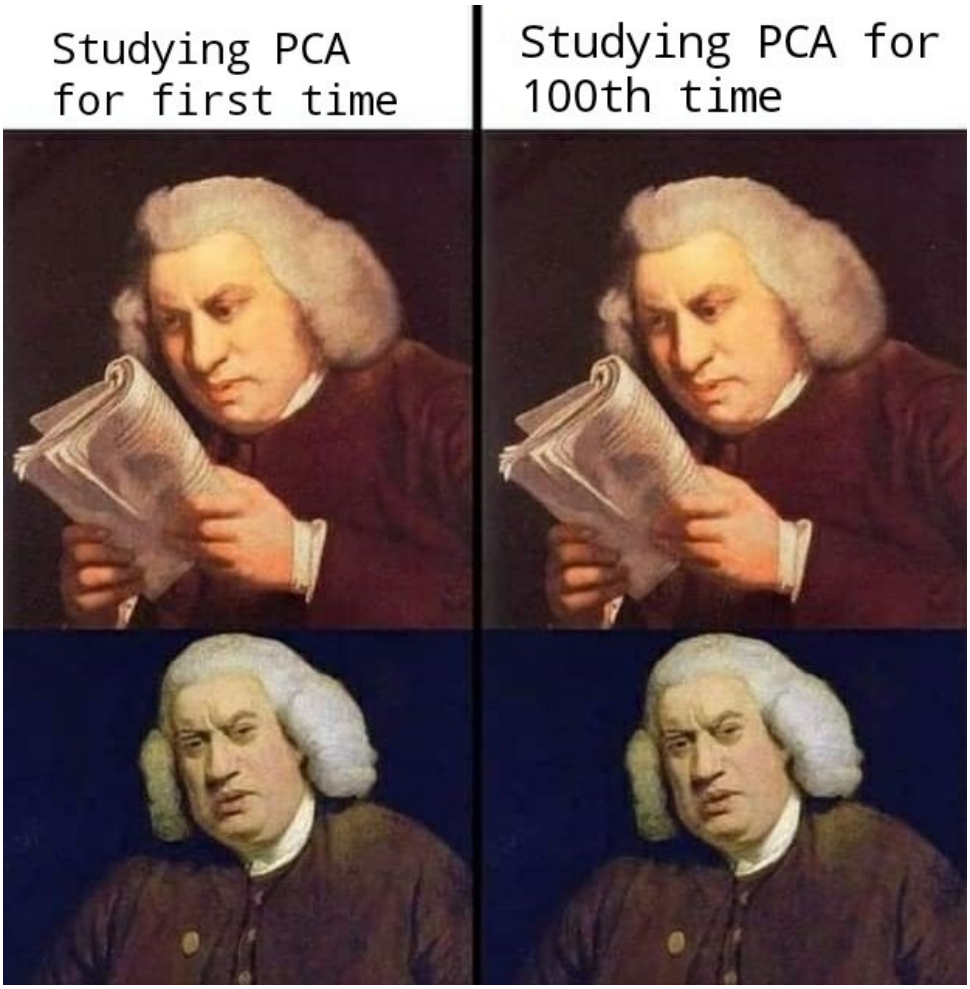
QUESTION 4 - VOLATILITY COMPARISON

Carel Olivier



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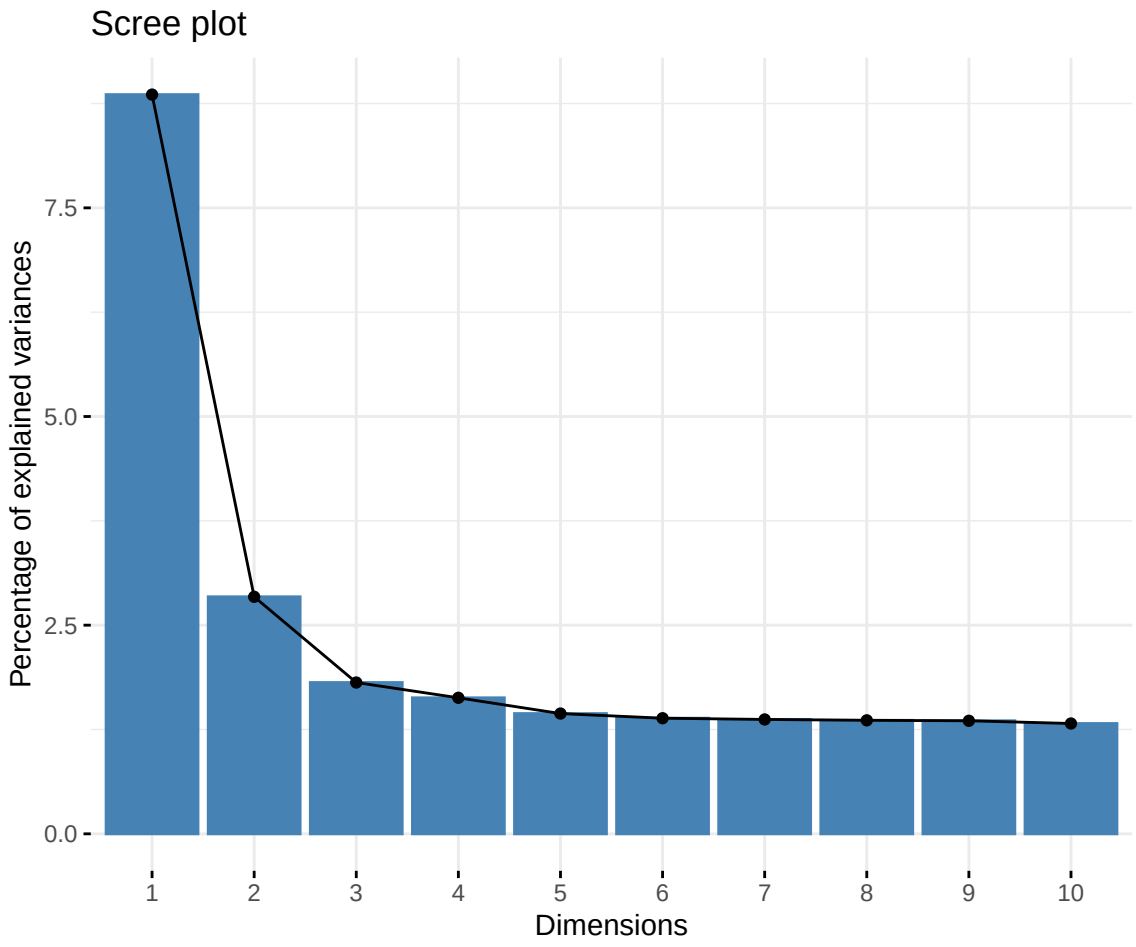
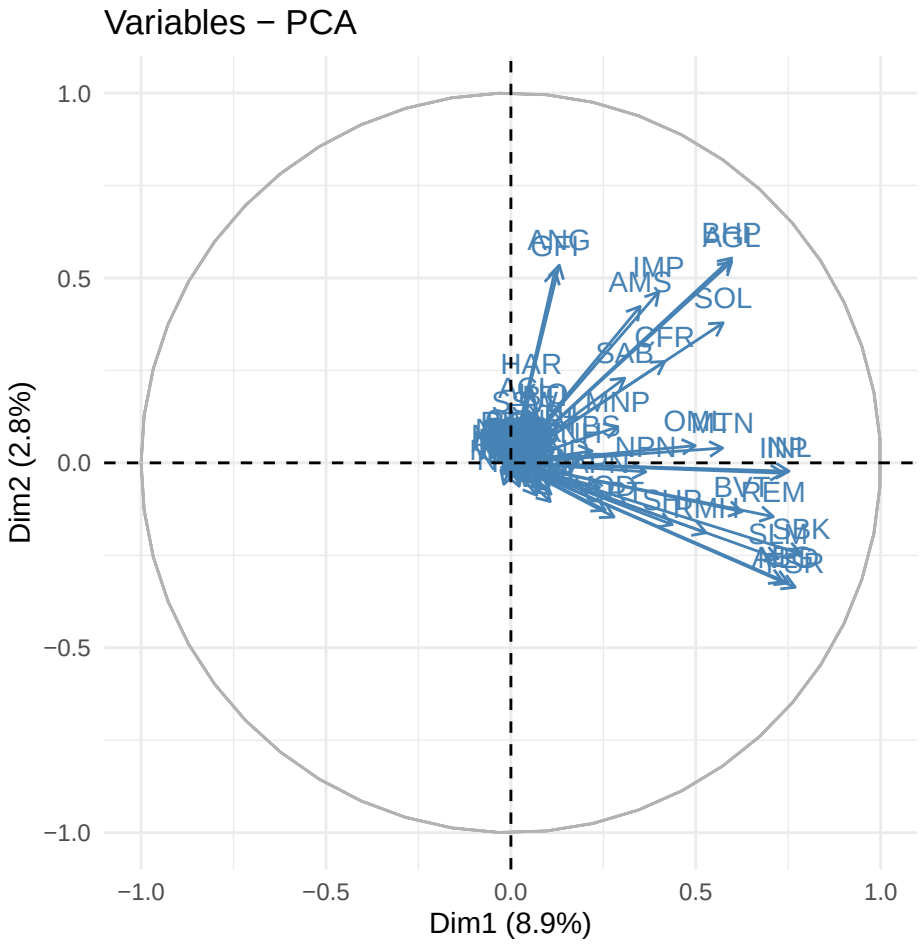
1. Short Introduction

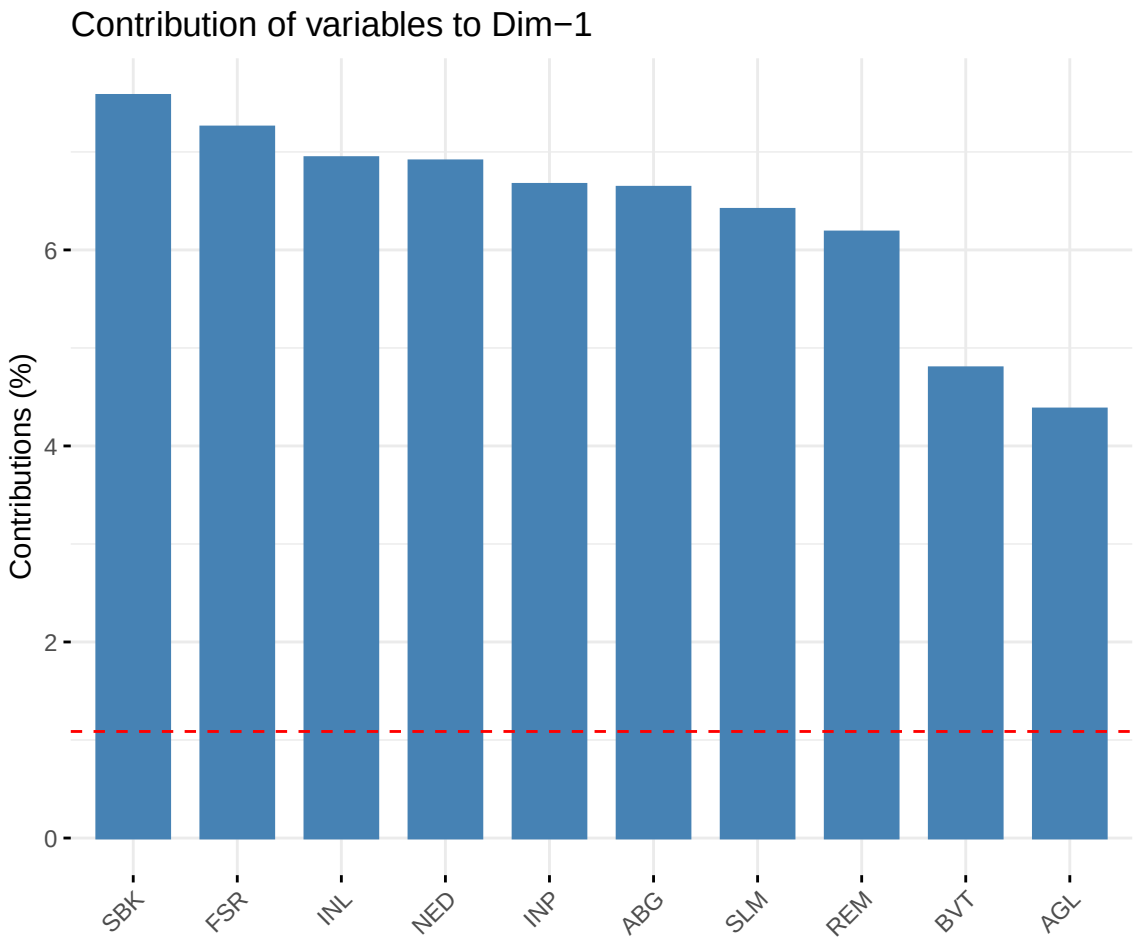
Using the Top 40 Index data I will perform Principal Component Analysis (PCA) as well as a rolling constituent correlation analysis to better understand the concentration and commonality of returns for the J200 index.

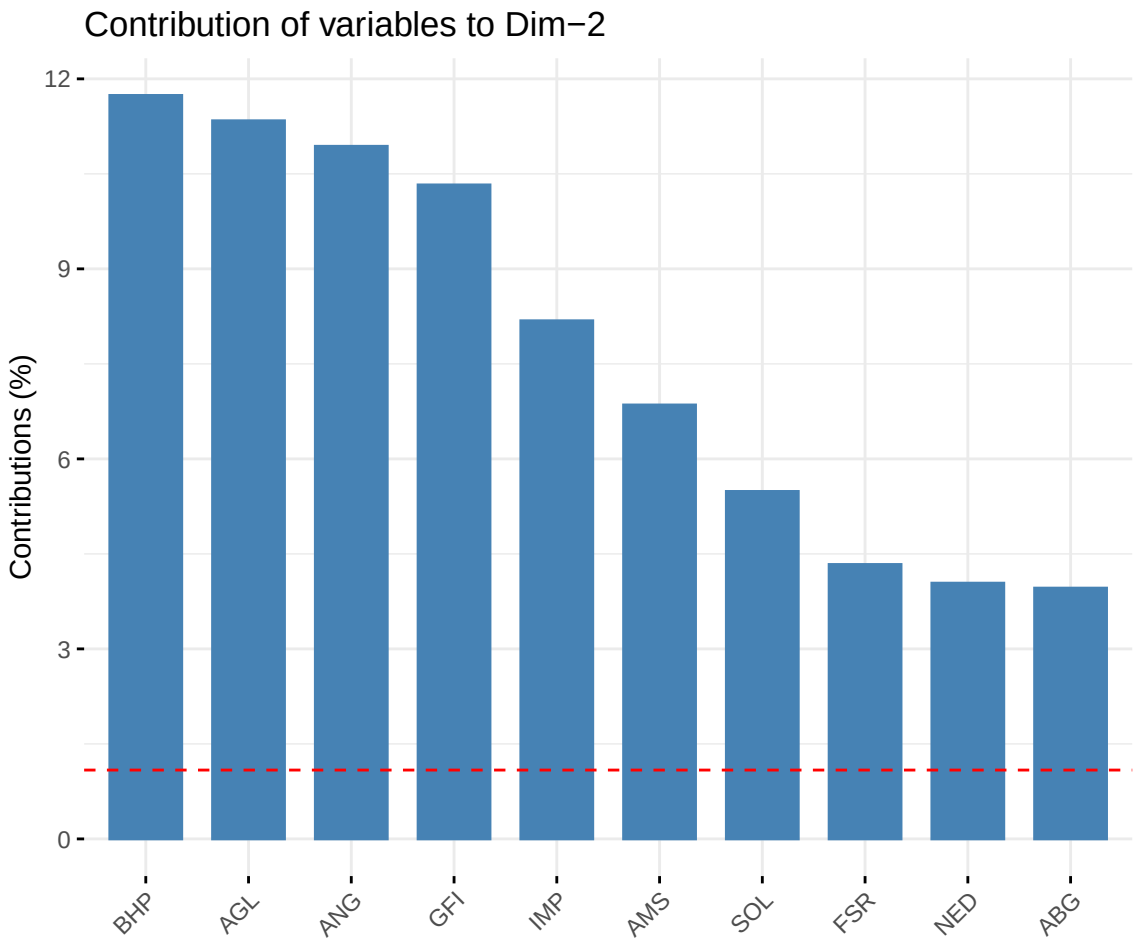
2. Calculate Returns





There are 92 components that explain a percentage of the total variation in the T40 returns. PC1 explains 8 % of the total variance, which is the most out of the 92 PCA's.


Contribution of variables to Dim−1
Contributions (%)
0
2
4
6
SBK
FSR
INL
NED
INP
ABG
SLM
REM
BVT
AGL

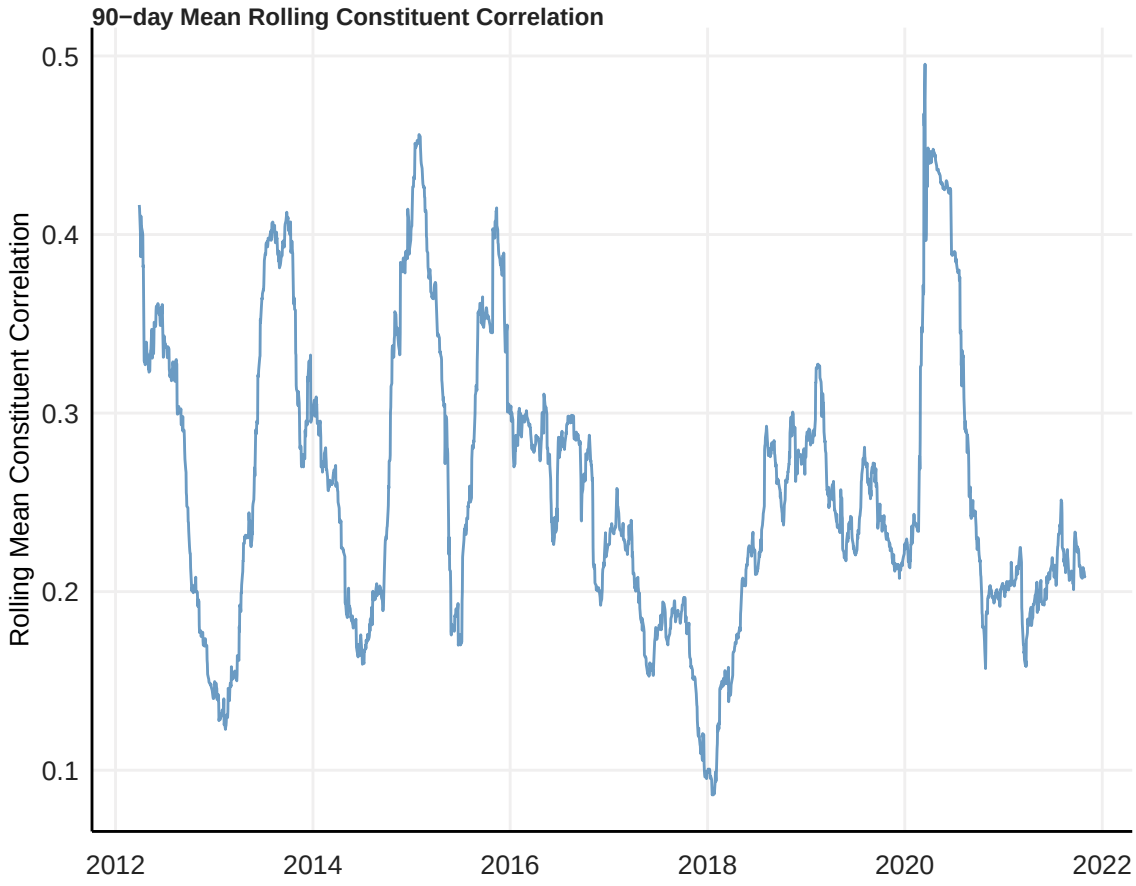


3. Calculate rolling constituent correlation

Next I will calculate the rolling average pairwise correlations between all the stocks. That will require calculating the rolling pairwise correlation between all the stock combinations in the index and then take the mean of all those. Thus, I will tackle the problem in bite-sized pieces. The graph below shows the 90-day Mean Rolling Constituent Correlation. I sourced the code I used for the function *rolling_cor_func* , from the following link:

(https://robotwealth.com/rolling-mean-correlations-in-the-tidyverse/)

- Calculate Rolling Correlation


90−day Mean Rolling Constituent Correlation
Rolling Mean Constituent Correlation
0.5
0.4
0.3
0.2
0.1
2012
2014
2016
2018
2020
2022