Q1

PC1 usually capture the most common source of variation across the dataset, so PC1 here might represent a broad market risk factor, often associated with the overall market movement because it explains the most variance. In the context of stock returns, PC1 could be related to the systematic risk that inherent to the entire market or market segment and affects all companies.

Then, PC2 typically captures the next most significant source of variance that is uncorrelated with the first. Here, PC2 might capture sector-specific risks or other factors that are orthogonal to the market risk. This could be size, value, or another common risk factor that influences stock returns differently across sectors or types of stocks. For example, the technology sector might react differently to a change in policy than the finance sector. These sector-specific responses create variances that are different from the general market movement captured by PC1.

Q2

Here we looked for 5 pharmaceuticals stocks

A screenshot of a computer program

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A screenshot of a computer program

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A graph with a green line

Description automatically generatedA graph of a graph

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Based on the scatter plot we got:

PFE: It has a high negative exposure to PC1 and almost no exposure to PC2. This suggests that PFE's stock movements are significantly influenced by PC1 and it moves in the opposite direction to what PC1 represents.

MRK: It has a high positive exposure to PC2 and minimal exposure to PC1. This implies that MRK's movements are more related to the risk factor captured by PC2.

JNJ, LLY and ABBV: They have little exposure to both PC1 and PC2, indicating that its stock price movements may be driven by factors not captured by the first two principal components or that it is less volatile in the context of the factors considered.

Overall, the results suggest that PC1 might be capturing a risk factor that is strongly influencing PFE, whereas MRK is notably influenced by what PC2 represents. The rest stocks appears to be less sensitive to both of these factors. Therefore, we would consider the percentage of total variance explained by them. If it is high enough, these two factors could be sufficient for a simplified risk model. If not, or if we seek a more detailed understanding, we might need additional factors.