Analyzing the Relationship Between Urban Housing Markets and Governance Costs*

A Study of Population, Income, and Public Space Factors

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This study analyzes urban housing markets based on data from multiple cities, focusing on the relationship between population size, household income, public space availability, housing needs, market prices, and governance costs. The key variables included in this analysis are City, Country, Population, Household Size, Number of Households, Monthly Income, Existing Open Space, Public Space Costs, Percentage of Households in Need of Housing Upgrades, Market Prices, Rent, Total Housing Costs, and Governance Costs. This paper explores how these variables interact and the potential implications for urban planning and governance.

1 Introduction

Urbanization has led to significant transformations in city structures and living conditions, placing pressure on housing markets and governance systems. As cities grow, the challenge of providing affordable housing, maintaining public spaces, and ensuring efficient governance becomes more complex. In this study, we analyze key variables such as population size, household income, housing market prices, public space availability, and governance costs in several cities. Our goal is to examine how these factors interrelate and provide insight into the broader implications for urban planning and policy.

The primary estimand of this study is the relationship between household income, population size, housing affordability, and governance costs in urban areas. By examining variables such as the average household size, monthly income, the percentage of households in need of housing upgrades, and the associated costs of governance and public space maintenance, we aim to quantify how these factors influence the overall housing market and urban governance efficiency. Results paragraph

*Code and data are available at: https://github.com/XYPKQ896/city_level_costs.

Understanding the relationship between income, housing demand, public space, and governance costs is crucial for designing urban policies that promote affordable housing and sustainable development. As cities continue to grow, failing to address these issues can lead to higher inequality, increased housing costs, and greater governance burdens. Insights from this study can help city planners and policymakers make informed decisions that balance growth with livability and fairness.

Telegraphing paragraph: The remainder of this paper is structured as follows. Section 2, Section 3, Section 4, Section 5.

2 Data

2.1 Overview

We use the statistical programming language R (R Core Team 2023) for data analysis. The data used in this study comes from the website (AidData 2024). The article (**Costs_City?**) includes various socio-economic and urban metrics such as population size, household income, housing costs, and public space availability across different cities. Following the guidelines in Telling Stories with Data (Alexander 2023), we consider on the relationship between urban growth, housing markets, public space, and governance costs. Our data captures a range of variables that are integral to understanding the challenges of urban development and housing affordability.

2.2 Measurement

The data entries are a representation of real-world phenomena, such as population size and household income, which have been translated into quantitative metrics through surveys and official records. For example, population data comes from census reports, while housing-related variables, such as the Average Monthly Rent of an Adequate Home, are sourced from market assessments. Each variable has been carefully measured to ensure that it accurately reflects the conditions in the cities under study.

2.3 Outcome variables

Add graphs, tables and text. Use sub-sub-headings for each outcome variable or update the subheading to be singular.

Some of our data is of penguins (**?@fig-bills**), from Horst, Hill, and Gorman (2020).

Talk more about it.

And also planes (**?@fig-planes**). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work well once you have enough text.)

Talk way more about it.

2.4 Predictor variables

Add graphs, tables and text.

Use sub-sub-headings for each outcome variable and feel free to combine a few into one if they go together naturally.

3 Model

The goal of our modelling strategy is twofold. Firstly,...

Here we briefly describe the Bayesian analysis model used to investigate... Background details and diagnostics are included in Appendix B.

3.1 Model set-up

Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$$y_i|\mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$
$$\gamma \sim \text{Normal}(0, 2.5) \tag{5}$$
$$\sigma \sim \text{Exponential}(1) \tag{6}$$

We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

Table 1: Explanatory models of flight time based on wing width and wing length

3.1.1 Model justification

We expect a positive relationship between the size of the wings and time spent aloft. In particular...

We can use maths by including latex between dollar signs, for instance θ.

4 Results

Our results are summarized in Table 1.

5 Discussion

5.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

5.2 Second discussion point

Please don't use these as sub-heading labels - change them to be what your point actually is.

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

In **?@fig-ppcheckandposteriorvsprior-1** we implement a posterior predictive check. This shows…

In **?@fig-ppcheckandposteriorvsprior-2** we compare the posterior with the prior. This shows…

Examining how the model fits, and is affected
by, the data

B.2 Diagnostics

?@fig-stanareyouokay-1 is a trace plot. It shows… This suggests…

?@fig-stanareyouokay-2 is a Rhat plot. It shows… This suggests…

Checking the convergence of the MCMC algo-
rithm

References

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Alexander, Rohan. 2023. *Telling Stories with Data*. Chapman; Hall/CRC. https://tellingstorieswithdata.com/.

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