European Urban Affordability Index(EUAI)

Dublin City

 

Module: Data Analysis and Visualization

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Part 1: Theoretical Framework

# Introduction

The **European Urban Affordability Index(EUAI)** is a composite indicator designed to evaluate cost-of-living pressures for young professionals (aged 22-35), in this Index I am going over the data of city of Dublin, Ireland specifically. Unlike broad economic metrics, the EUAI focuses on **Essential Expenditures** (Housing, groceries, transportation etc) and weight that against local earning power, providing actionable insights for:

* **Recent Graduates** assessing Job Markets
* **Employers** determining relocation packages
* **Policymakers** identifying affordability crises

# Index Rational

Dublin ranks among Europe’s top 5 most expensive cities for rent (Numbeo, 2025), with housing consuming **38.4%** of average monthly expenses. Traditional indices like the Consumer Price Index (CPI) fail to:

* Weight housing costs proportionally
* Adjust for disposable income
* Target youth demographics

# Sub-Indices and Variables

The EUAI combines **4 sub-indices** derived exclusively from Numbeo’s Dublin dataset (March 2025):

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| | **Sub-Index** | **Variables** | **Weight** | **Data Source** | **Operationalization** | | --- | --- | --- | --- | --- | | **Housing (40%)** | 1-bedroom rent (city center) | 20% | Numbeo "Rent Per Month" | Monthly cost in € | |  | Price per m² to buy apartment | 20% | Numbeo "Buy Apartment Price" | €/m² in city center | | **Essentials (30%)** | Groceries (single person) | 15% | Numbeo "Summary"\* | 60% of €1,087.50 (excl. rent) = €652 | |  | Basic utilities (85m² apartment) | 15% | Numbeo "Utilities" | Electricity/water/garbage in € | | **Lifestyle (20%)** | Meal at inexpensive restaurant | 10% | Numbeo "Restaurants" | Cost of 1 meal in € | |  | Monthly public transport pass | 10% | Numbeo "Transportation" | Regular price in € | | **Income (10%)** | Average monthly net salary | 10% | Numbeo "Salaries" | Post-tax income in € |  Weighting Justification Weights reflect **expenditure patterns** from Numbeo’s Dublin data:   * **Housing (40%)**: Largest expense (38.4% of total costs) * **Essentials (30%)**: Non-negotiable survival costs * **Lifestyle (20%)**: Discretionary spending capacity * **Income (10%)**: Contextualizes costs against earnings |
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| (Numbeo, 2025)  Part 2 : Data Selection Data Source Overview All the data used is sourced from (Numbeo, 2025)(March 2025). The data is Crowdsourced(User-reported) and covers all of the required variables for living in Dublin city. The data is up to date with March of 2025, this is my following data displayed in Jupyter:   Data Quality Assessment **Strengths**   * **Completeness**: No missing values for selected variables * **Transparency**: Numbeo provides ranges (e.g., rent: €1,700-2,500) * **Timeliness**: March 2025 data reflects current conditions   **Limitations**   * **Self-reported bias**: User-submitted data may skew high/low * **No suburb-specific salary data**: Used city-wide average * **Static snapshot**: No historical trends  Selected Variables The following 7 variables were chosen based on the Theoretical Framework (Part 1):   | **Category** | **Variable** | **Value (Dublin)** | **Numbeo Section** | **Notes** | | --- | --- | --- | --- | --- | | **Housing** | 1-bedroom rent (city center) | €2,038.71 | "Rent Per Month" | Range: €1,700-2,500 | |  | Price per m² to buy (city center) | €6,813.00 | "Buy Apartment Price" | Range: €5,000-10,000 | | **Essentials** | Groceries (single person) | €652.50\* | "Summary" | \*60% of €1,087.50 | |  | Basic utilities (85m² apartment) | €247.08 | "Utilities" | Electricity/water/garbage | | **Lifestyle** | Meal, inexpensive restaurant | €20.00 | "Restaurants" | Range: €15-30 | |  | Monthly transport pass | €115.00 | "Transportation" | Range: €70-173.91 | | **Income** | Average net monthly salary | €3,439.98 | "Salaries" | After-tax |   Single person monthly costs (excl. rent) = €1,087.50 × 60% (assumed groceries share) = €652.50  Part 3 : Imputation of Missing Data **Introduction to Imputation** Imputation is the process of replacing missing data with estimated values to ensure a complete dataset. Since our Dublin dataset from Numbeo (March 2025) is fully populated, we will:  **Confirm no missing values exist** in the selected variables.  **Outline a robust imputation strategy** for hypothetical missing data to demonstrate methodological rigor.  **Data Completeness Verification**  All **7 key variables** from Part 2 are complete. Below is the verification:   | **Variable** | **Value (Dublin)** | **Source** | **Missing?** | **Data Range (if applicable)** | | --- | --- | --- | --- | --- | | 1-bedroom rent (city center) | €2,038.71 | Rent Per Month | No | €1,700–2,500 | | Price per m² (city center) | €6,813.00 | Buy Apartment Price | No | €5,000–10,000 | | Groceries (single person) | €652.50\* | Summary | No\* | N/A (proxy) | | Basic utilities (85m²) | €247.08 | Utilities | No | €150–450 | | Meal, inexpensive restaurant | €20.00 | Restaurants | No | €15–30 | | Monthly transport pass | €115.00 | Transportation | No | €70–173.91 | | Avg. net monthly salary | €3,439.98 | Salaries | No | N/A (single value) | |
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# Hypothetical Imputation Strategy

If future updates introduce missing data, we would apply the following methods:

Method 1: Median Imputation

Method 2: Mean Imputation(if no range)

Method 3: Geographic Adjustment

Method 4:Future Time Adjustment

# References

Numbeo, 2025. *Numbeo.* [Online]   
Available at: https://www.numbeo.com/cost-of-living/in/Dublin  
[Accessed 3 4 2025].