

Overview of the Workflow

The work processes and visualizes multiple financial datasets, focusing on trends, distributions, and merging data from various sources for better analysis. It handles data cleaning, transformation, and visualization using Python libraries like pandas, matplotlib, and seaborn.

Data Processing Steps

Financial Leasing Dataset (andre-utlan.xls)

The dataset is cleaned by:

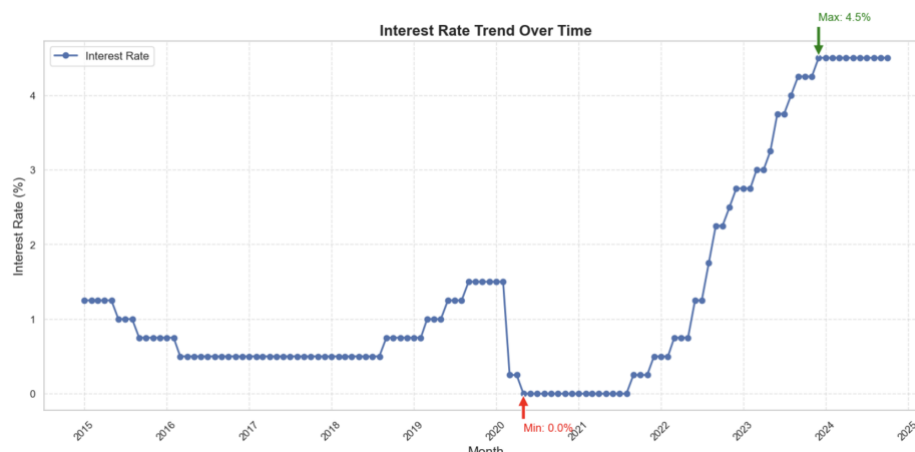
- Renaming columns for clarity.
- Converting the År (year) column to numeric and filtering for years between 2015 and 2023.
- Ensuring all values are numeric and standardized.
- Dropping one of the columns “busser” since it contains empty rows.

Interest Rate Trends (interestHist.csv)

The dataset is published on Statistics Norway <https://www.ssb.no/en>:

- Converting month to a datetime format for time-series analysis.
- Plotting interest rates over time with markers for maximum and minimum points.

Aggregating interest rates by year to calculate yearly averages, maxima, and minima:



From the plot, it shows a significant shift in interest rate trends over time. Between 2015 and 2020, rates steadily declined, hitting a historic low of 0% in 2020, driven by the economic impact of COVID-19 and central banks' efforts to stimulate borrowing and economic activity. Rates remained at 0% during the pandemic before sharply increasing from late 2021 to 2023, peaking at 4.5%.

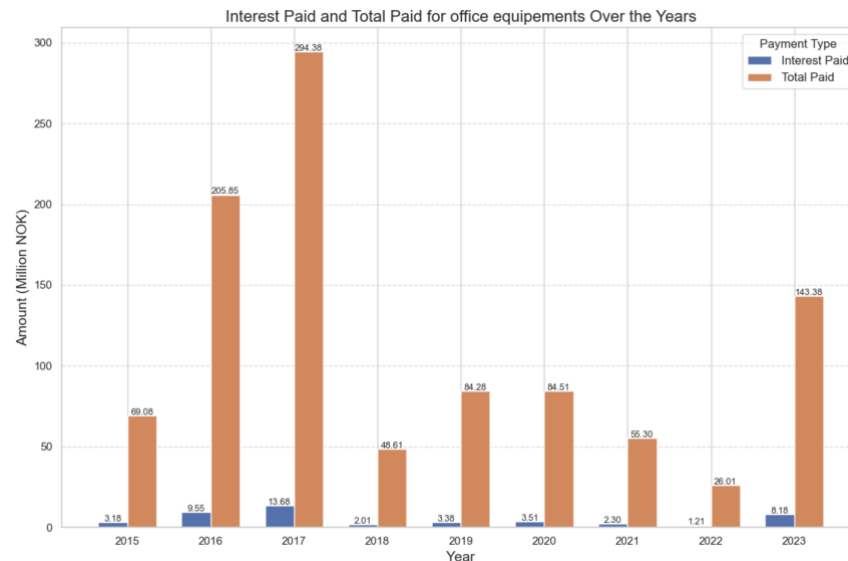
Data Merging and Integration

Multiple datasets are merged based on the year column to create a unified dataframe for analysis:

- merged_df: Combines financial leasing, interest rate data, and key policy rates.
- merged_interst_rate: Merges interest rates from multiple sources, excluding redundant columns (max_interest and min_interest).

Distribution of Specific Categories

It is easier to look at the effective interest rate (effektivrent) to see how much it has been spent as interest only over years (2015 -2023):



Peak in 2017: Interest paid for Kontor/data peaked in 2017, reaching the highest value (13.68 million NOK).

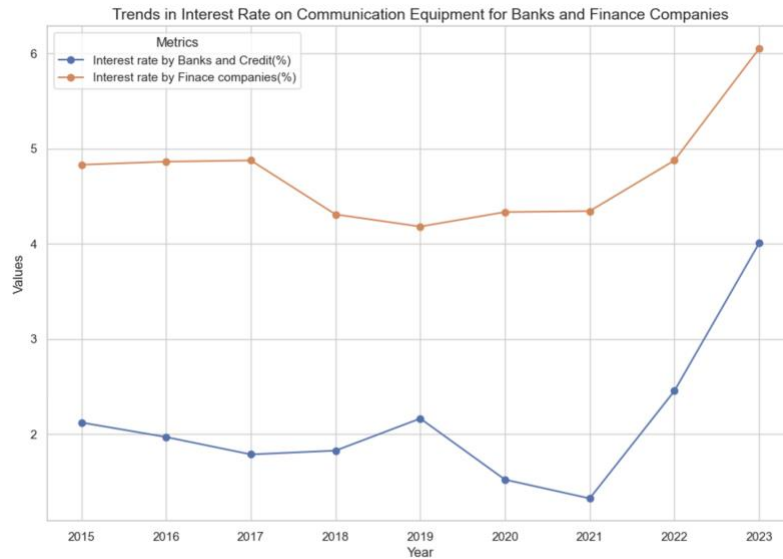
Steady Decline (2018-2022): After 2017, interest payments steadily declined, with the lowest interest paid in 2022 (1.21 million NOK). This is normal due to effect of Covid19 pandemic on the market. This decline might reflect reduced leasing activity, lower interest rates, or both.

Rebound in 2023: Interest payments increased sharply to 8.18 million NOK in 2023. This suggests sharply increase in leasing activity or higher interest rates, possibly due to inflation or changes in financing conditions such as the war in Ukraine.

Comparing the Interest Rate for Banks and Finance companies

Based on the provided chart below, the interest rates for banks (blue line) are consistently lower than those of finance companies (orange line).

The consistent gap in interest rates reflects structural differences in funding sources, risk profiles, regulatory oversight, and business models. Banks leverage their cost advantages and broader customer base to offer lower rates, while finance companies cater to higher-risk markets and rely on higher rates to remain profitable.



Growth Trends between the different leasing categories

The *annual* percentage growth rate is simply the percent growth divided by N, the number of years. Using `pct_change() * 100`).

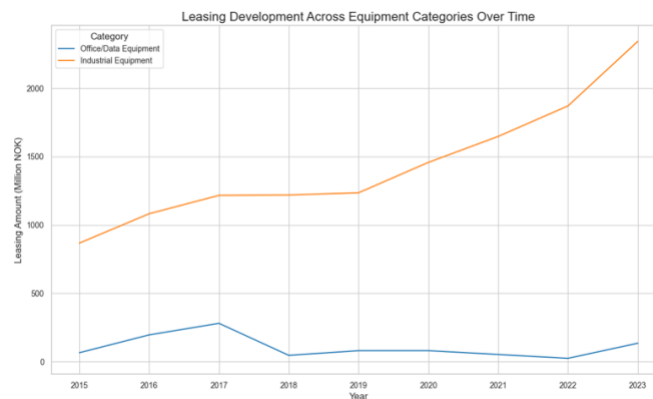
$$PR = \frac{(V_{Present} - V_{Past})}{V_{Past}} \times 100$$

Where:

PR = Percent Rate
 $V_{Present}$ = Present or Future Value
 V_{Past} = Past or Present Value

Analyze the Development of Leasing Across Different Equipment Categories Over Time:

The plot above shows the development of leasing amounts for the categories office equipment and industrial machinery over time.



Correlations between interest rate and leasing of office equipment

There is no significant correlation between interest rates and office equipment leasing, while confirming that lending rates are strongly tied to policy rates. This suggests that office equipment leasing decisions are likely driven by factors other than interest rates.

Calculating lagged correlation results

Testing if past interest rates affect current leasing shows a moderate negative lagged correlation with the last year. This could be used to forecast next year's leasing activity.

Lag 1-year correlation: -0.453

Lag 2-year correlation: -0.181

Lag 3-year correlation: -0.214

In practical terms, -0.418 suggests that if interest rates go up, there's a moderate tendency for office equipment leasing to decrease in the following year. However, this is far from a perfect relationship, and many other factors likely influence leasing decisions.

Planning Cycles: Many businesses plan their leasing decisions annually or bi-annually. A lag analysis can show if companies make decisions on historical interest rates rather than current ones.

Observations

1. Looking into the growth rates (in percentage) across different leasing categories shows relative stability of most leasing categories except for Buildings/Real Estate, which experienced exceptional but temporary growth spikes.
2. Leasing for industrial machinery shows steadier trends, reflecting stable industrial investments with less sensitivity to short-term market conditions.
3. Differences in growth rates between the categories may be influenced by varying financing terms or policy changes impacting office equipment more than industrial machinery.
4. There is no significant correlation between interest rates data and the leasing of office equipment. The relationship appears to be random.
5. The results of lagged correlations, while the -0.418 correlation at Lag 1 might seem noteworthy at first glance, the high p-value (0.302) means we cannot conclude there is a meaningful lagged relationship between interest rates and office equipment leasing. Any apparent relationship could be due to random variation in the data.
6. Office equipment leasing decisions are primarily driven by factors other than interest rates (such as business needs, technology cycles, or regulatory requirements). This suggests interest rates might be a secondary consideration in leasing decisions