IPO Performance Analysis (2019-2023)

Project Overview

This project is an analysis of Initial Public Offering (IPO) performance between the years 2019 to 2023. The core objectives include identifying market trends, evaluating the associated risk and return profiles, and determining the influence of high performing outliers (companies with exceptional return rates) have on the overall market statistics. This analysis is designed to provide an understanding of the typical investor experience within the IPO market across this five year period.

Data Source

The data utilized for this analysis is gathered from StockAnalysis.com for each year.
- 2019 IPO Data: https://stockanalysis.com/ipos/2019/
- 2020 IPO Data: https://stockanalysis.com/ipos/2020/
- 2021 IPO Data: https://stockanalysis.com/ipos/2021/
- 2022 IPO Data: https://stockanalysis.com/ipos/2022/
- 2023 IPO Data: https://stockanalysis.com/ipos/2023/

Methodology

Each Python script performs a sequence of steps relevant to its yearly scope:

1. Data Acquisition: IPO data is directly retrieved from StockAnalysis.com, leveraging the requests library for web content fetching and pandas.read_html for efficient parsing of tabular data.
2. Data Cleaning: This phase involves converting critical columns, specifically 'Return', 'IPO Price', and 'Current Price', to numeric data types. This was done by removing non-numeric characters such as currency and percentage symbols ($, %).
3. Summary Statistics Generation: Key descriptive statistics, including mean, median, standard deviation, skewness, kurtosis, minimum, and maximum values, are computed for the 'Return', 'IPO Price' and 'Current Price' metrics to provide quantitative overview of the dataset.
4. Negative Returns Quantification: The proportion of companies that experienced negative returns in a given fiscal year is calculated to assess the volume of underperformance.
5. Data Visualization (Histograms) : Histograms are constructed to provide a visual representation for the distribution characteristics of 'Return', 'IPO Price', and 'Current Price'. Each plot includes the calculated skewness and kurtosis values in its title, providing insight into the shape and tail behavior of the data distributions.
6. Outlier Impact Analysis: The dataset is segmented into two datasets: the Top 30 performing IPOs and the remaining companies. Followed by a comparative analysis of their respective summary statistics for return rates to quantify the influence the high-performing outliers have on the aggregate dataset.
7. Data Visualization (Box plots): Box plots are generated to provide clear visual comparison of return rate distributions between the top 30 IPOs and the remaining dataset. This is to illustrate the differences in central tendency, spread, and the presence of outliers between these groups.

Key Findings

Overall IPO Trends (2019-2023)
- Prevalence of Negative Returns: Across the entire five year analysis period, a consistent and significant proportion of IPOs finished with negative returns. This ranged from approximately 46% in 2021 to over 67% in 2023, highlighting a risk profile within the IPO market.
- Influence of Outliers on Aggregate Averages: While the calculated average returns typically presented a favorable result, a more detailed and specific analysis revealed these values were distorted by a small number of exceptionally successful IPOs. These high performing outliers inflated the mean. On the contrary, the median return, a representation of typical performance, often suggested that the majority of IPOs experienced a minimal increase in value or a substantial decrease in value.
- Separated Market Performance: The data illustrates a "winner takes most" dynamic within the IPO landscape.The top performing IPOs consistently generated exceptional gains, while the majority of other IPOs typically showed negative average and median returns. These results show the challenging environment for the majority of newly public companies.
- High Volatility: The 'Return' metric consistently demonstrated a high standard deviation throughout the entirety of the five year period. This highlighted the unpredictability of IPO performance, and illustrating the high risk investment avenue.
- Deteriorating Performance Trend: A trend that appeared was progressive decline in typical IPO performance over the five year analyzed period. Specifically, the median returns became increasingly negative from 2019 (-7.79%) to 2023 (-45.8%), suggesting a more challenging market environment for newly public companies in recent years.

Year-Specific Highlights (with Visualizations)

2023 IPO Performance
- Summary: In 2023, companies typically experienced a loss of almost half their value (average -21.51%, median -45.8%). Over half of the companies that offered experience negative returns (67.32%).
- Visualizations:
    - Distributions of Return, IPO Price, and Current Price for 2023 IPOs. The strong right skew in returns indicates the few high performing outliers.
    - A comparative analysis of Return distributions for the top 30 against the remaining 2023 IPOs, illustrating a significant impact of outlier performance.

2022 IPO Performance:
- Summary: Underperformance was a notable characteristic in 2022, with companies experiencing losses typically around a quarter of their initial value (average -8.81%, median -24%). Additionally, 56.14% of companies experienced negative returns.
- Visualizations:
    - Distributions of Return, IPO Price, and Current Price for 2022 IPOs.
    - A comparison of Return distributions for the Top 30 against the remaining 2022 companies.

2021 Performance
- Summary: Over half of the market experience a decline in value in 2021 (average -11.96%, median 0.6%). Specifically, 46.64% of companies showed negative returns.
- Visualizations:
    - Distributions of Return, IPO Price, and Current Price for 2021 IPOs.
    - A comparison of Return distributions for the Top 30 against the remaining 2021 IPOs.

2020 Performance
- Summary: IPOs generally showed underperformance in 2020 (average -4.85%, median -2.1%). The majority of companies (53.08%) recorded negative returns.
- Visualizations:
    - Distributions of Return, IPO Price, and Current Price for 2020 IPOs.
    - A comparison of Return distributions for the Top 30 against the remaining 2020 IPOs.

2019 Performance
- Summary: Despite a positive average return (26.23%), the median return in 2019 was negative (-7.79%), indicating that the majority of companies experienced a decline in value. A total of 54.67% of companies experienced negative returns.
- Visualizations:
    - Distributions of Return, IPO Price, and Current Price for 2019 IPOs.
    - A comparison of Return distribution for the Top 30 against the remaining 2019 IPOs.

Repository Contents: Each script is dedicated their respective annual IPO data
- 2019_ipo.py: 2019 IPO data analysis
- 2020_ipo.py: 2020 IPO data analysis
- 2021_ipo.py: 2021 IPO data analysis
- 2022_ipo.py: 2022 IPO data analysis
- 2023_ipo.py: 2023 IPO data analysis
- images/ :This folder contains all generated visualizations in .png format.

Technologies:
- Python
- Pandas
- NumPy
- Requests
- Matplotlib
- Seaborn
- SciPy