ANALYSING THE VOLATILITY OF LARGE, MID AND SMALL CAP SHARES IN SOUTH AFRICA

Joshua Strydom

Stellenbosch University

January 2023

Analysing the volatility of large, mid and small cap shares in South Africa

Joshua Strydom[a]

[a]*Stellenbosch University, Stellenbosch, South Africa*

Keywords: Volatility, ALSI, Standard deviation

JEL classification L250, L100

1. Introduction

In general, small cap stocks tend to have higher volatility than large cap stocks, and mid cap stocks tend to fall in between the two in terms of volatility. This is because small cap companies typically have less established business models and less predictable revenue streams, which can lead to greater fluctuations in their stock prices. On the other hand, large cap companies tend to have more established business models and more predictable revenue streams, which can lead to less volatility in their stock prices. In R, one can use the package 'PerformanceAnalytics' to calculate the volatility of different indexes.

2. Index Analysis

The analysis of volatility is based on three indexes of the Johannesburg Securities Exchange (JSE). Data is attained by filtering out the FTSE All Share Index (ALSI). The large cap index is based on the FTSE/JSE Top 40 Index (J200), the mid cap index is based on the FTSE/JSE Mid Cap Index (J201) and the small cap index is based on the FTSE/JSE Small Cap Index (J202). The derived returns for each of the separate indexes are calculated as the product of a stocks daily return and the assigned weight in the respective index. For the large and small cap indexes, data from 2005 to 2022 is available. Unfortunately for the mid cap index, data is only available from 2016 onward.

Email address: 20718284@sun.ac.za (Joshua Strydom)

Contributions:

The authors would like to thank no institution for money donated to this project. Thank you sincerely.

2.1. Drawdowns

A drawdown chart is used to display the worst time for a portfolio under analysis. The charts below display the peak-to-trough decline in each of the indexes value. The graphs are important for measuring the historical risk of an investment. A drawdown chart is a measure of downside volatility.

2.1 displays the large cap drawdown chart.

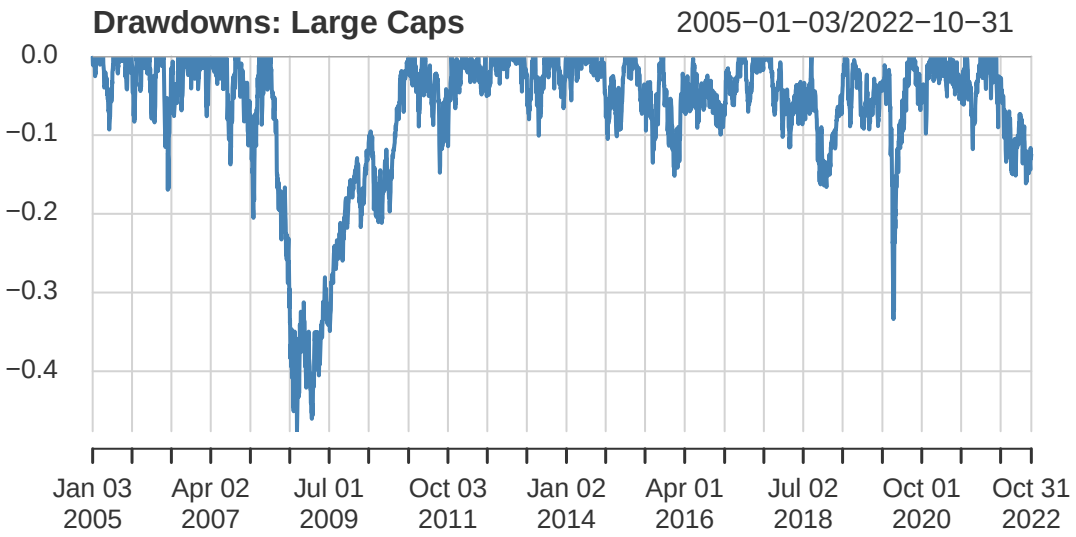


Figure 2.1: Large Cap drawdown chart

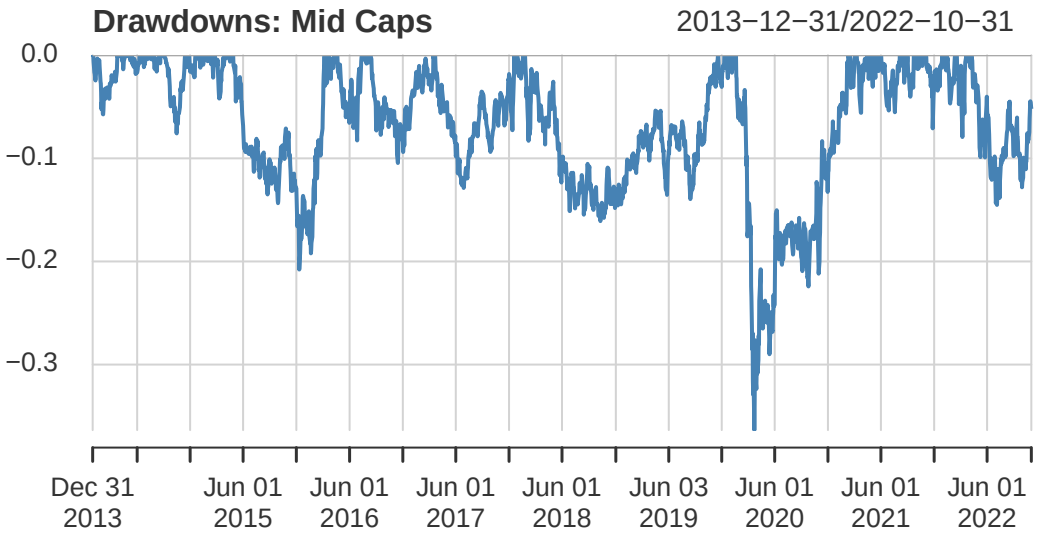


Figure 2.2: Mid Cap drawdown chart

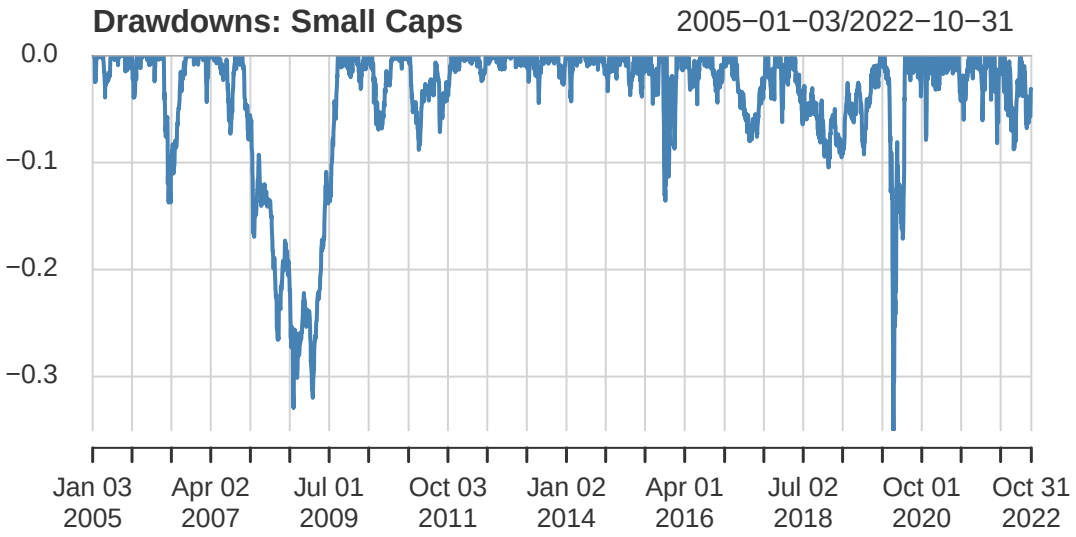


Figure 2.3: Small Cap drawdown chart

2.2. Sector weightings

2.1 below is a depiction of the mean daily returns for each sector over the entire period. The Industrials sector clearly generates, on average, the best results by a large magnitude. The Financials sector generates the second highest mean daily returns with the Property and Resources sectors trailing behind. Each indexes goal is to optimise its return profile.

Sector	Mean
Financials	0.16530
Industrials	1.342
Property	0.009539
Resources	0.07961

Table 2.1: Mean daily returns

As can be seen in 2.4, the large cap index has historically neglected the Property sector and has been dominated mostly by the Industrial and Resource sectors. In earlier periods of the sample (2005 to 2012) Resources dominated Industrials but the opposite became true in later periods. The weightings in the later portion of the period do not sum to one. This is due to a few mid cap stocks forming part of the FTSE/JSE Top 40 Index but being filtered out for the analysis conducted in this paper.

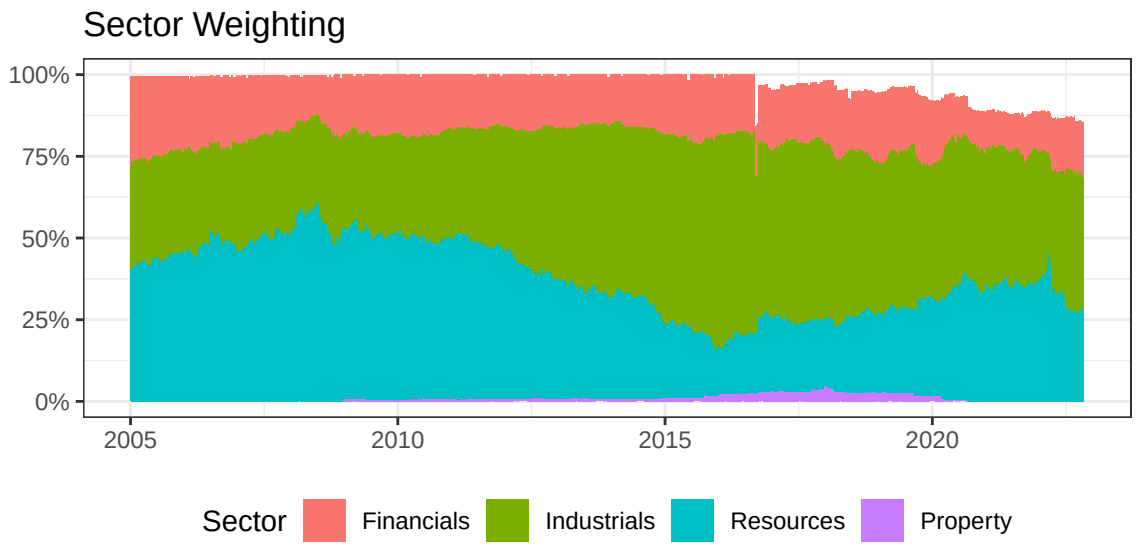


Figure 2.4: Sector weights for Large Cap index

The Industrials sector also dominated the weighting of the mid cap index. Figure 2.5 displays a consistent domination of the Industrials sector for the index. The Financial sector was assigned the second highest weighting in the latter portion of the period at hand, surpassing the early dominance of the Resources and Property sector. The mid cap index assigns a noticeably greater weight to the property sector when compared to the large cap index. IS THE PROPERTY SECTOR MORE OR LESS STABLE IN SA? The mid cap index is higher on property and lower on resources than the large cap index. COULD THIS BE THE REASON FOR THE LARGE INDEX DOING BETTER THAN THE MID INDEX RETURNS?

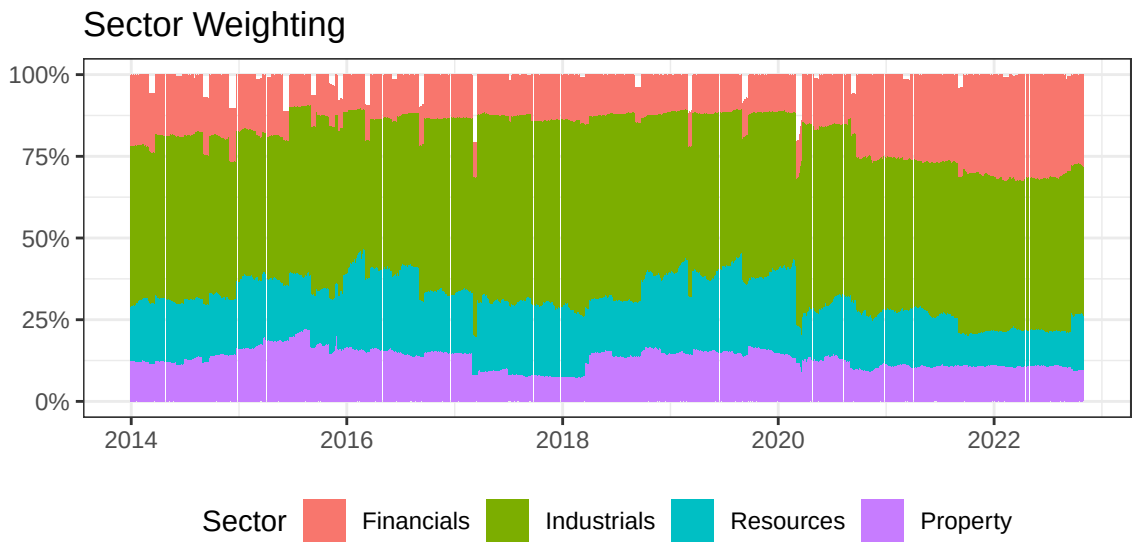


Figure 2.5: Sector weights for Mid Cap index

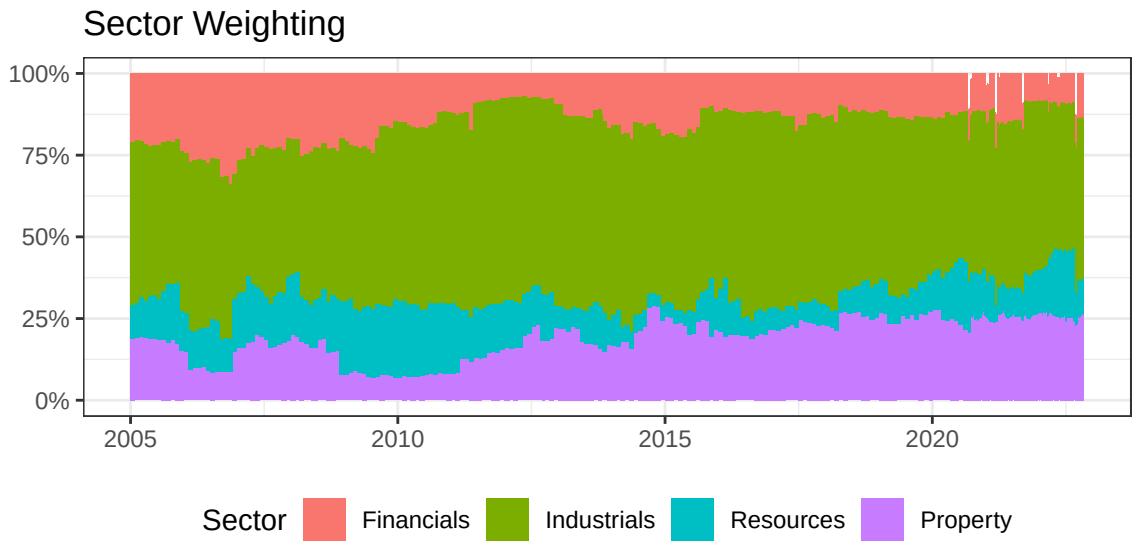


Figure 2.6: Sector weights for Small Cap index

3. Annualised returns

The idea behind annualising returns is to be able to make direct comparisons of returns across different time periods. A rolling annualised return calculation was conducted in order to provide a means for actual performance comparison for the indexes at hand. As can be seen in 3.1 below, the small cap index consistently outperforms both the large and mid cap indexes. An elementary analysis based on

the figure of how large and small cap shares responded to the aftermath of the Global Financial Crisis of 2007/2008 yields interesting results. The analysis is limited to the period between 2009 and 2011. The small cap index seems to have had enjoyed increasingly positive returns subsequent to 2009 which may be due to the fact that the index had a low international exposure. The large cap index on the other hand did not ride that same proverbial wave and experienced less satisfactory returns. Although the returns never turned negative, the level of positivity of returns diminished. The annualised returns for the large and small indexes were most similar between 2013 and 2015.

The mid cap index outperformed the large cap index from 2016 to approximately half way through 2020. Thereafter, the large cap index outperformed the mid cap index. It is important to note that the small cap index consistently outperformed both the large and mid cap indexes throughout the period of analysis.

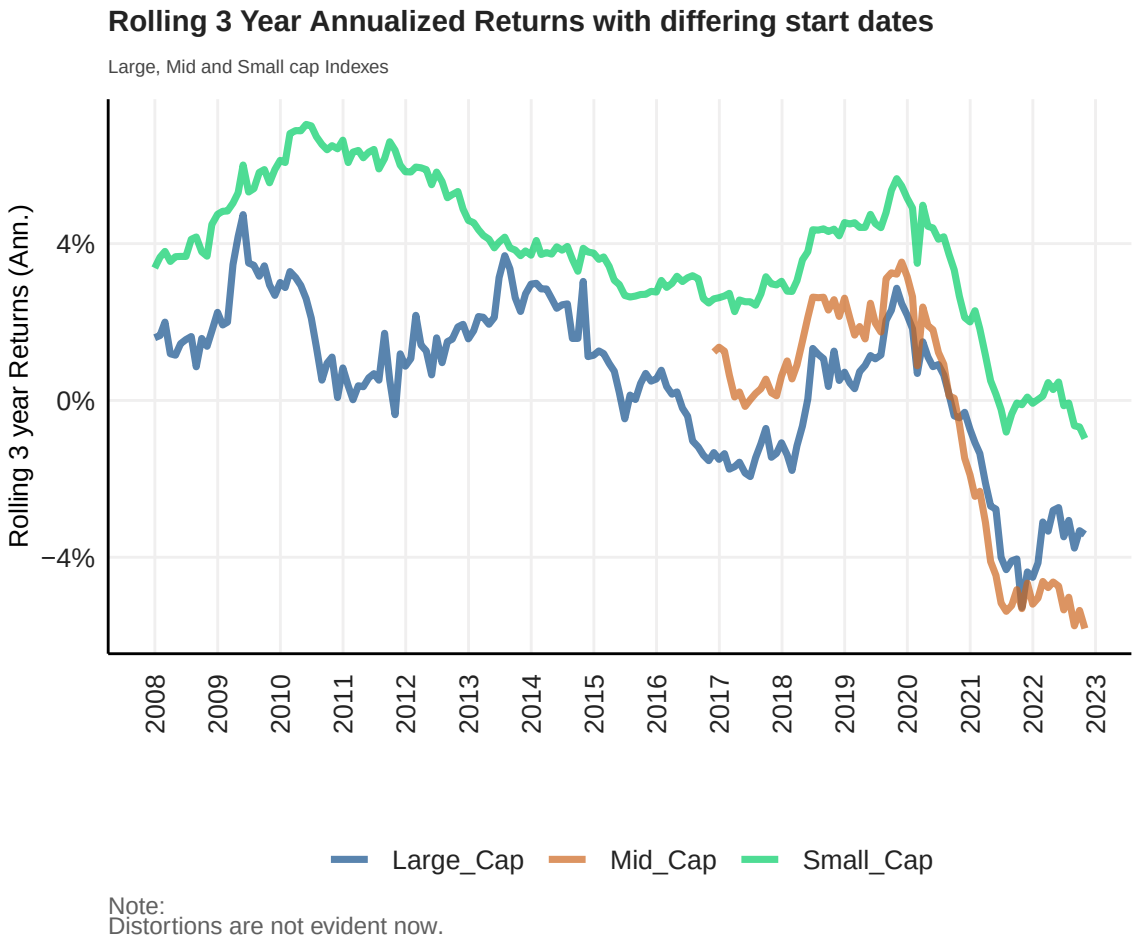


Figure 3.1: Rolling Annualised Returns of the Indexes

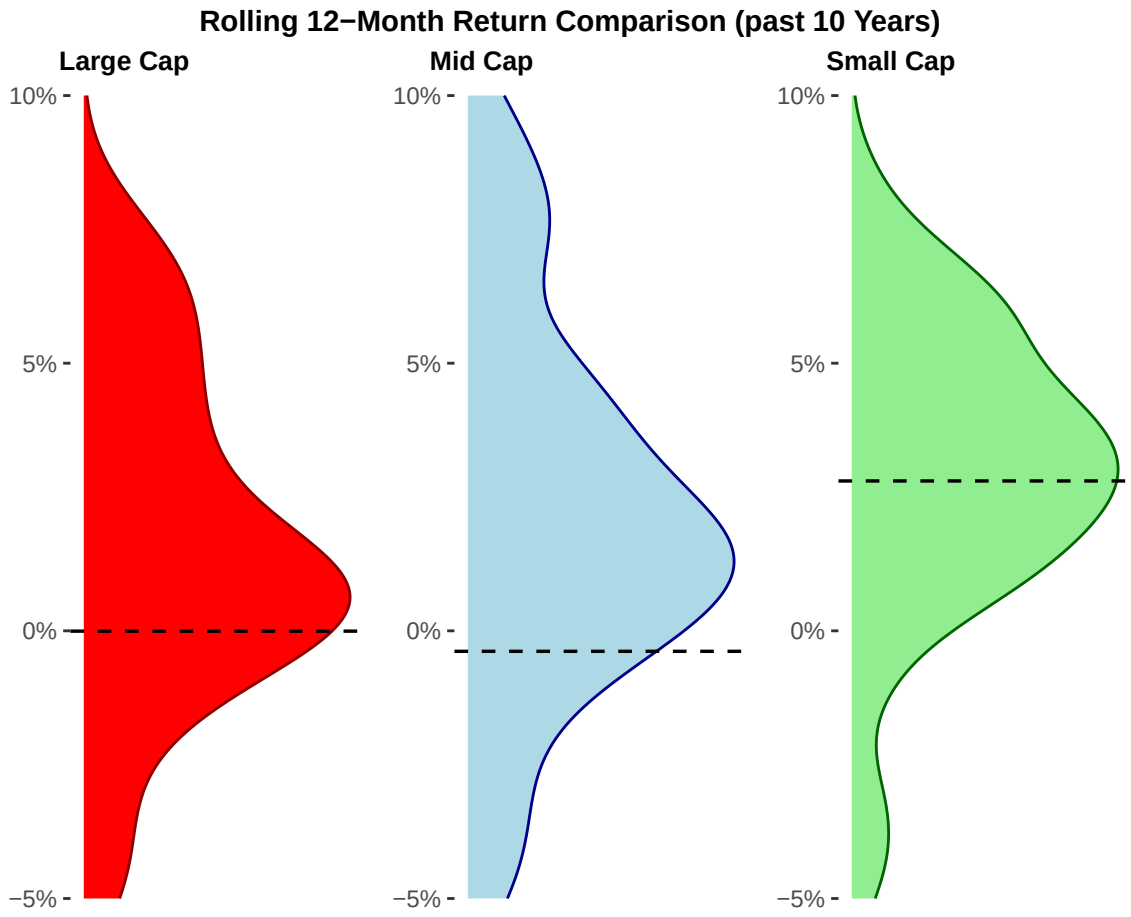


Figure 3.2: Rolling 12-Month Returns Comparison (past 10 Years)

4. Rolling Standard deviation

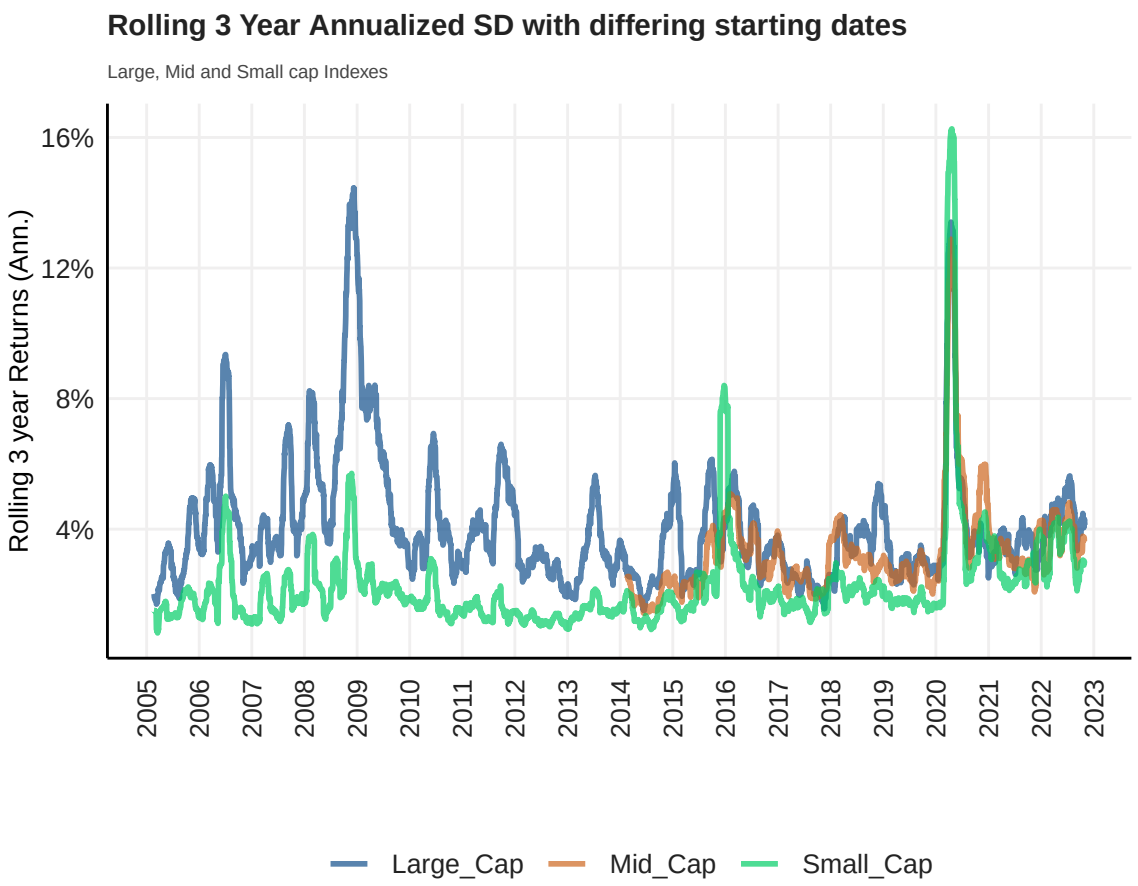
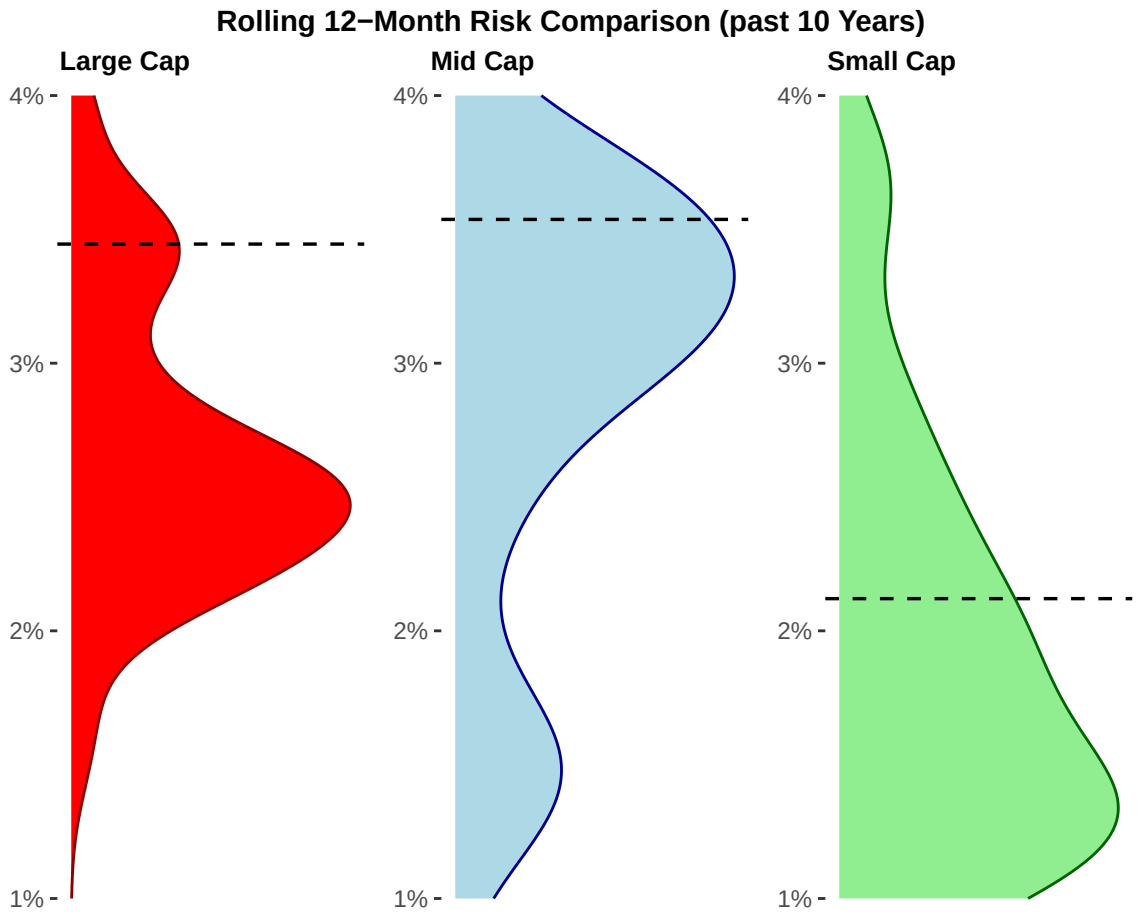


Figure 4.1: Rolling Annualised Standard Deviation of the Indexes



	Standard deviation
Large cap	0.01298498
Mid cap	0.01039368
Small cap	0.00801369

Table 4.1: Standard deviation

Figures 2.1 and 2.2

	Large cap	Mid cap	Small cap
Volatility skewness	1.069731	0.9739739	1.379238

Table 4.2: Volatility skewness

The upside/downside ratio is often used to gauge overbought and oversold conditions in the market. Low values can indicate that the market is reaching oversold levels, while high values can indicate that the market is becoming overbought.

5. Correlation

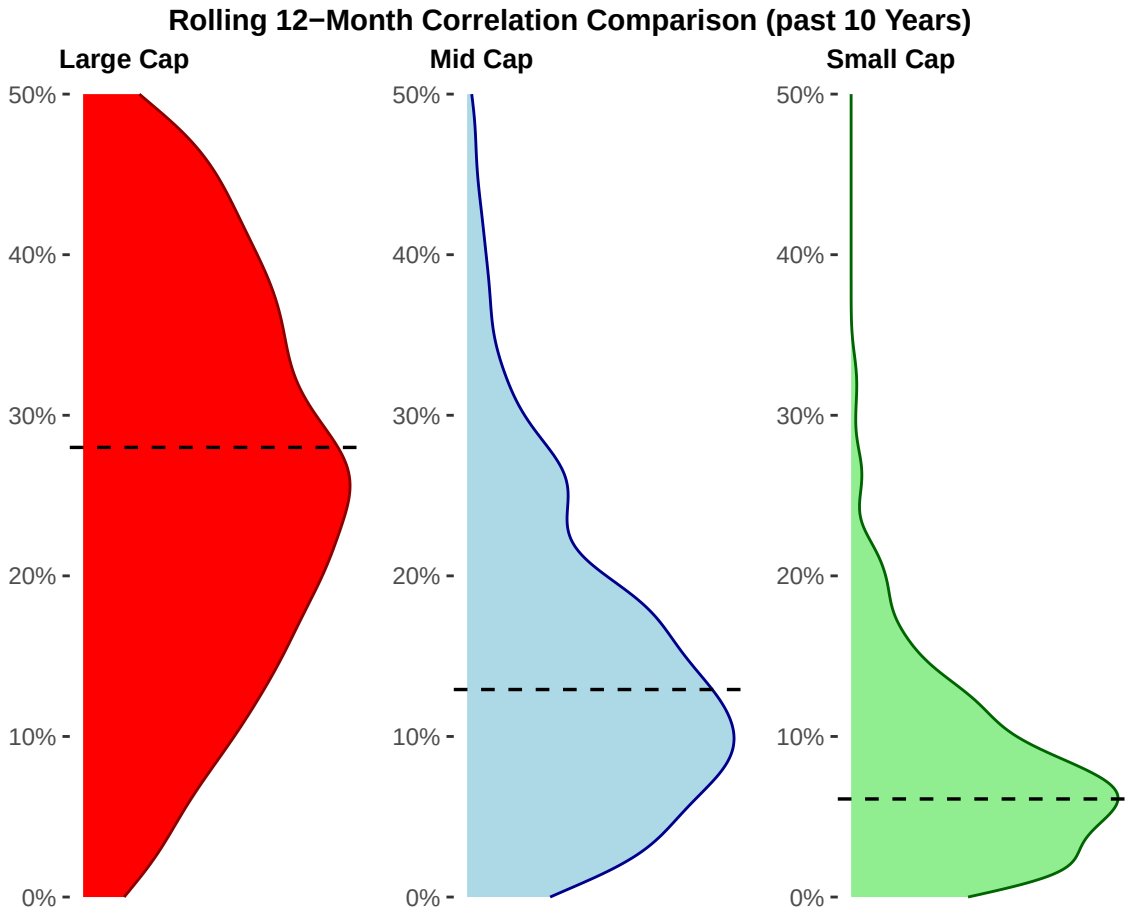


Figure 5.1: Rolling Correlation Comparison of the Indexes

6. Conclusion

I hope you find this template useful. Remember, stackoverflow is your friend - use it to find answers to questions. Feel free to write me a mail if you have any questions regarding the use of this package.

To cite this package, simply type citation("Texevier") in Rstudio to get the citation for Katzke (2017) (Note that uncited references in your bibtex file will not be included in References).

References

10 Katzke, N.F. 2017. *Texevier: Package to create elsevier templates for rmarkdown.* Stellenbosch, South Africa: Bureau for Economic Research.

Appendix

Appendix A

Some appendix information here

Appendix B