# Question 2

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**Abstract**

Answers the Question of whether a manager should want to hedge against the ZAR or not.

## 1. Introduction

I start by replicating the figure given in the article. I then construct a hedged and un-hedged portfolio, calculate their three year rolling returns and standard deviation. Lastly, I compare the annualised returns and standard deviations over three different time periods to show that the results hold.

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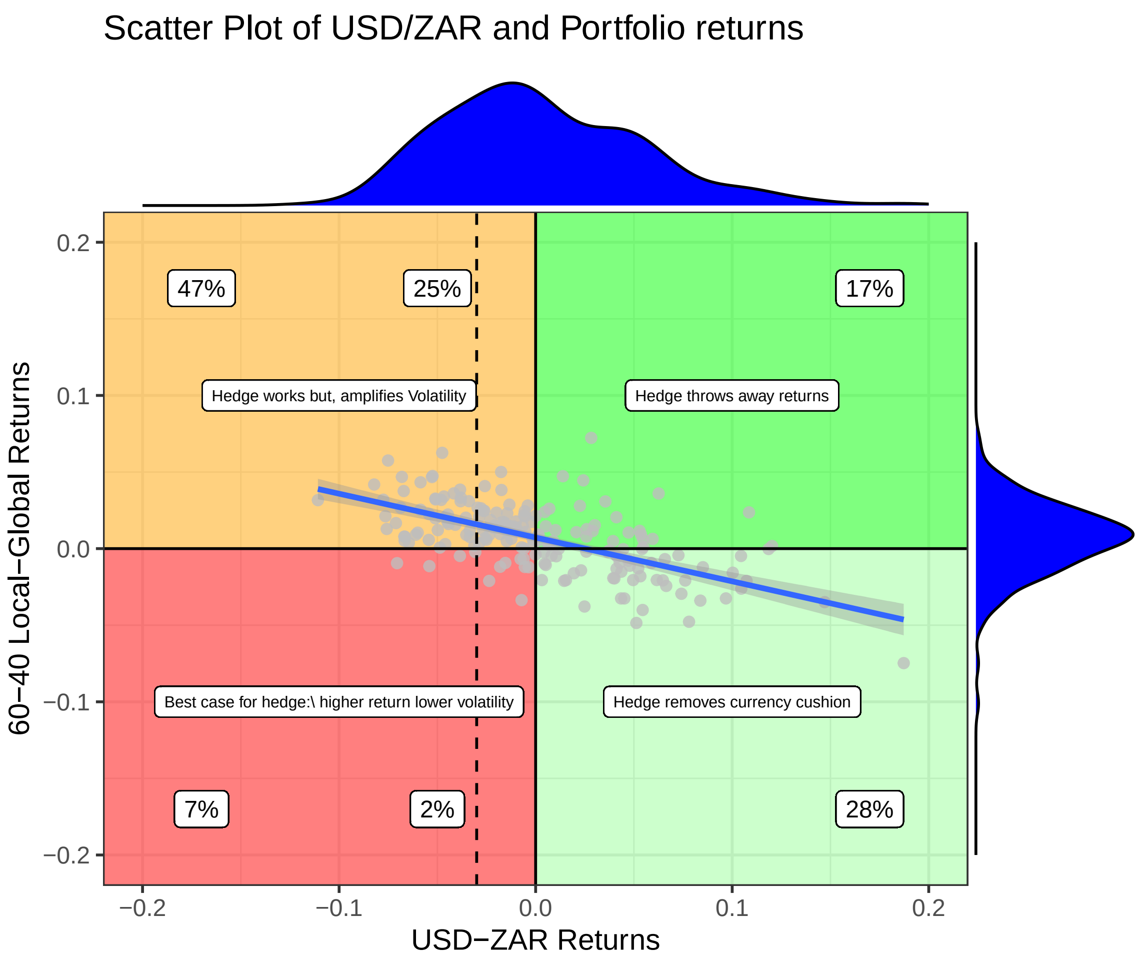


Figure 1.1: Replication of Scatter plot

## 2. Volatility analysis

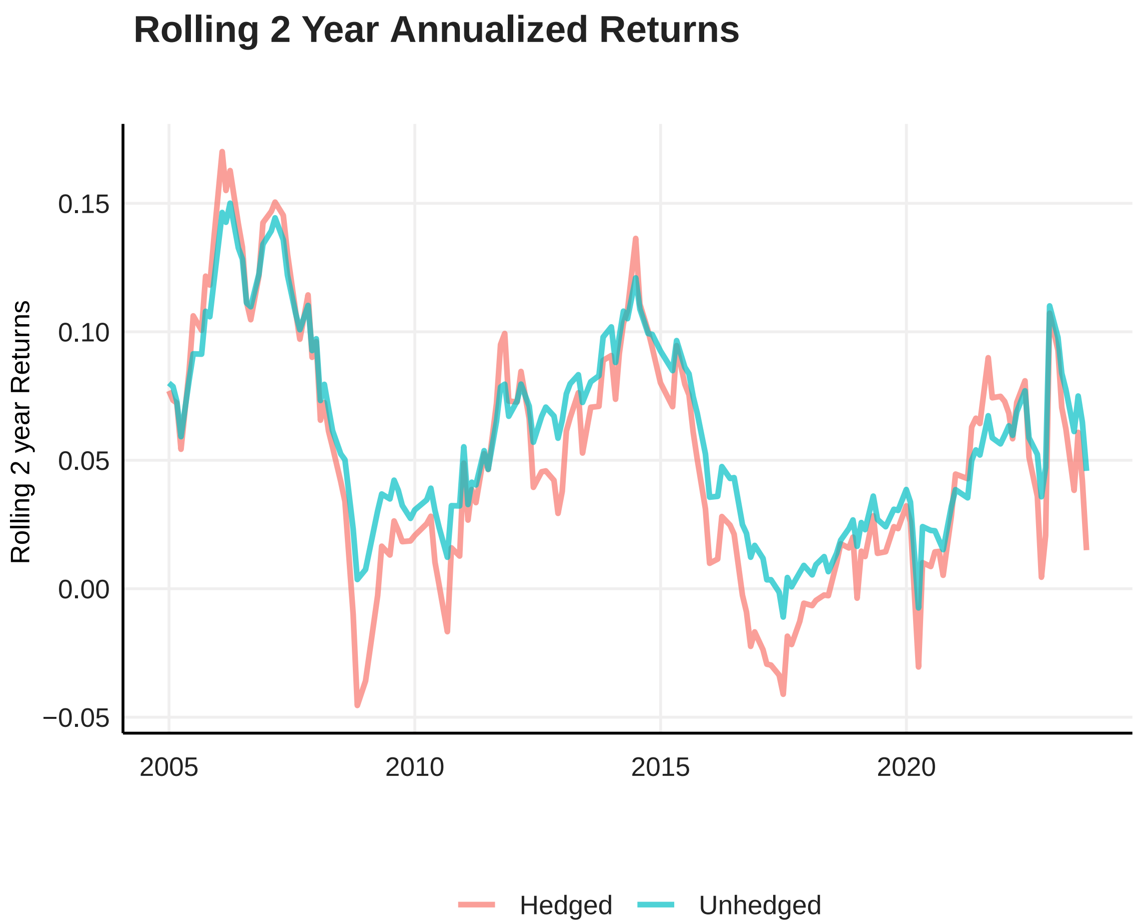


Figure 2.1: Rolling 2 year Annualised Returns

Figure 2.1 incorporates the fee identified in the study and in Figure 1.1. Once the fee has been accounted for it is clear to see the that unhedged portfolio almost always outperforms it's hedged counterpart.

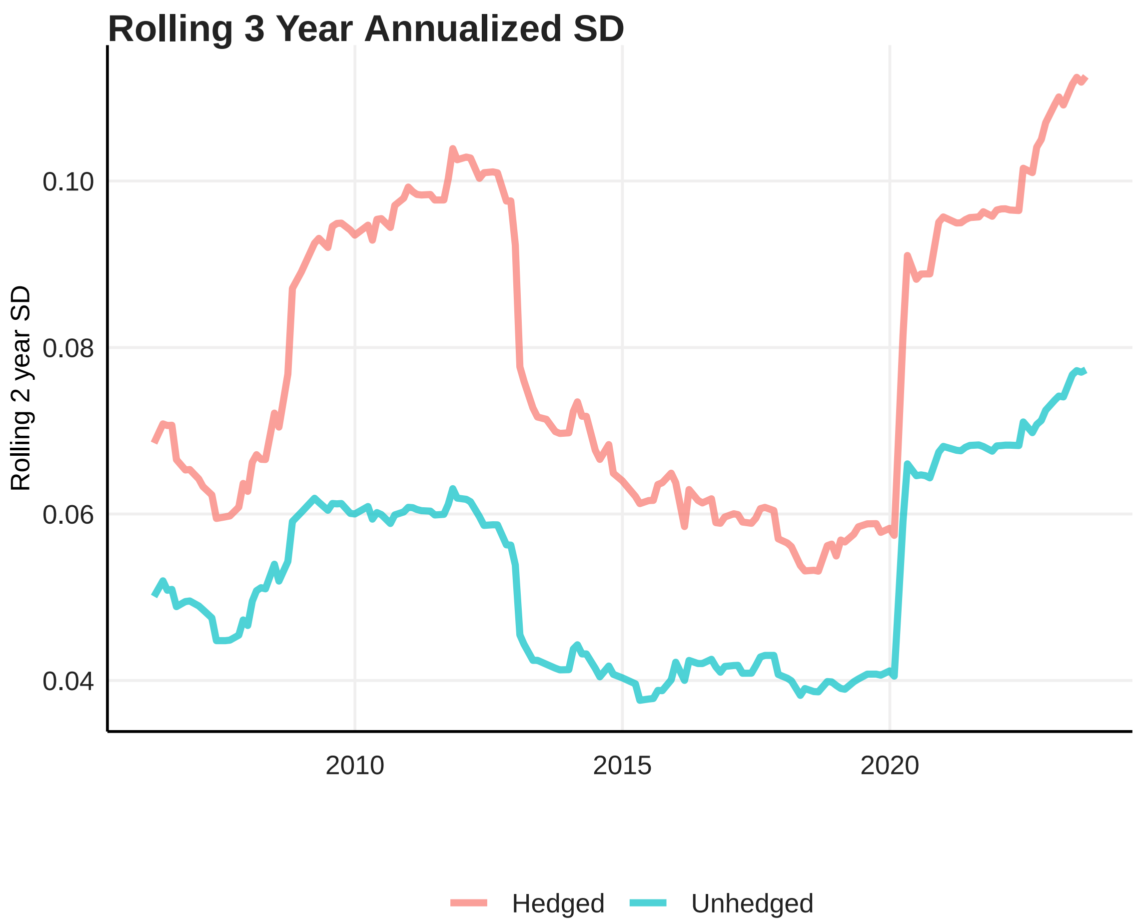


Figure 2.2: Rolling 2 year Annualised SD

If the returns comparison was not convincing enough the comparison of a two year rolling SD paints an even clearer picture. Throughout the entire sample period the Hedged portfolio is more risky. Figures 2.3 and 2.4 only strengthen this argument to show that the results are strong irrespective of the lookback period. Finally the table at the end of the question calculates the correlations of both portfolios to the USD/ZAR exchange rate and finds that hedged portfolio is more negatively correlated to the USD/ZAR exchange rate. This confirms the existence of the paradox in volatility in that negatively correlated assets may produce portfolio volatilities that are lower than the sum of its parts.

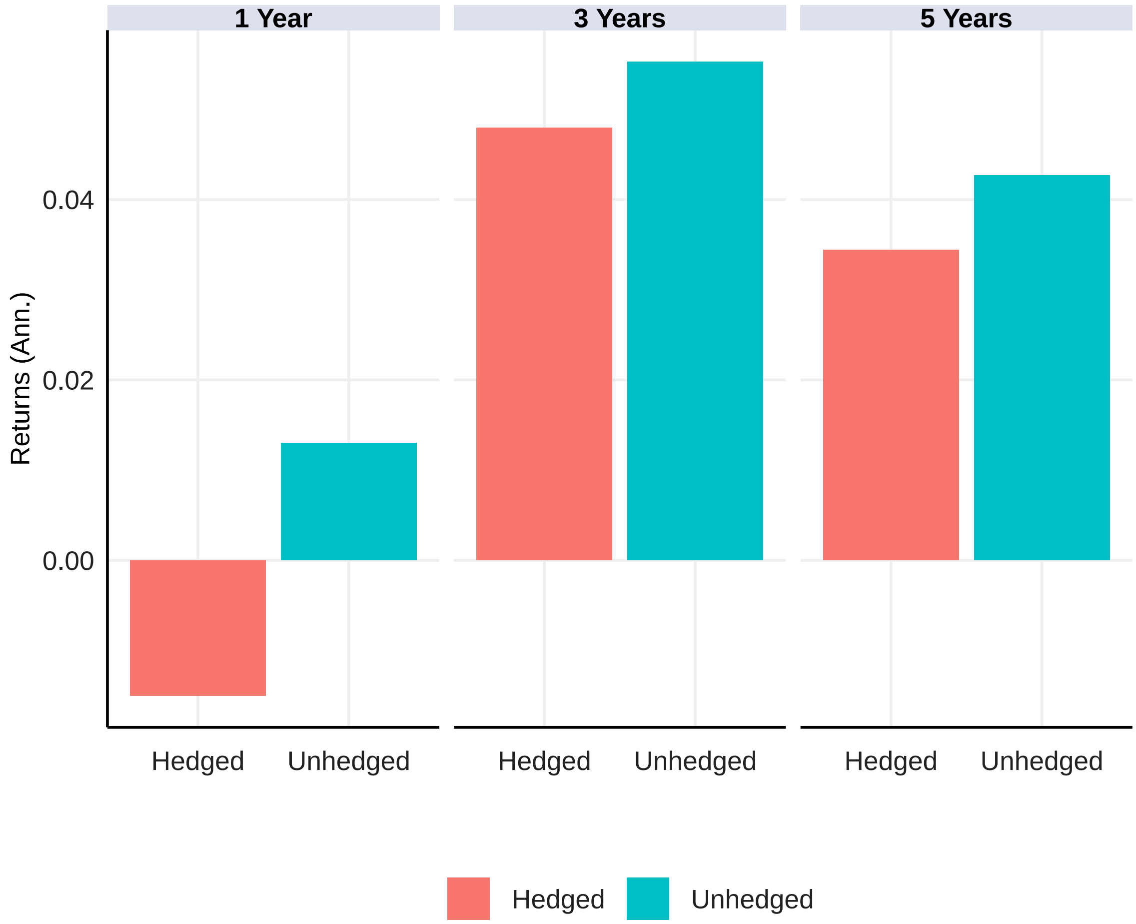


Figure 2.3: Rolling Returns over time

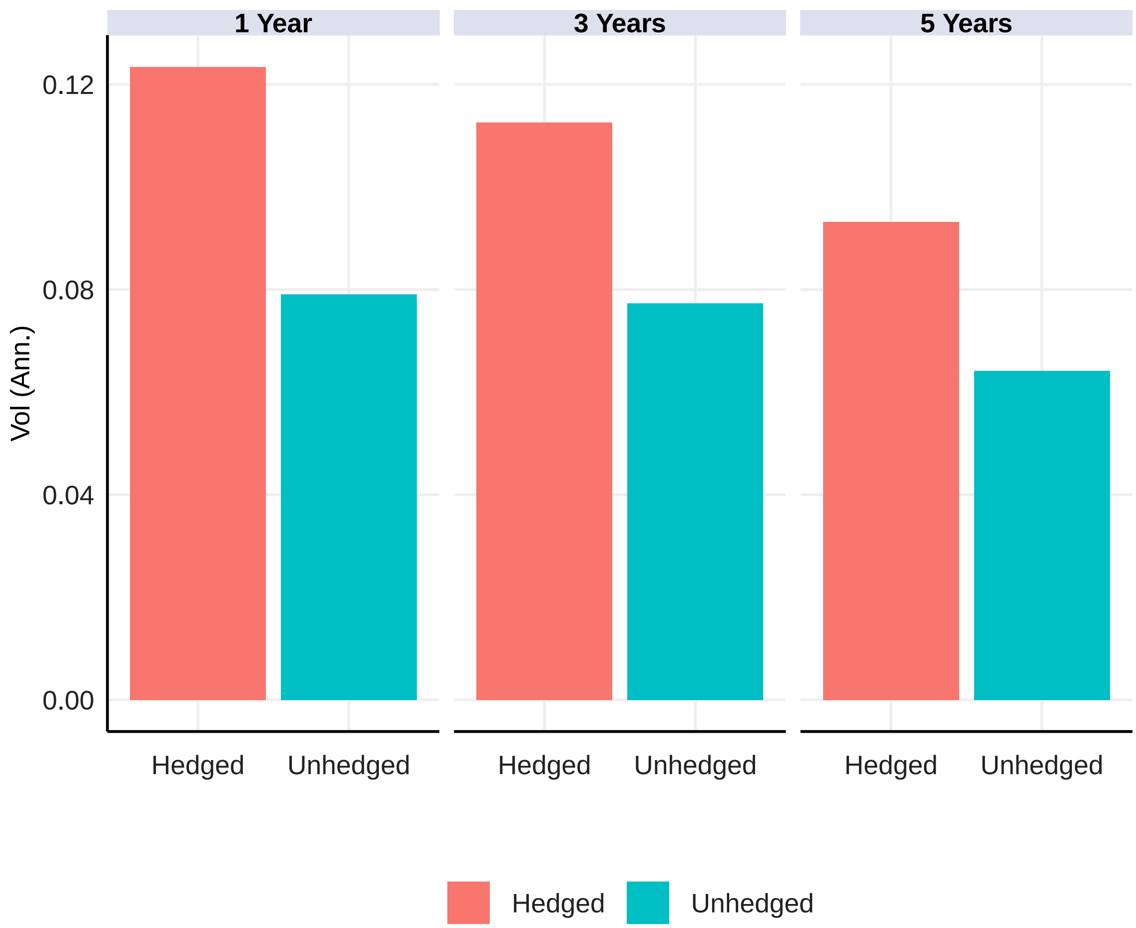


Figure 2.4: Rolling SD over time

| Type | Correlation |
|---|---|
| Hedged | -0.6121116 |
| Unhedged | -0.5452580 |

## References