

GDP and stock market growth

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Abstract

In this paper we observe how connected or dependent on each other are the GDP and stock market growth. We consider the growth of GDP in USA from 2014 till 2021 year. As stock market indicators we take SP500, AAPL, AXP, IBM, BA. To obtain data we applied Yahoo API. We investigate if there are correlations between these variables. As conclusion we can state that US gdp mostly correlates with stock market.

Keywords: GDP, Stock market indices, Spearman correlation

Mathematics Subject Classification (2010): 05C10

1. Introduction

We are considering the question of possible relationship between the stock market growth and the GDP. If we look to the past we can observe that some countries with emerging market demonstrated incredible growth and it is a possible question for economists if it is connected with the GDP rather than capitalization of the market. In this paper we will analyze growth of the returns of stock market within almost 10 years, check the dynamical changes of gdp growth (case of USA) and try if there is any relationship.

1.1 *Stock market variables*

Mostly we are taking index of SP 500 index but we also include in our research stocks such as AAPL, IMB, BA, AXP. We have to draw attention to SP500 because it is a very important index of stock market growth. SP 500 tracks stock actions of the 500 large corps that are on stock exchange in New York. Tracking stocks which we listed can be also important for us because it reflects the real situation of the

American stock market life.

2. Data set

2.1 Uncleaned data

Let's consider our dataset. We have the stock returns of some stock indicators including the stock index of SP500 and 4 stocks of AAPL, IBM, AXP, BA. In addition we apply the historical data of American GDP growth since 2014 till 2021 years. We used Yahoo API to obtain the data we need for the research. To some up we got the picture of real stock returns within the period we need.

What was important for us is to get the visualization of SP500 index's growth from 2014 till 2021 years.

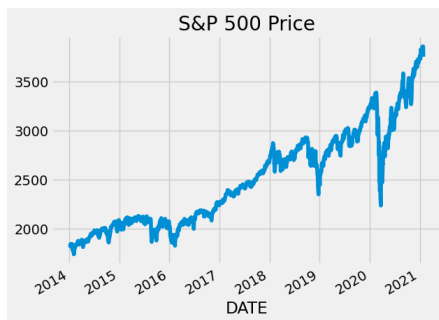


Figure 1: The growth of SP500 index's price within years of 2014-2021

Then we add another figure which represents returns of stocks and the Cumulative returns within our period.



Figure 2: The growth of our chosen stocks within years of 2014-2021

2.2 Prepared Dataset

Important for us was working with non raw data, we cleaned the dataset, removed the Na values. Then we finally calculated the dy-

namics in the stocks price returns. It seemed to be nice to calculate the means of stocks growth so we did it. The highest one is APPL while the lowest IBM.

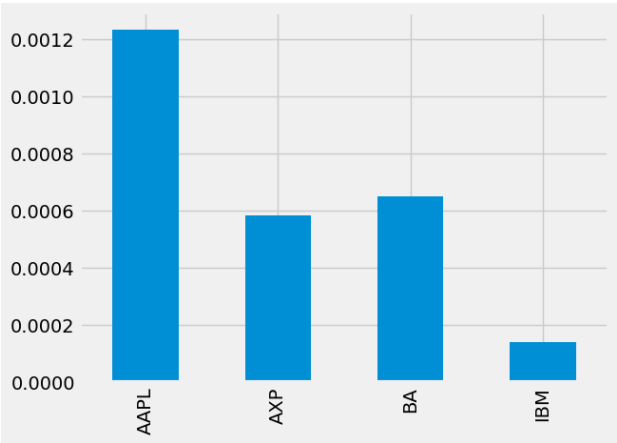


Figure 3: Means of the stocks' growth level

3. Methodology

Here we wanted to reveal the connection between the stock market growth and GDP by applying the tools from Data science. In two words we want to find the correlation between the stock index and American GDP. Then also we will estimate it within GDP of many countries.

By python programming language we apply the correlation here to estimate the connection between GDP and stock market growth. The correlation is lying within from -1 to 1 interval showing the strenght of relationship. But we also would like to extend the field of our research. Let's add other countries and their GDPs.

4. Results

We added GDP of other countries. So we can see that the highest correlation is between the US stock market and US GDP. On the second place is Denmark. We can conclude that GDP of other countries correlates strongly with US stock market.

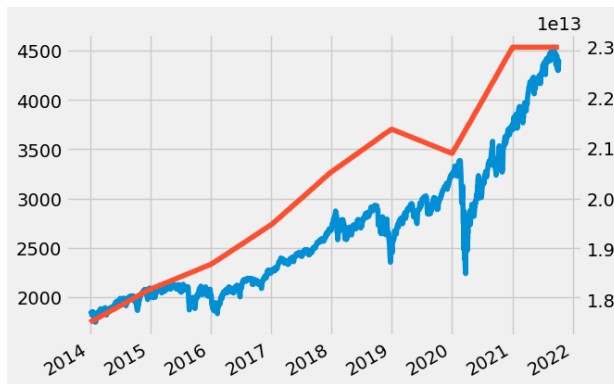


Figure 4: We compared growth of SP500 index and American GDP

References

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