



Advanced macro economics I - Fall 2025
Project I
Due: 30 Dey 1404

You have to submit one report file (.pdf) and one .py or .ipynb file in a zip folder per assignment

Please name the .zip file as following: Project01_TA_Macro_Studentnumber

Attention: Submitting a project report (.pdf) is mandatory.

Abstract:

Bike sharing is an increasingly popular service, especially as cities are moving to be more sustainable. **Eren and Uz (2020)** identified several factors affecting bike sharing, including **weather** (e.g. seasons, precipitation, and temperature), **public transportation**, **safety**, and other **temporal factors**. Bay Wheels is a bike sharing service in San Francisco provided by Lyft (similar to the Shaw Mobi bikes in Vancouver). Some differences are that Bay Wheels provides both electric bikes and regular bikes, and that the service is accessible through the Lyft application and Clipper cards (similar to Vancouver's Compass card). Bay Wheels' dataset is publicly available on Lyft's website at <https://www.lyft.com/bikes/bay-wheels/system-data>. This project aims to look at factors that influence bike sharing in San Francisco.

Literature Review

Look at the mentioned paper by Eren and Uz (2020), which is attached, and write a one page summary and one page about your thoughts on its findings. (2 page total)
And we want to examine the findings of the paper with San Francisco bike sharing data.

You must answer these questions:

Weather – San Francisco's mild coastal weather ranges around 8 – 21 °C all year round, with an average of 8 days of precipitation in the winter months and 0 days in the summer months. These numbers make San Francisco's weather the ideal conditions for bike sharing.

- 1) Examine whether seasonality still influences bike sharing in San Francisco by cross-examining weather data with start/end times for bike share sessions.

Public transportation – Look at bike share usage along BART (rail/subway), Caltrain, and MUNI (light rail and cable car) stops and the time of day. Since many working in the city are commuters. Interpret the data and elaborate your insights.

Safety – Examine whether crime rate (from San Francisco Police Department) affects bike share usage. Safety is often cited as a concern for bike share users,

One other parameter which is based on the project's paper by your choice.

Extra Points: answer to these questions is not mandatory but will gain points.

Temporal factors - Break down bike share usage by weekdays/weekends, and also the time of day.

Train a linear regression model to predict bike share usage comparing linear regression and one with polynomial transformations applied

DataSets:

- 1) San Francisco GeoPolygon for filtering for San Francisco data only
- 2) [Historical weather records from San Francisco Bay Area Weather Forecast Office](#).
(extract data from [weather.gov](https://www.weather.gov) website)
- 3) Passenger rail stations data from California's Metropolitan Transportation Commission (MTC), which includes Bay Area Rapid Transit (BART), Caltrain, and San Francisco Municipal Railway (MUNI - light rail and cable car) data
- 4) [Incidents report from San Francisco Police Department \(2018 to Present\) \(attached\)](#)
- 5) [San Francisco Neighborhoods from San Francisco Open Data \(DataSF\)](#)

This is a project, there is no pre-structured way to do it. Please plot whatever you think is useful and elaborate your reasons. You should examine data for at least a whole year. Do not use pandemic time data. The more you pay attention to details the better you get points.

Fun Facts: Paradox of thrift: If everyone tries to save more at the same time, total saving in the economy can actually fall because spending drops and incomes shrink.