



Report: Investment Strategies Analysis

Programming for Data Science

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Group 2

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1. Tasks related to investment strategies analysis

1.1. Return Task

Question: Taking into account ALL generated returns, does your team think it is more probable to obtain a positive or negative return?

Data analysis performed for this task:

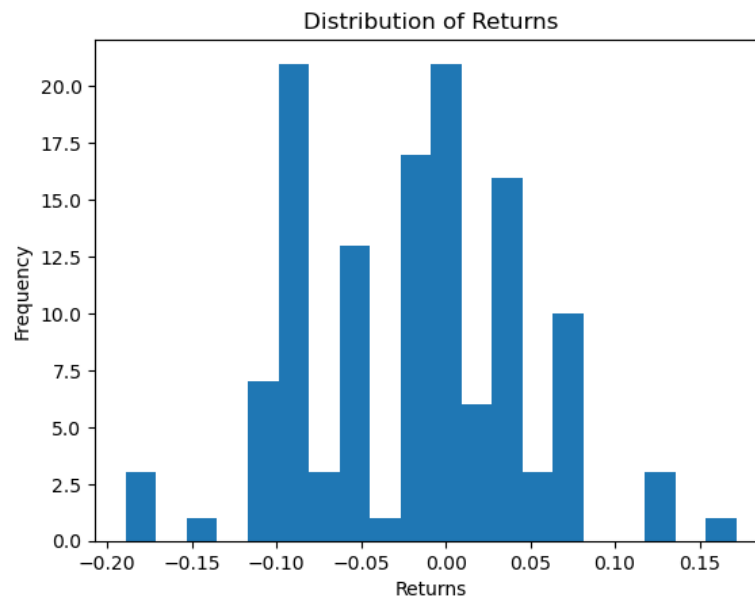


Figure 1: 'Returns' distribution histogram

Mean return: -0.02186198634887946

Standard deviation of return: 0.06884379977770783

Percentage of positives return values: 43.65079365079365

Percentage of negatives return values: 52.38095238095239

Percentage of zero return values: 3.968253968253968

Conclusions:

As it can be appreciated, to be able to answer the question asked, we decided to create a vertical bar plot which measures the 126 'Returns' values based on the frequency and value of the 'Returns' distribution.

Looking at the mentioned histogram, it can be seen that the distribution is significantly balanced, slightly tending to a more negative value trend, which can be then confirmed by seeing the mean 'return' value (-0.022). This insight suggests that it would be more

probable to obtain a negative return, however, we wanted to continue with the analysis to be sure about our thoughts.

Therefore, we extracted the percentages of each possible 'return' value (negative, positive or zero, which before was classified as positive also). By doing so, we saw that there is a higher percentage of negative values (52.38%) compared to positive ones (43.65%). Also, considering that we decided to treat the zero values (3.97%) as zero, neither positive nor negative, we confirmed our previous reasoning: there is a higher chance of getting a negative 'return' value.

1.2. Return vs Risk Task

Question: Does your team think it is ALWAYS true that the higher the risk, the higher the obtained return is?

A simple way to check if a higher risk always includes a higher return, is to check whether there exists a correlation between these two variables or not. For this assumption to be true, there should be a strong positive correlation, observing that higher risk values relate to higher returns.

To check this assumption, we decided to use a scatter plot, to see where each of the 126 portfolios stands in a graph where the axes are the volatility against the return.

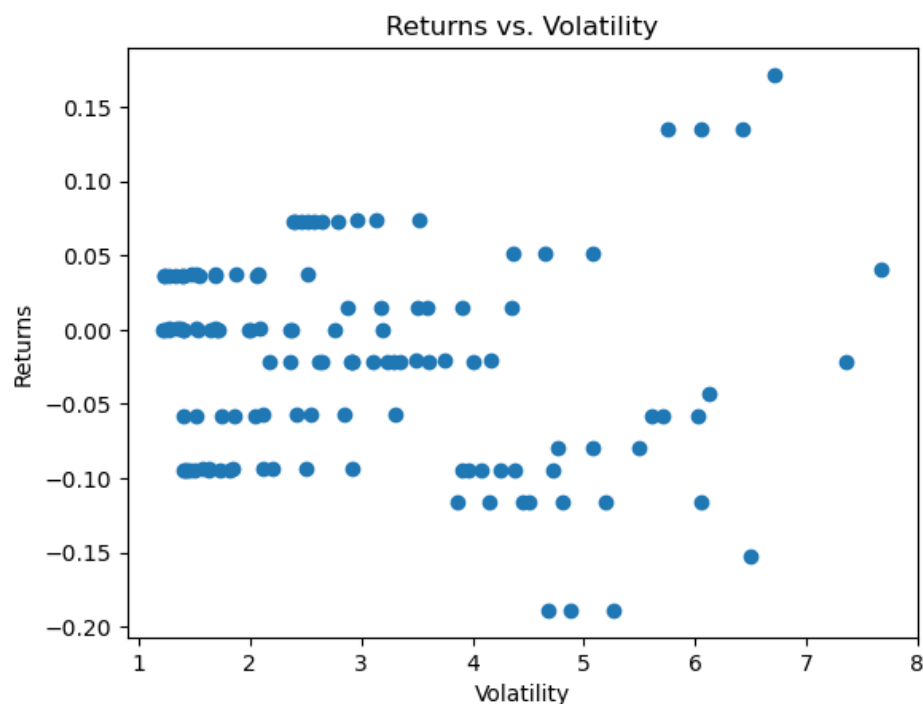


Figure 2: Return vs Volatility Scatter Plot from the 126 portfolios.

As observed from Figure 2, visually it does not seem that there exists any kind of correlation between the two variables. It is true that, for low volatility values the returns gather more around the positive and negative values of 0, while when the volatility starts increasing, more extreme values of return appear, not only in the positive part (higher return) but also on the negative (losses).

To further analyze this result and not just conclude from the visual appearance of the graph, we calculated the correlation coefficient from the values of the scatter plot, to check if there was any existing correlation between the volatility and return variables. The obtained coefficient was of **-0.098**. This value indicates that there is no linear correlation of any kind between the two variables, as the parameter is almost 0. Furthermore, as the sign is negative, it even indicates that return values tend to slightly decrease as volatility increases, however since the coefficient is so low, this cannot be affirmed.

Overall, the scatter plot and the analysis perform indicate that it is not true that for higher volatility values, the return increases, as there is no linear correlation between the two attributes. What can be concluded from Figure 2, is that for lower volatility values, the returns are more gathered around positive and negative values of zero, indicating a lower risk but as well as a lower possibility of obtaining high returns, while instead, when the volatility values increase, more extreme returns appear, having the possibility of obtaining higher returns, but as well increasing the risk of losing more money.