Task 2.1

**2) Does your team think it is ALWAYS true that the higher the risk, the higher the obtained  
return is?**

To analyze the relationship between *risk* and *return*, we first calculate the **correlation coefficient** between the two variables. We obtain a value of **0.7**. Such a value is quite high and therefore indicates a strong positive linear relationship between the two variables. This means that there is a strong tendency that as risk increases, return also increases. However, this does not necessarily mean that all variations in the dependent variable (‘RETURN’) are explained by the independent variable (‘VOLATILITY’). Thus, that does not allow us to say that higher risk always leads to higher return. We can see this on the scatterplot: some portfolios with a higher risk value lead to lower returns than other less risky portfolios.

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Table 1: Scatterplot of risk and return levels

To further determine whether a significant linear relationship exists between risk and return, we perform a linear regression. We obtain a determination coefficient **R² of 0.5**. So, it means that only 50% of the variation in the return is explained by the risk. This confirms that there are other factors to consider besides risk to determine the level of return. There may be some cases where these other factors lower the return of a riskier portfolio.

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Table 2: Linear Regression Return vs Risk

To better understand the relationship between risk and return, we divide portfolios into three groups: low-risk, medium-risk and high-risk portfolios.

For each risk category, we calculate the average return:

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk category** | **Low** | **Medium** | **High** |
| **Average return** | 1.4 | 4.8 | 10.4 |

Table 3: Average return according to risk level

We can see that higher risk leads, on average, to higher return.

On the following boxplots, we can see that the higher the risk category, the more dispersed the return values. This could mean that higher risk portfolios have potentially higher returns but are also more unpredictable.

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Table 4: Box plot of return according to the level of risk

To conclude, we can say that higher risk favors higher return. However, risk is not the only factor influencing returns. Many macroeconomic factors such as interest rates, inflation, government policies, etc., also influence investment returns. It is important to take these factors into account when interpreting the results and not to conclude that high-risk portfolios are always more profitable than low- or moderate-risk portfolios.