

## Team Members

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## Project Title

Prediction of Housing Affordability Based on Wage Growth and Inflation in the EU

## Summary

This project aims to predict housing affordability trends across EU countries by analyzing the impact of wage growth, inflation, and housing costs. Using statistical and machine learning techniques, the project will uncover patterns and propose evidence-based solutions for improving housing accessibility.

## Problem Definition

Housing affordability has become a critical issue in the EU, where rising housing costs and inflation often outpace wage growth. The project seeks to model the interplay of these factors to identify affordability trends and recommend strategies for mitigating the impact of economic pressures on housing.

## Dataset(s) Sources

The project integrates data from multiple sources to ensure comprehensive analysis:

1. Eurostat:

- Wage growth, inflation rates, GDP per capita, and household disposable income:

[https://ec.europa.eu/eurostat/databrowser/view/tec00118/default/table?lang=en&category=t\\_prc.t\\_prc\\_hicp](https://ec.europa.eu/eurostat/databrowser/view/tec00118/default/table?lang=en&category=t_prc.t_prc_hicp)

[https://ec.europa.eu/eurostat/databrowser/view/sdg\\_08\\_10/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/sdg_08_10/default/table?lang=en)

[https://ec.europa.eu/eurostat/databrowser/view/ilc\\_mdcd01/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/ilc_mdcd01/default/table?lang=en)

2. Global Property Guide:

- Average property prices, regional housing trends, and affordability indices.

<https://www.globalpropertyguide.com/home-price-trends>

<https://ec.europa.eu/eurostat/databrowser/view/tipsho60/default/table?lang=en>

## Proposed Research Questions

Primary Research Question (Implemented):

1. How do wage growth and inflation rates correlate with housing affordability trends across the EU?

Secondary Research Questions (Designed):

2. Can predictive models accurately forecast housing affordability trends for specific regions in the EU?
3. How do housing affordability disparities differ between urban and rural areas in the EU, and which regions are most vulnerable to affordability crises?

## Design and Methodology

### 1. Design Overview

The project will consist of the following steps:

- Data Engineering: Extracting, cleaning, and transforming data from multiple sources.
- Exploratory Data Analysis (EDA): Understanding trends, identifying key drivers, and visualizing disparities.
- Machine Learning (ML) Models: Building predictive models for housing affordability.

### 2. Data Engineering and Ethical Issues

Data Engineering Challenges:

- Standardizing datasets from different sources and formats.
- Handling missing data for housing prices or regional wage data.
- Addressing temporal mismatches in datasets (e.g., inflation data vs. property price data).

Ethical Considerations:

- Ensuring privacy by anonymizing demographic data if required.
- Avoiding biases in predictive models, particularly regarding regional disparities.

### 3. Exploratory Data Analysis (EDA)

- Analyze the distribution of wage growth, inflation, and housing prices across time.
- Explore correlations between economic indicators and housing affordability.
- Compare urban vs. rural affordability trends and visualize disparities across countries.

### 4. Predictive Modeling

- Implement regression-based models (e.g., Linear Regression, Random Forest) to predict affordability indices.
- Test alternative methods, such as XGBoost or Neural Networks, for robust prediction.
- Evaluate model accuracy using metrics such as RMSE,  $R^2$ , and MAE.

## Expected Deliverables

1. Datasets: Cleaned and integrated data for analysis, combining Eurostat and external sources.
2. EDA Results: Visualizations and insights highlighting housing affordability trends and disparities.
3. ML Models: Predictive models with documented performance metrics.