Battle of the Neighborhoods – Purchasing a Home

Introduction and Business Problem

Problem Background

In Germany only about 45 percent of households own their main residence as shown in Figure 1. This is the second lowest number among all OECD countries, undercut only by Switzerland. This is driven by housing policies that produce incentives to rent.

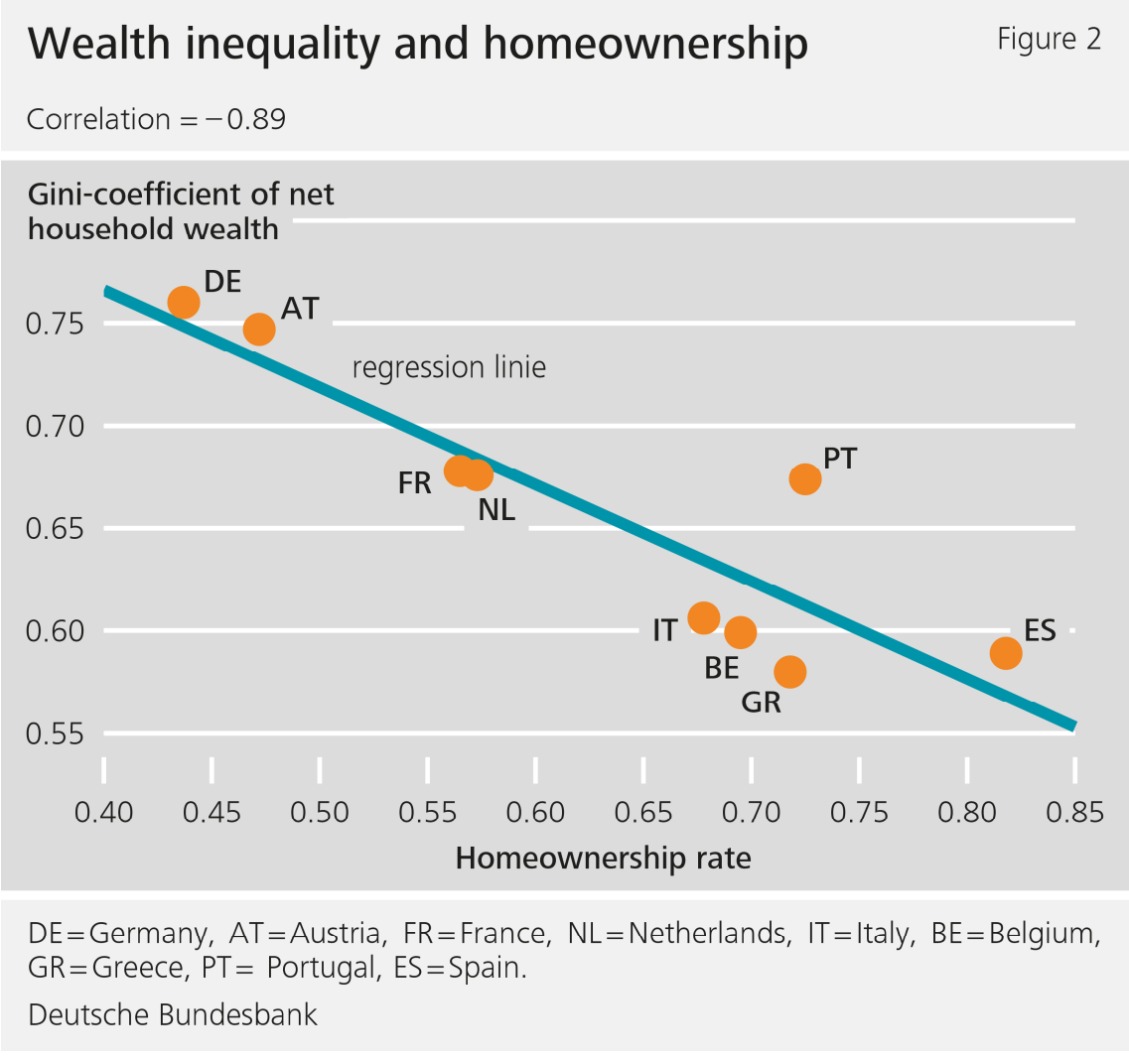

Figure 1 - Wealth inequality and homeownership

Nonetheless buying a home can be a good investment, especially if you are planning to take advantage of good market conditions.

One of the most important and impactful decisions to make, when choosing to buy a home, is the location. The key factors of a great location are accessibility, appearance, and amenities

available in a neighborhood. These factors greatly influence the buying price, location desirability and investment value appreciation over time.

Considering the amenities available in a neighborhood, these translate directly to a better living and quality of life, for example consider not having to travel far to go to a doctor's appointment, doing your shopping or dining in a good restaurant near your house, these are some of the hallmarks of a great neighborhood.

Here lies our problem, regarding the availability of amenities in a neighborhood, where should you choose to live? What makes a great neighborhood, and which are the best neighborhoods to purchase a housing.

Problem Description

This project is about studying amenities availability when location choosing in Germany. In this study we will focus around the areas of Bad Homburg vor der Höhe and Frankfurt am Main, characterized by their existing postal codes and a radius around them. Our final objective is clustering and comparing neighborhoods to try to find the best places to live considering the amenities available in the studied area. We will use exploratory data analysis, data visualization and machine learning algorithms to study this problem.

Target Audience

Our target audience is mainly composed of potential investors interested in purchasing a home in the target area. But it can also be a powerful tool for property developers prospecting where to build a new house or amenity or policymakers to decide where should the government invest to influence regional economic development.

Data and Methodology

For our study we will use a list of postal codes that cover the main cities around a 20-kilometer radius around Bad Homburg vor der Höhe and all the postal codes for Frankfurt am Main as shown in Figure 2. To get this data we will leverage the Openstreetmap data and Suche-postleitzahl website.

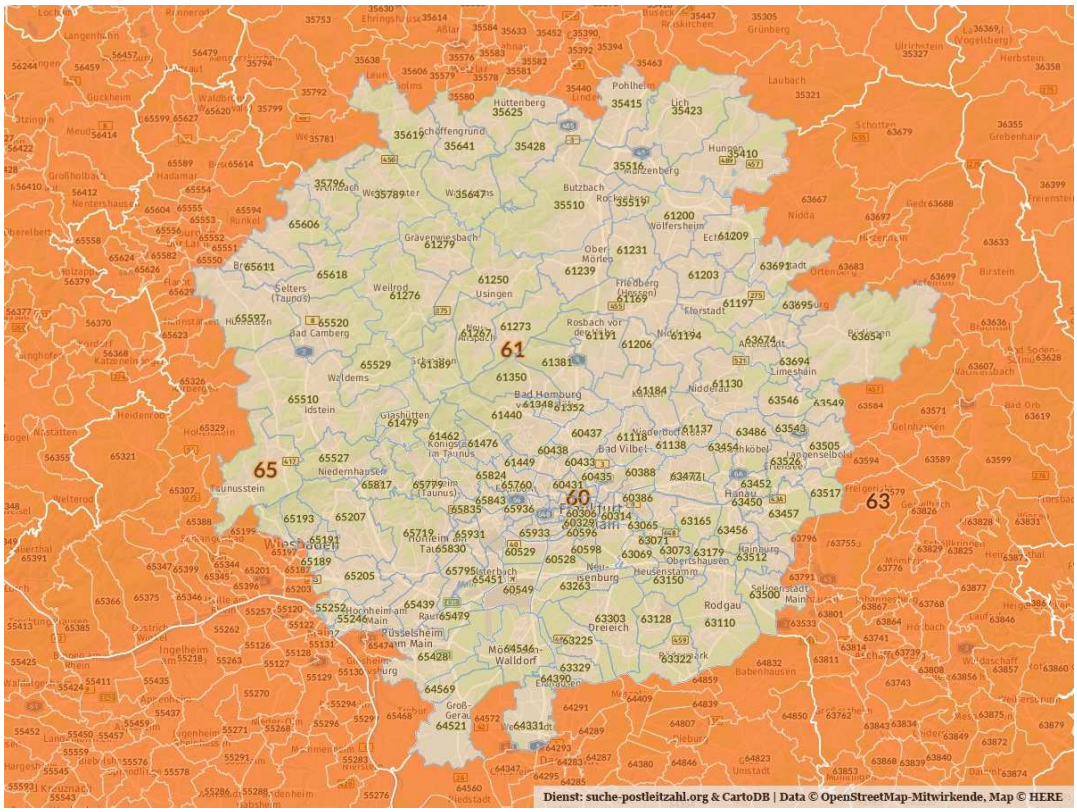

Figure 2 - Postal Codes

After defining the necessary postal codes, we'll use the Nominatim api to search the OpenStreetMap data to get the coordinates latitude and longitude for each postal code.

To search the amenities in a predefined radius for each pair of coordinates we will use the free tier account from Foursquare API to get location data. Foursquare is one of the most trusted, independent location data platforms in the world.

Concerning our methodology we will be collecting, cleaning and preparing the data, followed by data presentation and visualization on the different features, and finally we will build a clustering approach using a machine learning algorithm to arrive to conclusions about our problem: location choosing when buying a home.

References

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https://www.suche-postleitzahl.org/

https://www.openstreetmap.org/#map=10/50.2639/8.8962

https://github.com/osm-search/Nominatim

https://developer.foursquare.com/