Financial Econometrics 871 Practical Exam 2022: Question 4

Tian Cater[a]

[a] *University of Stellenbosch, Western Cape, South Africa*

Abstract

In this question, I use the Top 40 Index data from question 3 to calculate the concentration of returns among the ALSI constituents (J200) by considering it from a Principal Component Analysis (PCA) perspective. I plot the Scree plot (percentage of explained variances) and the Cos2 plot (quality of representation) for the principal components that explain the most volatility (quality of representation). The findings suggest that NPN, BHP, and AGL explain a significant portion of the ALSI Top 40 index variation.

1. Scree Plot (percentage of explained variances)

Figure 1.1 indicates that a single component explains nearly 20% of the variation in the ALSI index. It does not give insight into what this component or factor might be, but it tells us how it is calculated linearly. In addition, excluding the large portion explained by the first two PCs, the remaining seven comprise roughly the same amount of variation in the ALSI.

Email address: 19025831@sun.ac.za (Tian Cater)
2022-11-27

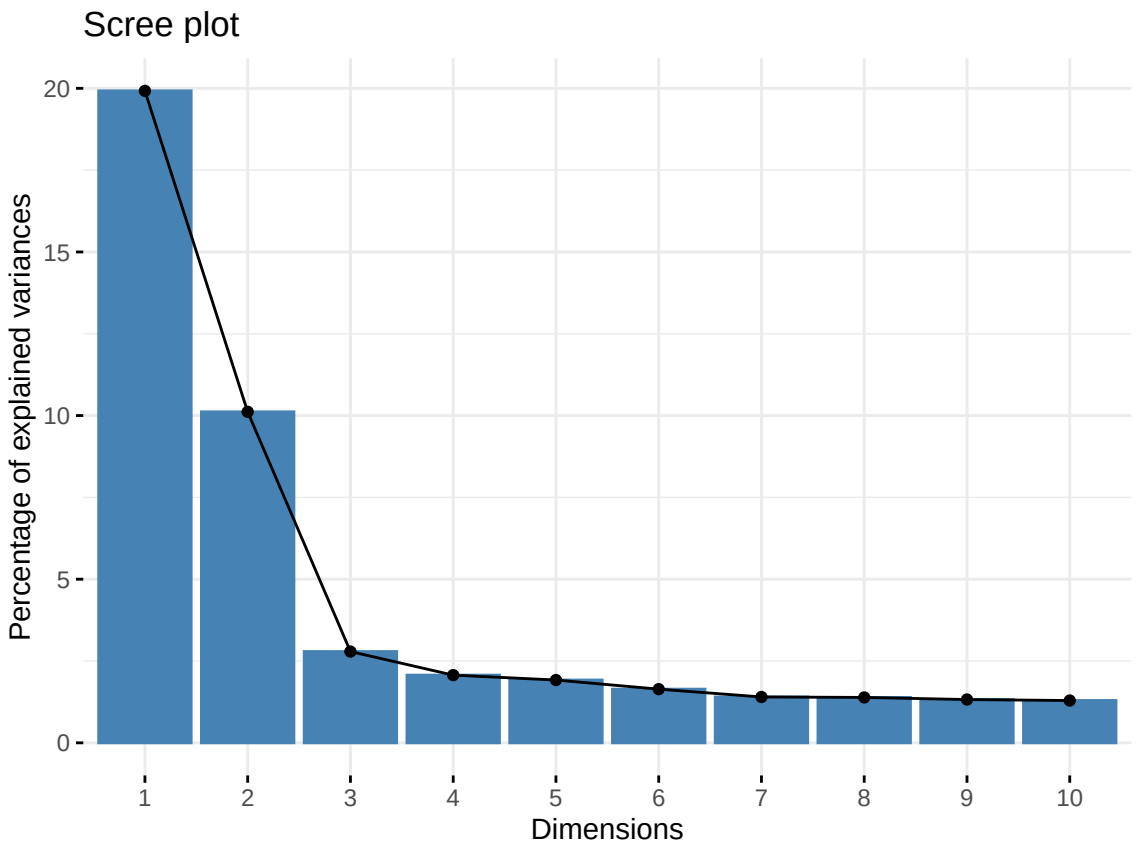

Figure 1.1: Scree Plot of Principal Components of ALSI Top 40.

2. Cos2 Plot (quality of representation)

Given the significant contribution of the first two components, I generate the cos2 plot below (Figure 2.1) for the first two PCs. Figure 2.1 shows that NPN, BHP, and AGL have high cos2 values, indicating a good representation of the variable on the first two PCs.

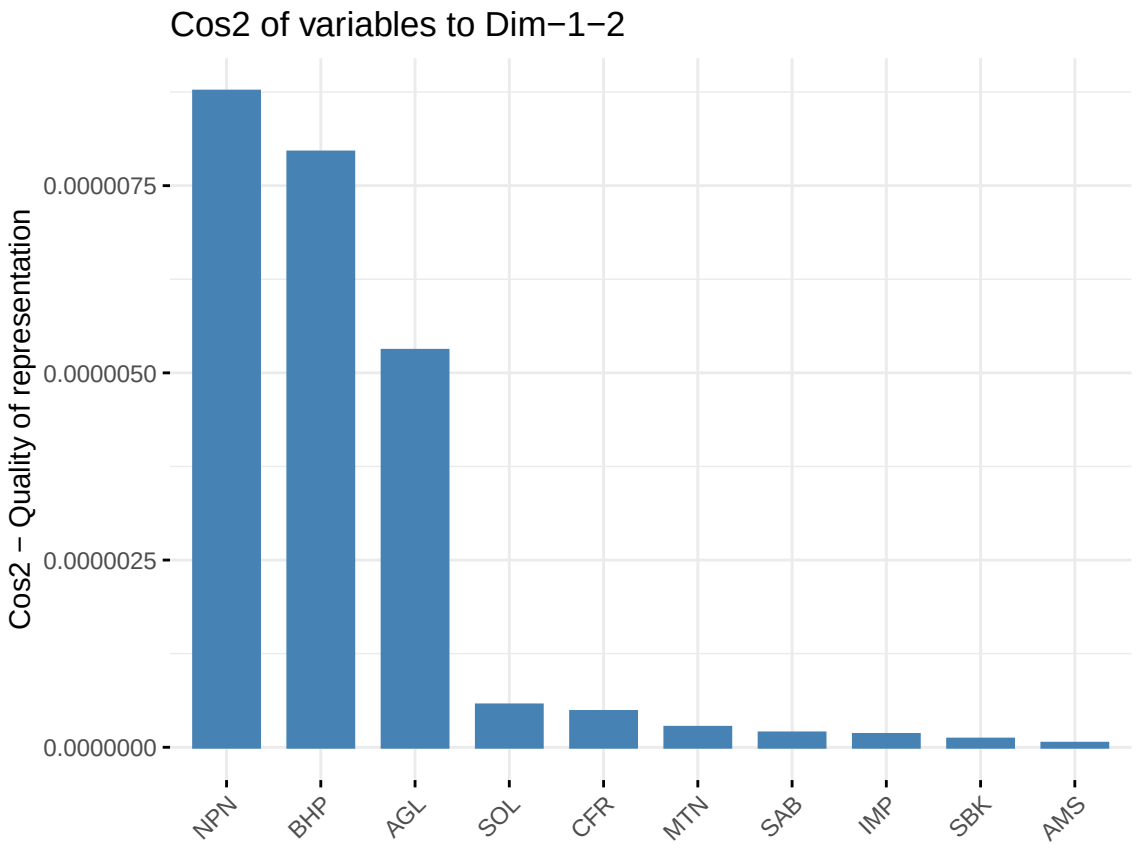

Figure 2.1: Cos2 Plot of First Two Principal Components of ALSI Top 40.

References

00