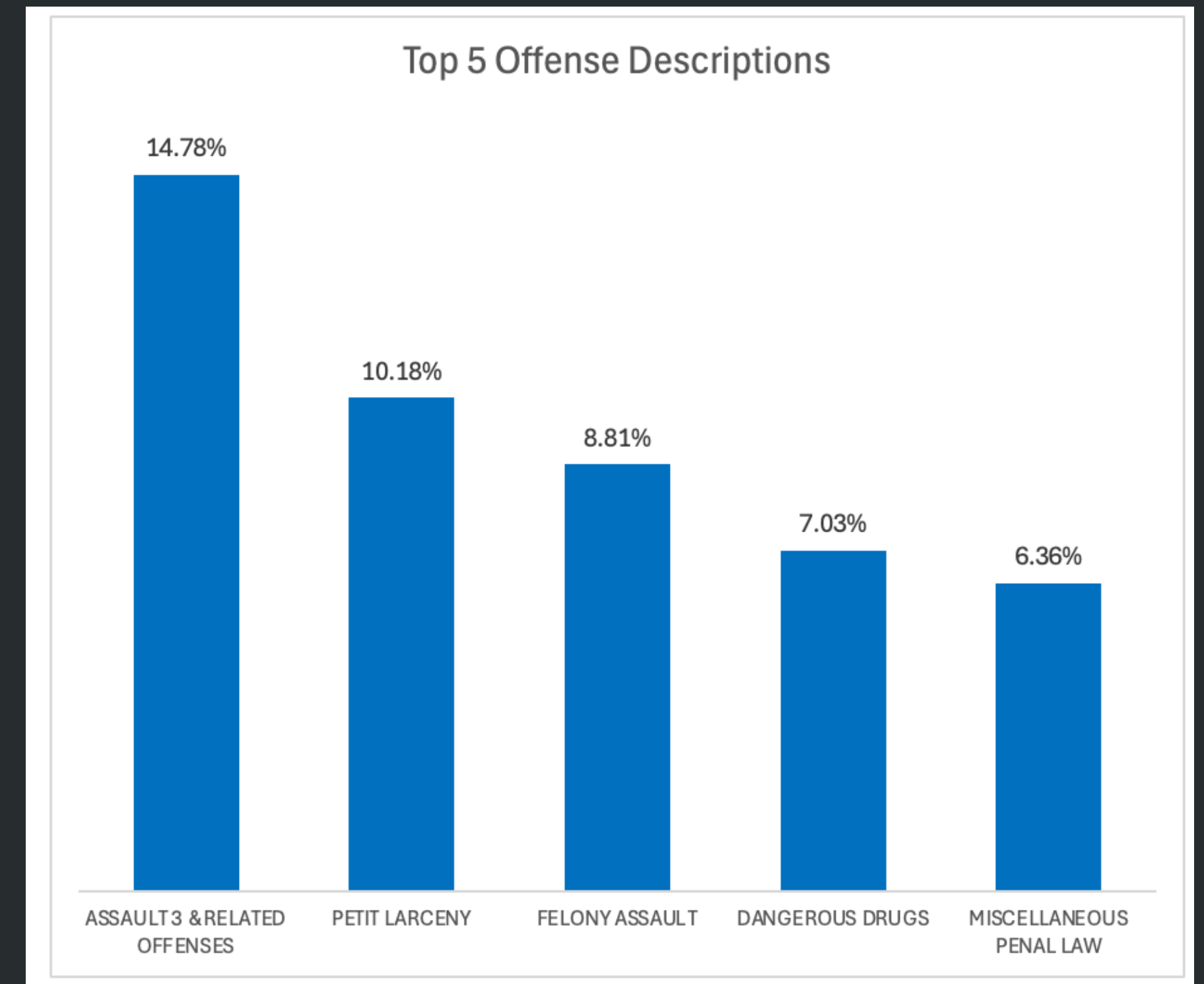
4. Dangerous Drugs – 7.03%

A major issue with drug-related crimes.

5. Miscellaneous Penal Law – 6.36%

Covers a variety of offenses, adding complexity to crime patterns.

These trends point to assaults and thefts being the primary drivers of arrests in NYC.

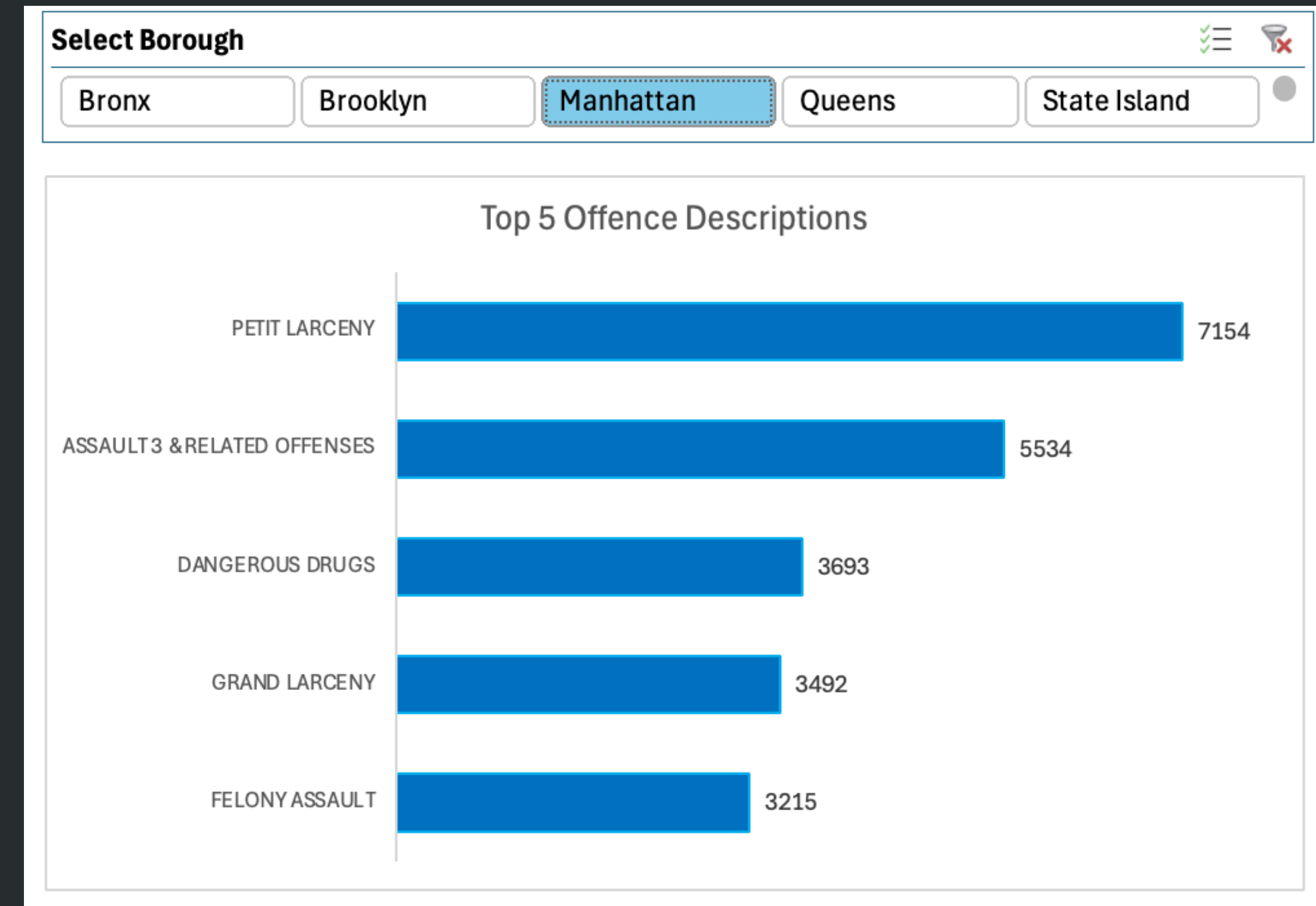


Offence Breakdown

Top Offenses Across NYC Boroughs:

- **Assault 3 & Related Offenses** dominate in most boroughs, including Bronx, Brooklyn, Queens, and Staten Island.
- **Petit Larceny** leads in Manhattan, with Assault 3 & Related Offenses as the second-most frequent.
- **Least Common Offenses:** Dangerous Drugs are the lowest in Brooklyn, Queens, and Staten Island, while Vehicle and Traffic Law violations and Felony Assault are the least in the Bronx and Manhattan respectively

Assault 3 is the most common offense across NYC, highlighting a recurring pattern of minor assaults in the city's crime landscape



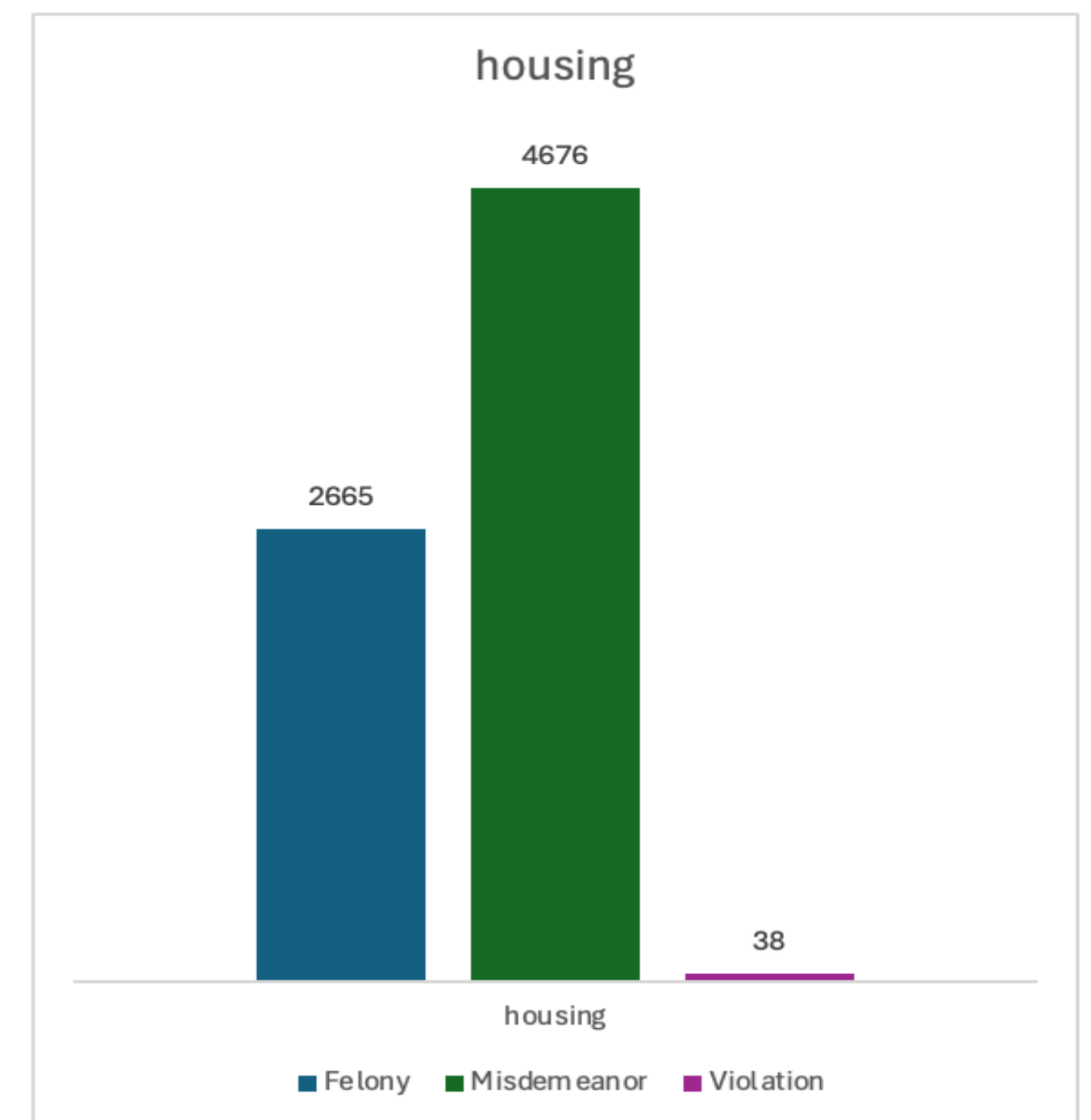
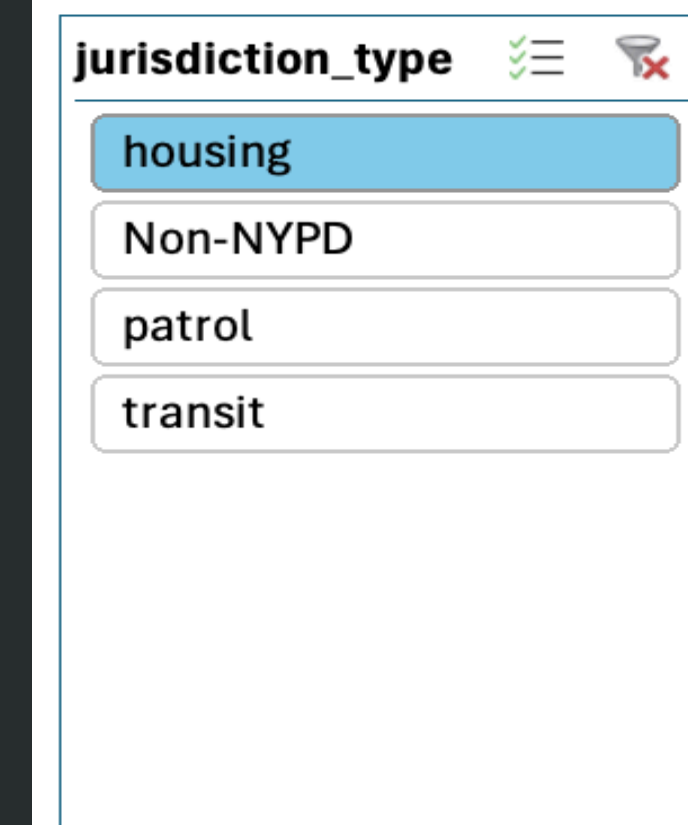
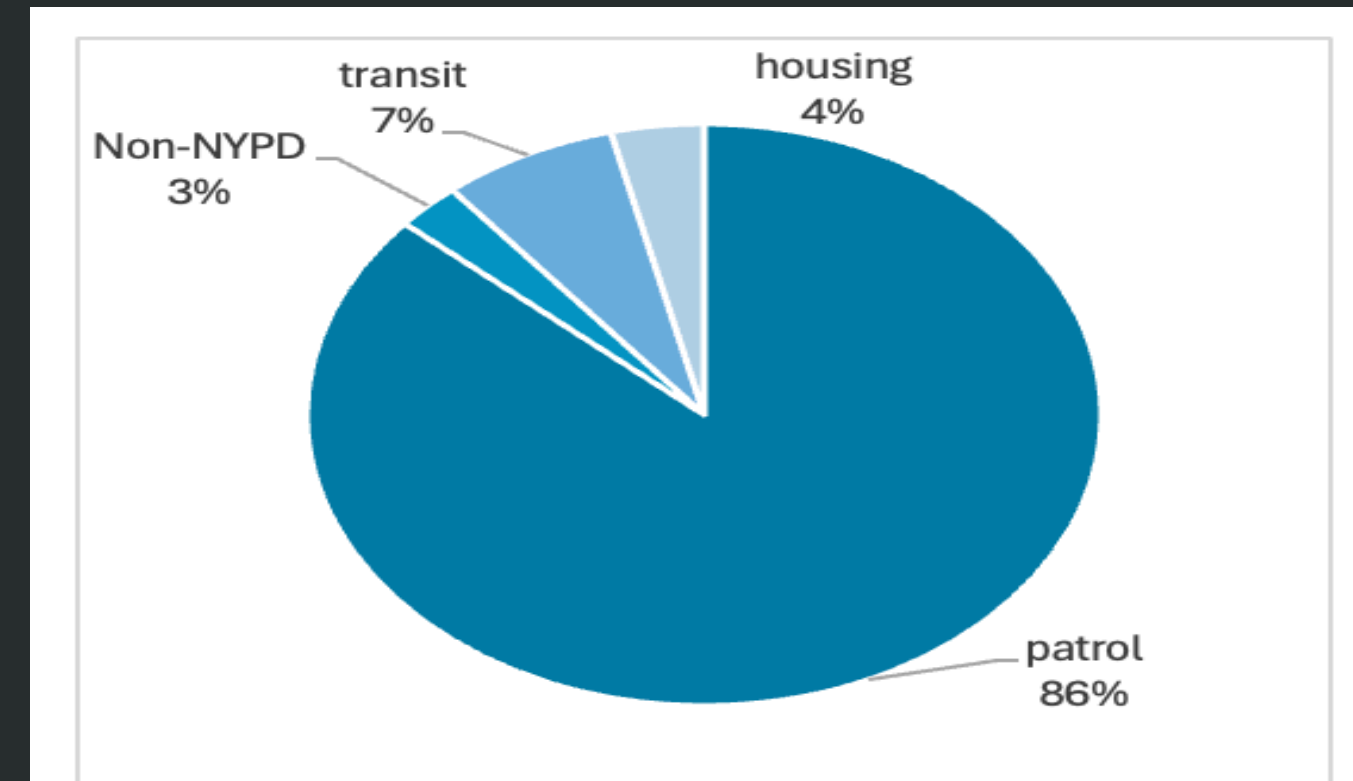
Jurisdiction and Arrest Analysis

Jurisdiction Type:

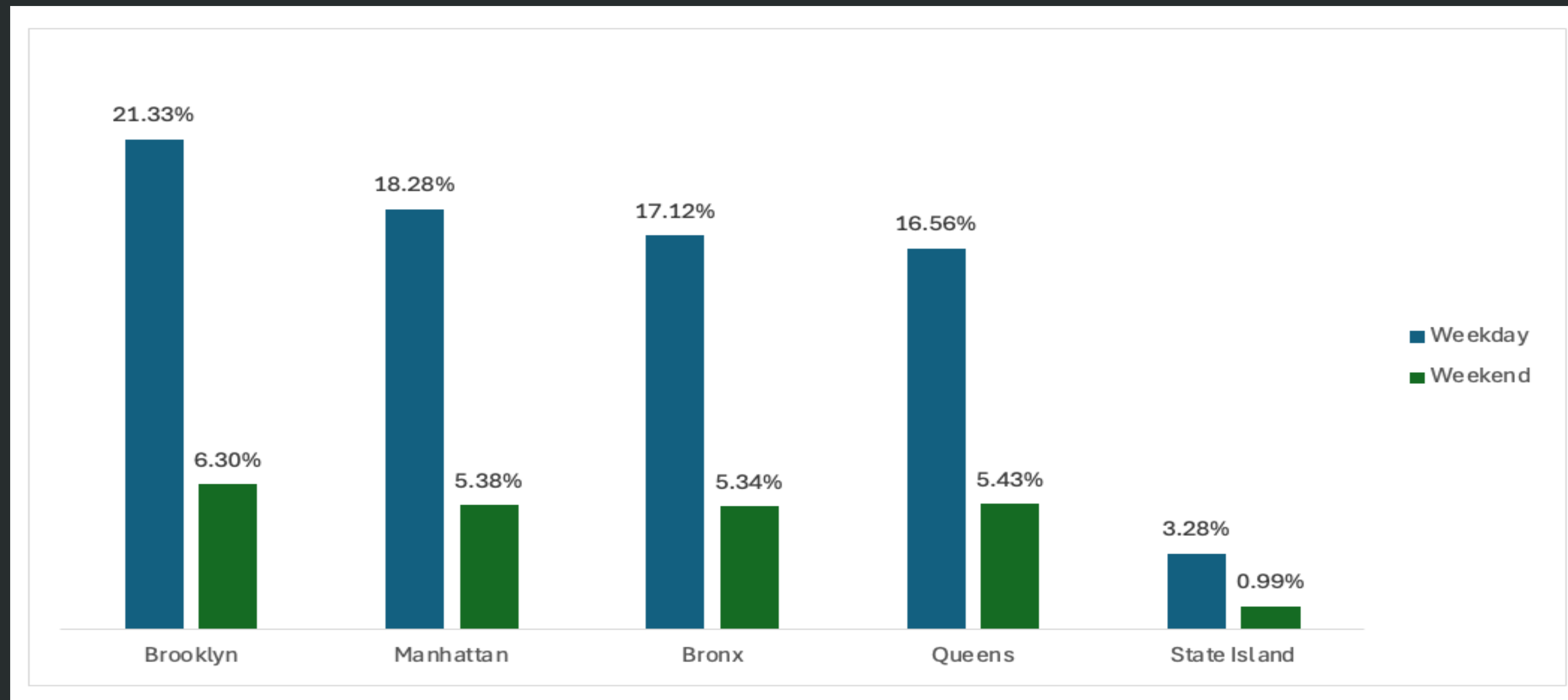
- **Patrol:** Responsible for the majority of arrests (86%), with all other jurisdiction types accounting for just 14%. Non-NYPD jurisdictions have the lowest share of arrests.

Offense Levels: Across all jurisdictions, misdemeanors consistently lead arrests, followed by felonies, with violations being the least common.

Transit and Housing focus heavily on misdemeanor arrests, while Patrol sees a similar pattern with misdemeanors dominating.



Time - Based Patterns



- **Weekdays** see the highest arrest activity across all boroughs, while **weekends** have notably fewer arrests.
- **Brooklyn** leads in arrests on both weekdays and weekends, followed by Manhattan. **Staten Island** has the lowest arrest rates, contributing just ~4.5%.

Recommendations

- **Allocate Resources Based on Arrest Patterns:** Focus additional patrols on Wednesdays and weekdays in high-activity boroughs like Brooklyn and Manhattan.
- **Target Offense-Specific Interventions:** Address recurring issues such as Assault 3 & Related Offenses and Petit Larceny, particularly in boroughs where they dominate.
- **Refine Strategies for High-Risk Groups:** Prioritize initiatives for males and younger age groups (<44) involved in misdemeanors and felonies.
- **Improve Weekend Monitoring:** While weekends show fewer arrests, maintain strategic coverage in Brooklyn and Manhattan.

Skills Demonstrated in Analysis:

- **Data Visualization:** Created interactive **line charts**, **bar plots**, and **pie charts** to identify arrest trends by borough, offense, and demographics.
- **Advanced Formulas:** Utilized **XLOOKUP**, **VLOOKUP**, **INDEX-MATCH**, **COUNTIFS**, and **TEXT()** functions for dynamic calculations and insightful analysis.
- **Time-Based Insights:** Applied **DATE formulas** to identify trends across weekdays, weekends, and months.
- **Interactive Charts:** Built charts with **slicers** and **pivot tables** for user-driven exploration of arrest data.
- **Data Cleaning & Transformation:** Leveraged **UNIQUE** and **conditional formatting** to highlight anomalies and categorize data effectively.