Question 5: Volatility and GARCH estimates

Gabriella Neilon[a]

[a]*Stellenbosch University*

Abstract

This analysis delves into the volatility of the Rand against select currencies, aiming to compare South Africa's currency performance with that of both developing and developed countries. Additionally, the study investigates instances where the Rand demonstrates advantages, particularly during periods of relative strength in the Dollar.

1. Statement 1

The South African rand (ZAR) has over the past few years been one of the most volatile currencies;

```
## Q(m) of squared series(LM test):
## Test statistic:  1677.512  p-value:  0
## Rank-based Test:
## Test statistic:  3331.602  p-value:  0
## Q_k(m) of squared series:
## Test statistic:  8489.753  p-value:  0
## Robust Test(5%) :  7435.948  p-value:  0
```

```
## Sample mean of the returns:  7.22831e-06 0.000179327 0.0002452295 0.0002151889 1.978441e-05
## Component:  1
## Estimates:  0 0.033259 0.963705
## se.coef  :  0 0.002579 0.002715
## t-value  :  4.451156 12.89795 354.9005
## Component:  2
## Estimates:  0 0.085644 0.933416
## se.coef  :  0 0.004219 0.002508
```

*Corresponding author: Gabriella Neilon
Email address: 22581340@sun.ac.za (Gabriella Neilon)

```
## t-value   :  13.4003 20.30174 372.1938
## Component:  3
## Estimates:  3e-06 0.158857 0.783796
## se.coef   :  0 0.010984 0.013002
## t-value   :  13.64895 14.4619 60.28387
## Component:  4
## Estimates:  0 0.120259 0.888693
## se.coef   :  0 0.007793 0.005987
## t-value   :  7.933895 15.43177 148.4483
## Component:  5
## Estimates:  0 0.047263 0.943425
## se.coef   :  0 0.004161 0.005244
## t-value   :  4.964245 11.35975 179.8889
```
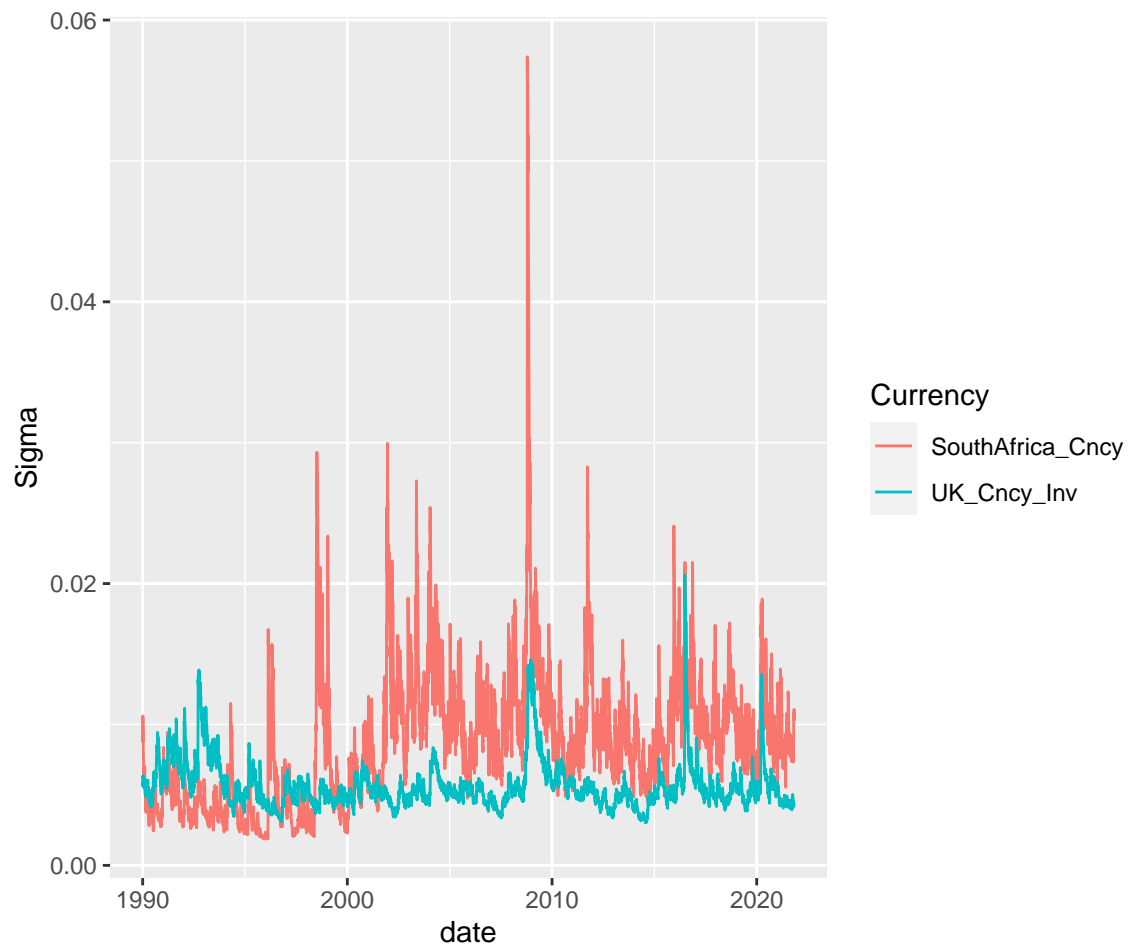

The MARCH test indicates that all the MV portmanteau tests reject the null of no conditional

heteroskedasticity, motivating our use of MVGARCH models.

2. Statement 2:

The ZAR has generally performed well during periods where G10 currency carry trades have been favourable and currency valuations relatively cheap. Globally, it has been one of the currencies that most benefit during periods where the Dollar is comparatively strong, indicating a risk-on sentiment.

Rolling 3 Year Annualized Currency Returns of ZAR and Indexed G1
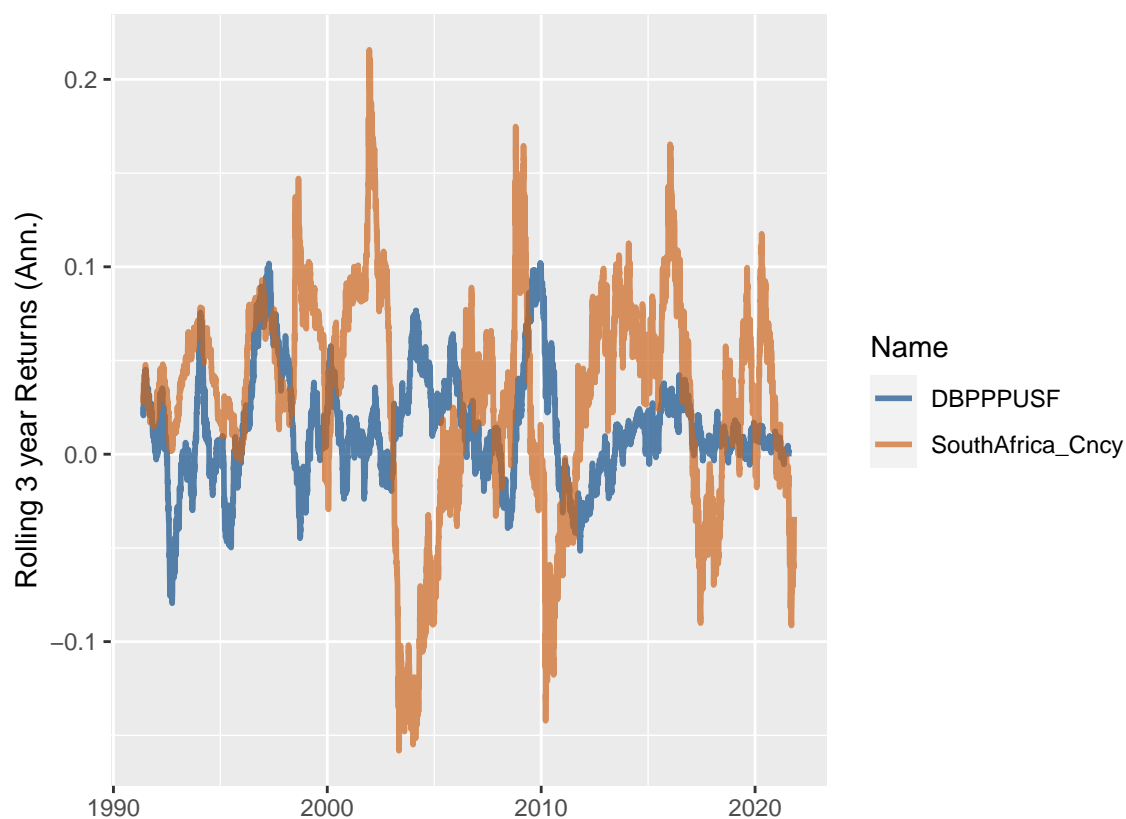
This figure illustrates a distinct relationship between the Dollar (acting as the Carry Index) and the Rand; when the Dollar appreciates, it tends to coincide with a subsequent depreciation in the Rand's value. This relationship can be interpreted as a result of supply and demand dynamics within these currencies. For instance, increased demand for the Rand could drive its depreciation. This pattern suggests that when the Dollar displays strength, the Rand appears relatively cheaper, indicating an environment where there's heightened investment in the Rand, typically reflecting a risk-on sentiment

3. Results

In periods of lowest flows, the top three funds—E473, N924, R928—show an upward trend in returns, whereas the bottom three funds—D394, T410, U411—indicate a downward trend. Conversely, during periods of highest flows, the top three funds exhibit both upward and downward trends in returns, while the bottom three funds showcase an upward trend. Consequently, it appears that the fund performance does not consistently align with the flow pattern, indicating that flow volume might not serve as a reliable predictor of fund returns.