# How Affordable is Housing in NYC? An Empirical Analysis of Housing Expenditure Shares in 2021

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Funded by: Penn Undergraduate Mentoring Program

PURM Penn Undergraduate Research Mentoring Program

## Abstract

The goal of my project was answering the central question: "How affordable is rental housing in NYC?" I assembled a data set of households that rent apartments based on the 2021 NYCHVS. I measured housing affordability using the rental expenditure share. Using a hedonic rent regression that controls for differences in housing characteristics, I estimated housing prices. I then estimated price and income elasticities using a log-linear housing demand function for different household types. Finally, I analyzed the impact of rent regulation on housing affordability - approximately half of the rental units in NYC are subject to rent regulation (rent stabilization, rent control, and other regulation).

## Data Set

The data for this project was drawn from the New York Housing and Vacancy Survey (NYCHVS), a city-wide survey sponsored by the New York City Department of Housing Preservation and Development (HPD). The survey is administered every three years in compliance with the Emergency Housing and Rent Control Act of 1962 to help assess the need for new regulation and the impact of existing policies. The most recent survey was conducted in 2021.

## Results

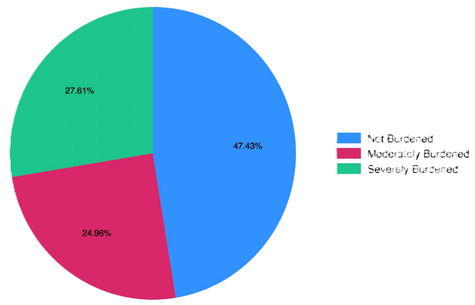


Figure 1: 2021 Rent Burden in NYC

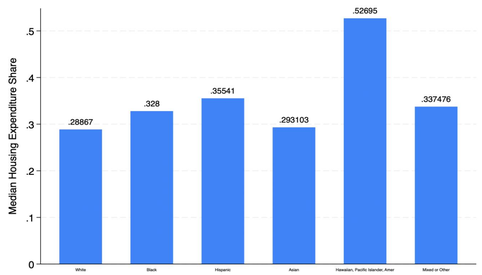


Figure 2: Median Rent Burden by Race

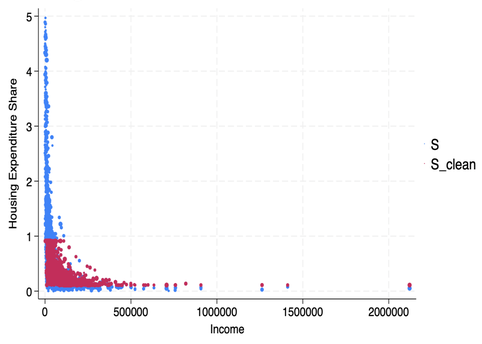


Figure 3: S vs Income, Cleaned and Uncleaned Data

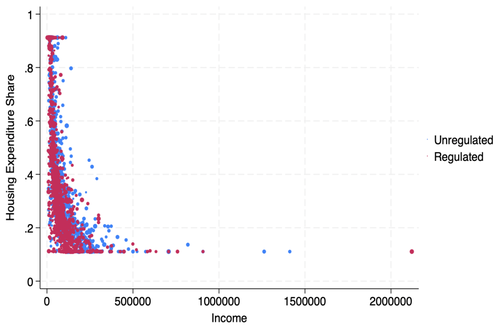


Figure 4: S vs Income, Regulated vs Unregulated Units

## Conclusions

- Over half of NYC is rent burdened and 27% of all households are severely burdened, meaning they spend half or more of their income on rent (Figure 1).
- Black, Hispanic, and Native/Islander households are significantly more rent burdened than White or Asian households (Figure 2).
- There is a negative correlation between housing share and income, meaning that wealthier households spend less of their earnings on rent. This is not impacted by regulation (Figure 4).
- Unregulated tenants spend approximately 7.56% more of their income on rent than rent stabilized tenants, 23.52% more than rent controlled tenants, and 36.47% more than "other regulated" tenants.
- The income elasticity of demand for the rental market is 0.49, and the price elasticity is –0.73.

## Methodology

### Rent Regression:

To estimate housing prices I interpreted housing services as a function of observed housing characteristics using the following regression model, where x denotes observed housing characteristics, n denotes the household, and j denotes the borough:

$$\ln(r_{nj}) = \ln(p_j) + \beta_0 + \beta_1 x_{1nj} + \ldots + \beta_K x_{Knj} + v_{jn}$$

Here ln(p) is the borough-specific intercept and its coefficient is the borough-specific price level. With the normalization of p0 = 1 I constructed housing prices for each neighborhood and imputed these into the housing share regression to obtain price elasticity.

### Housing Share Regression:

I derived the housing share regression from the following log-linear demand function for housing:

$$h(p, y, u) = Bp^{\eta} y^{\nu} \exp(u)$$

where h are housing services, p is price per unit of housing services, y is income, and u is an idiosyncratic demand shock (h and p are unobserved). Substituting the definition of rent (r=ph) and housing expenditure share (s=r/y) into the housing demand function and taking logs yields:

$$\ln(s) = \ln B + (\eta + 1)\ln p + (\nu - 1)\ln(y) + u$$

After imputing housing prices, this regression estimates price and income elasticity. Controlling for housing type allows me to analyze the impact of regulation.