MSCI Funds

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1. Introduction

This report uses the return profiles of different asset classes to investigate if diversification ability has decreased in the last decade. The main methodology will be with the use of a DCC model allowing for correlations between series to vary over time.

1.1. Data

The data I include is the MSCA_ACWI, EURO_10Yr, MSCI_USREIT and the Oil_Brent.

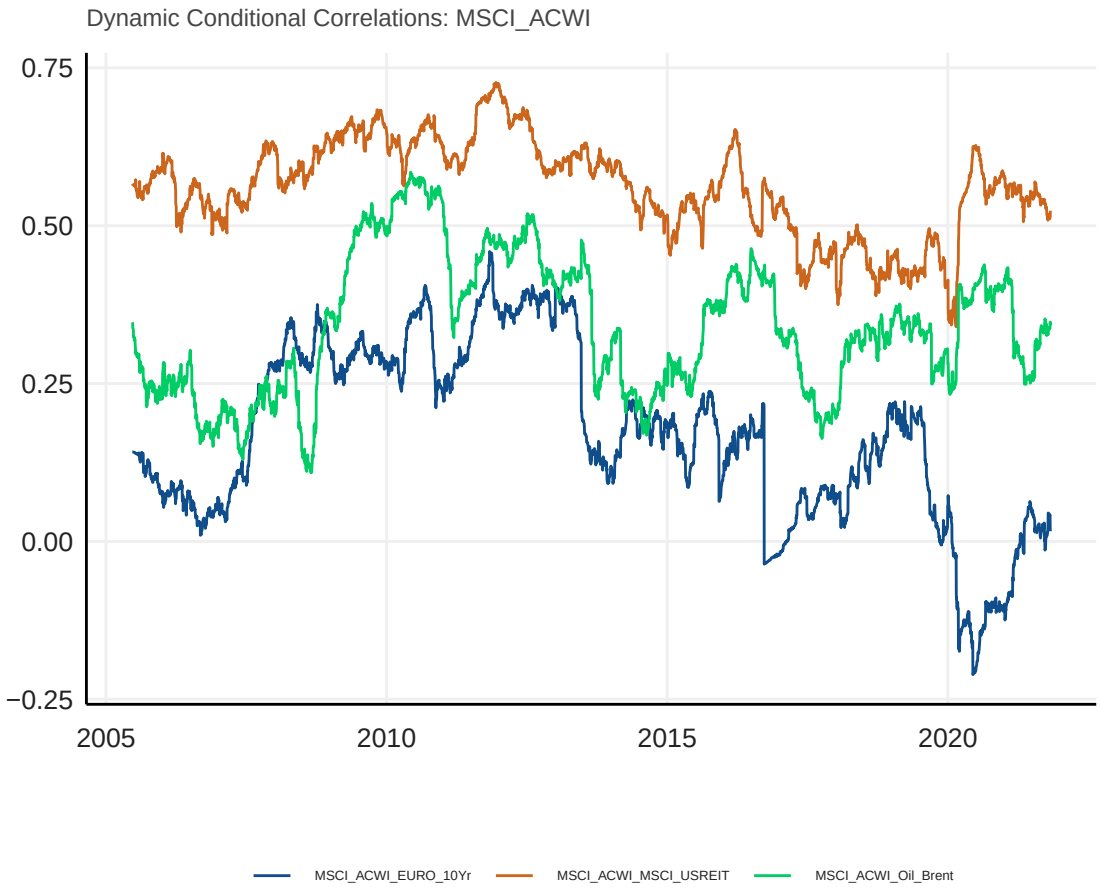
1.2. Test the data

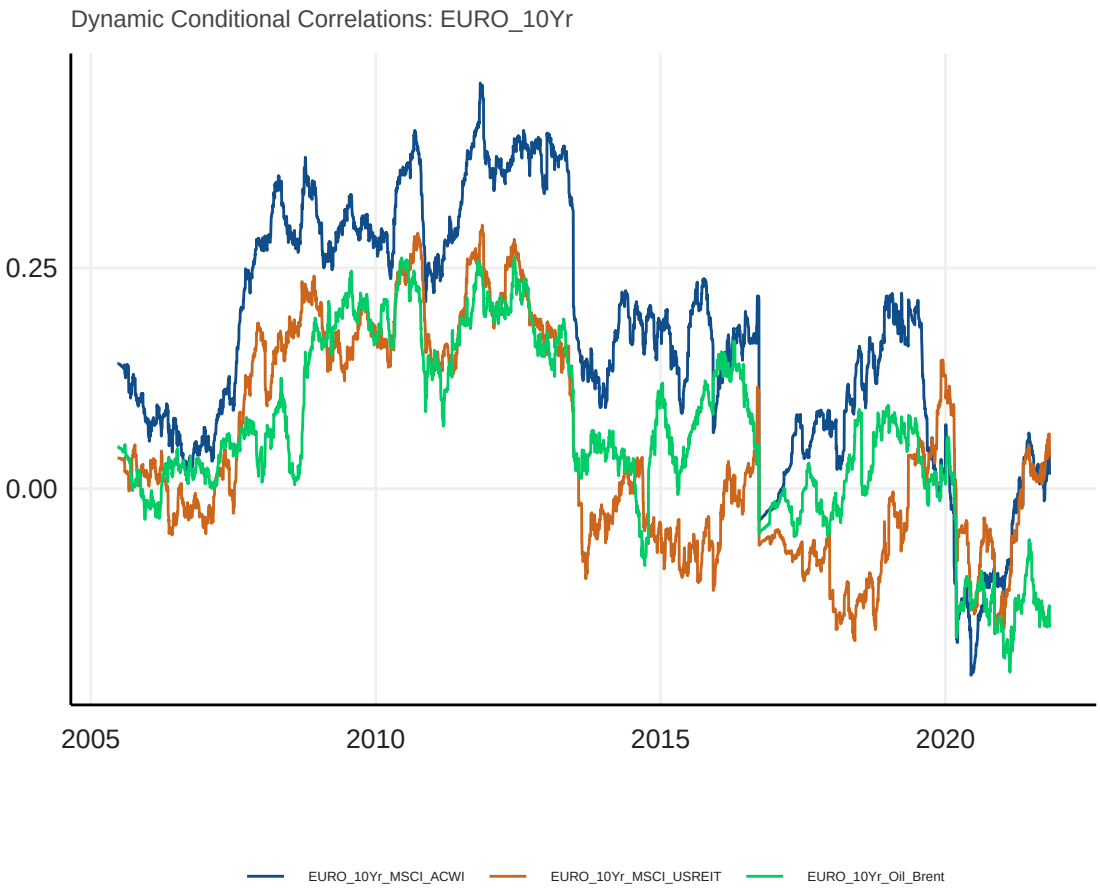
First we will look at the March test which indicates that all the MV portmanteau tests reject the null of no conditional heteroskedasticity, motivating the use of MVGARCH models.

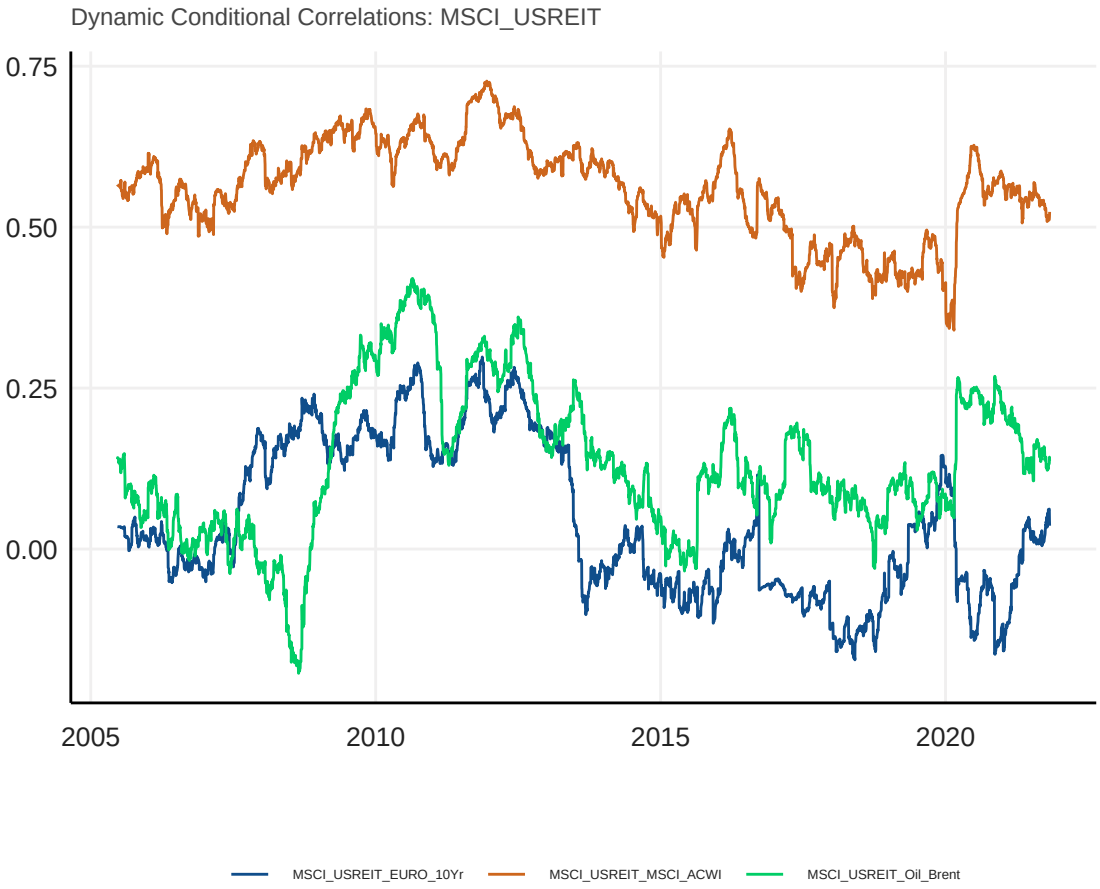
```
## Q(m) of squared series(LM test):
## Test statistic:  1.86752  p-value:  0.9972583
## Rank-based Test:
## Test statistic:  3732.492  p-value:  0
## Q_k(m) of squared series:
## Test statistic:  8118.375  p-value:  0
## Robust Test(5%) :  3741.885  p-value:  0
```

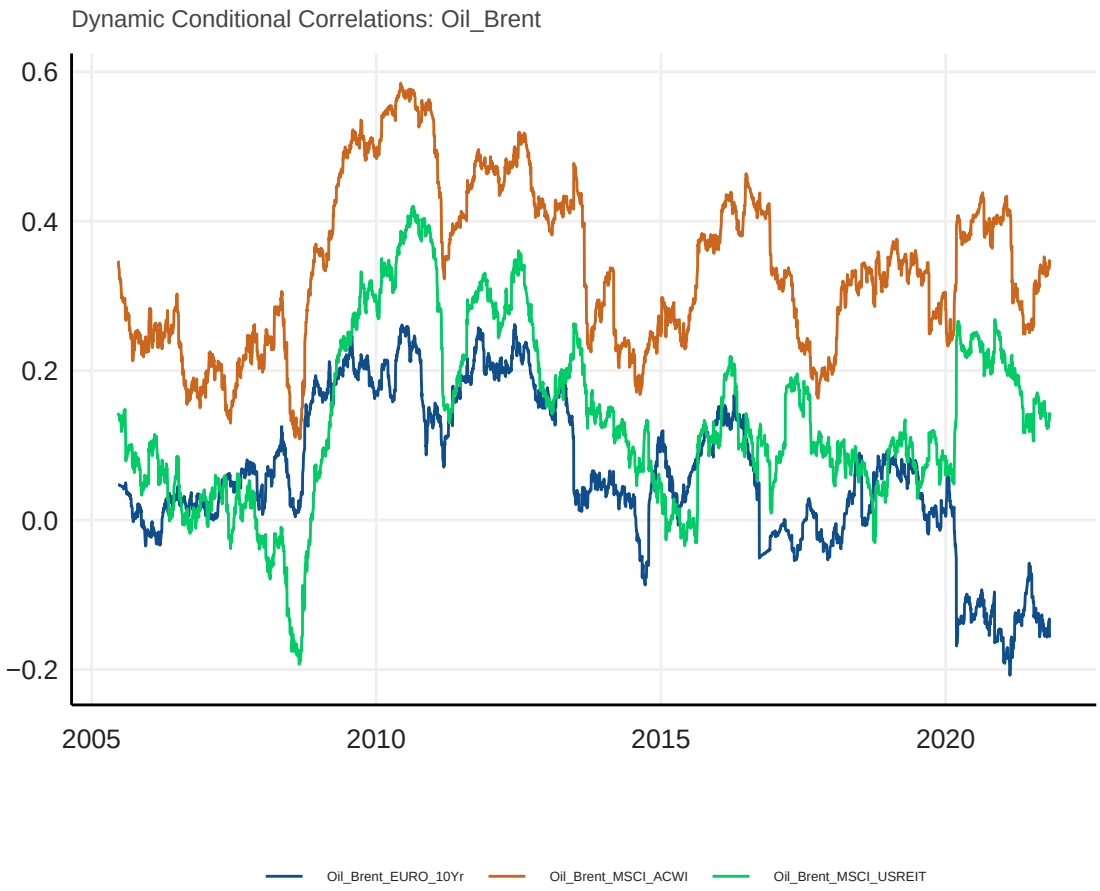
Email address: 20850980@sun.ac.za (Sven Wellmann)

1.3. Implement DCC Model



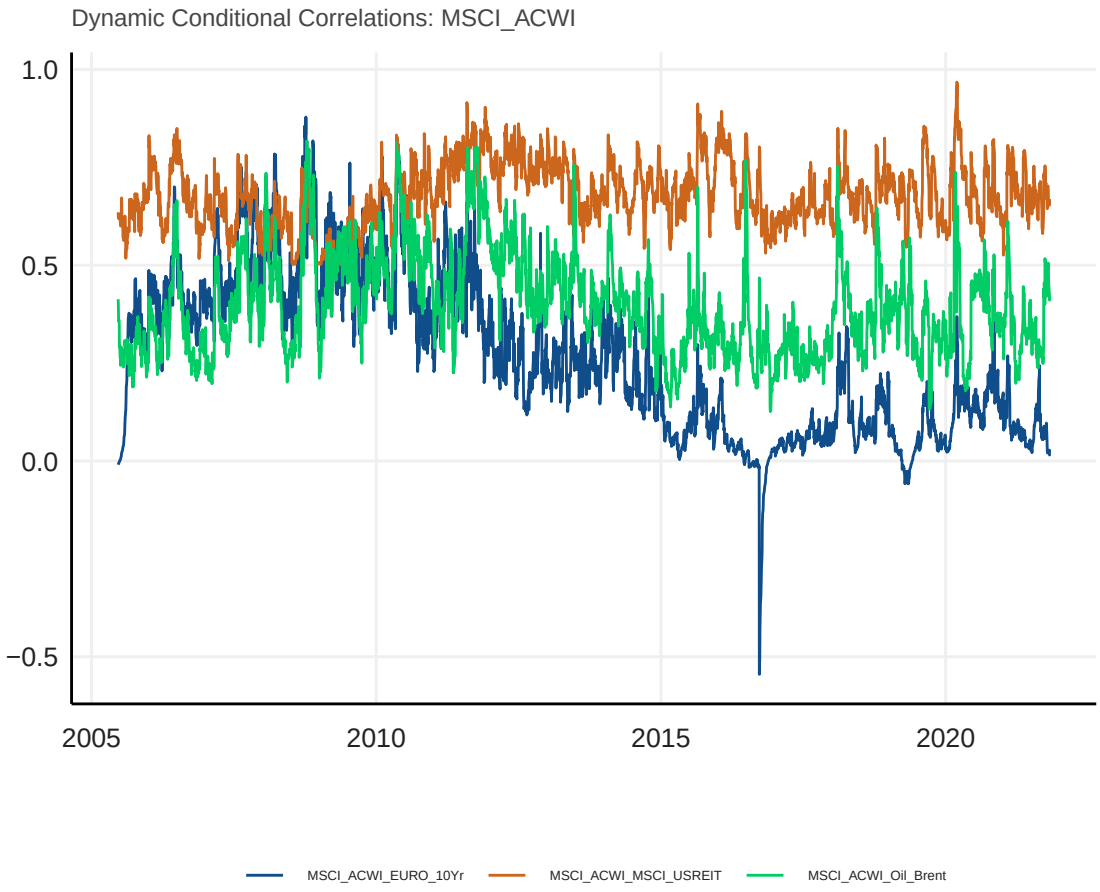

Dynamic Conditional Correlations: EURO_10Yr
0.25
0.00
2005
2010
2015
2020
EURO_10Yr_MSCI_ACWI
EURO_10Yr_MSCI_USREIT
EURO_10Yr_Oil_Brent

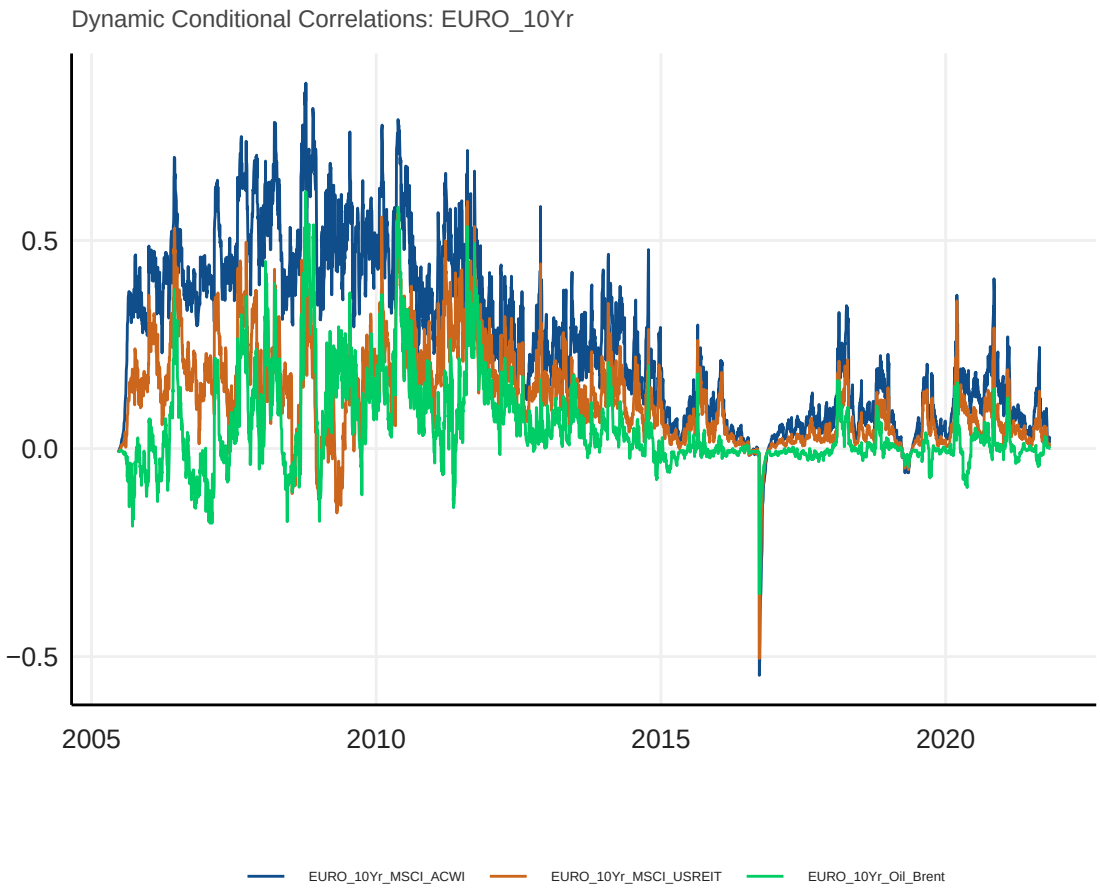

Dynamic Conditional Correlations: MSCI_USREIT
0.75
0.50
0.25
0.00
2005
2010
2015
2020
MSCI_USREIT_EURO_10Yr
MSCI_USREIT_MSCI_ACWI
MSCI_USREIT_Oil_Brent

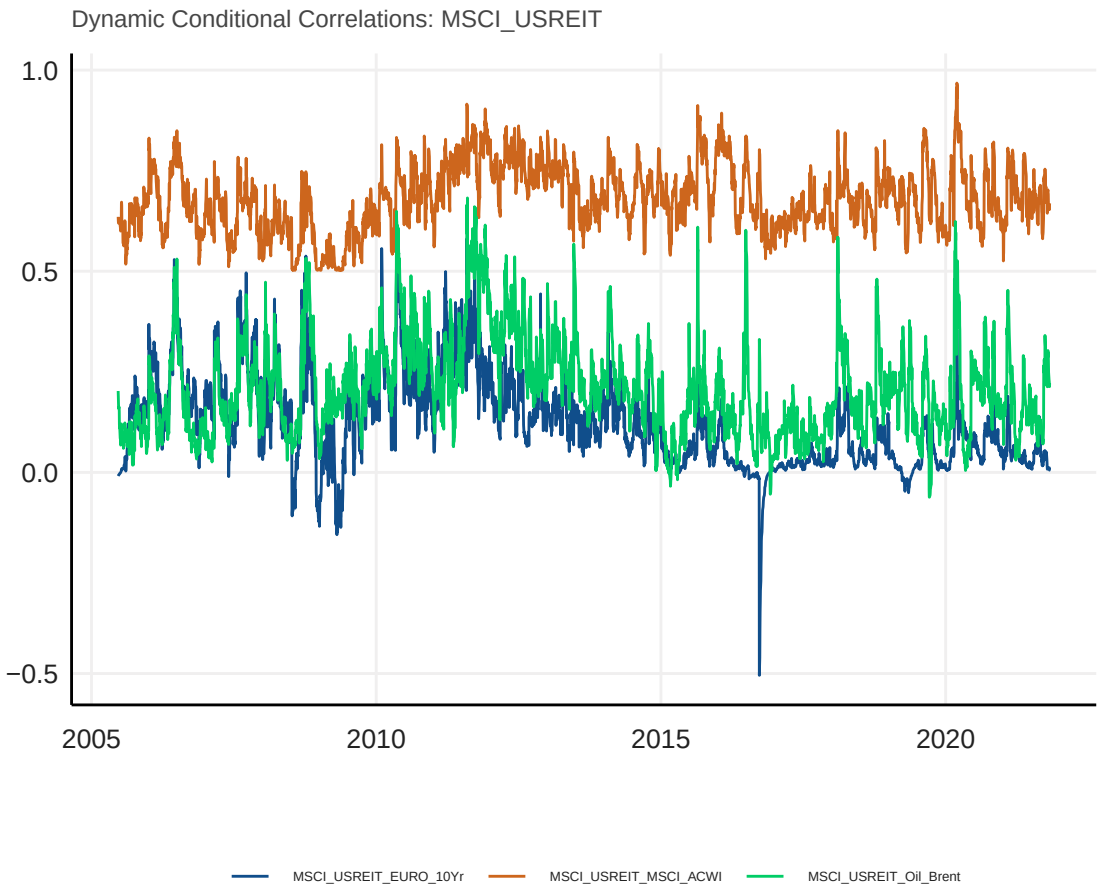


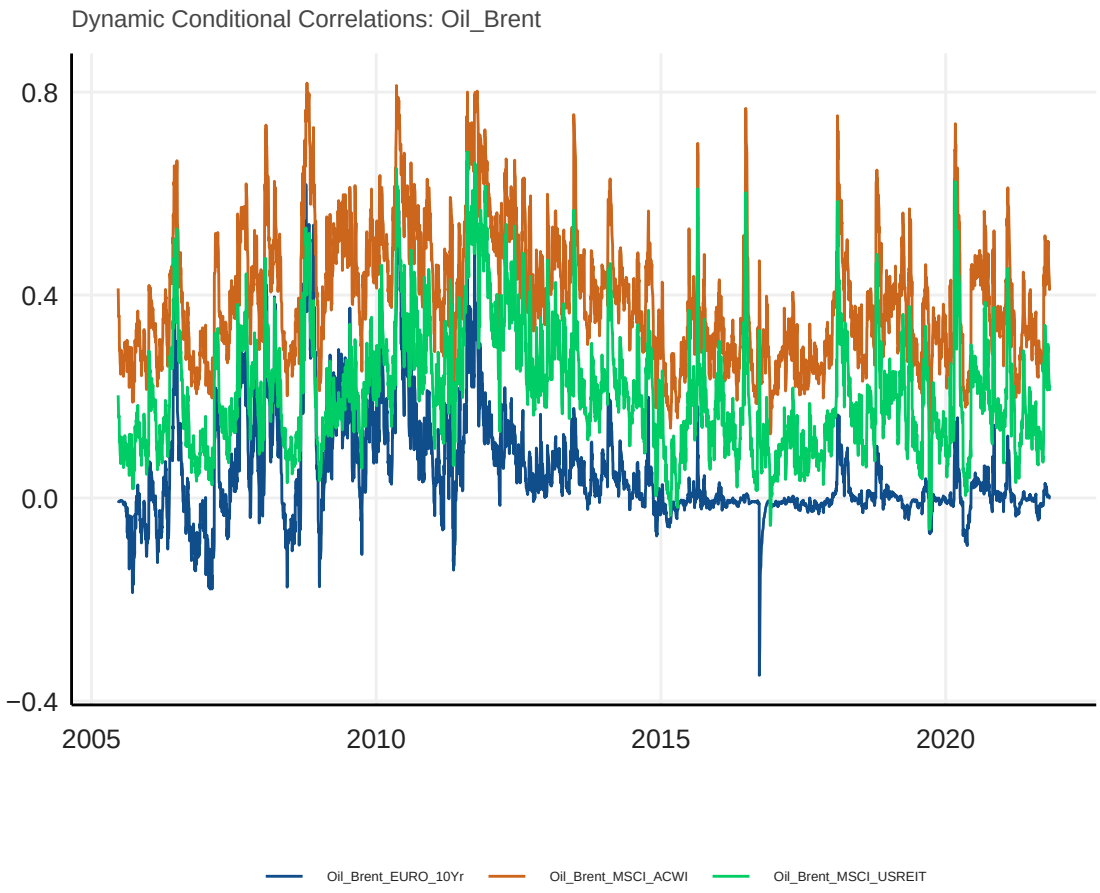

```
##
## *-------------------------------*
## *        GO-GARCH Fit           *
## *-------------------------------*
##
## Mean Model       : CONSTANT
## GARCH Model      : sGARCH
## Distribution : mvnorm
## ICA Method       : fastica
## No. Factors      : 4
## No. Periods      : 4269
## Log-Likelihood   : 46768.8
## ------------------------------------
##
## U (rotation matrix) :
```

```
##
##           [,1]     [,2]     [,3]     [,4]
## [1,]  0.99998 -0.00172 -0.00608 -0.00117
## [2,] -0.00239  0.66028 -0.65146  0.37366
## [3,] -0.00195 -0.66138 -0.26866  0.70028
## [4,]  0.00564  0.35581  0.70949  0.60827
##
## A (mixing matrix) :
##
##            [,1]      [,2]    [,3]     [,4]
## [1,]  0.000159 -3.29e-05 0.01021 -0.00114
## [2,] -1.540173  2.64e-03 0.00937  0.00180
## [3,]  0.000227  7.14e-04 0.01093 -0.01676
## [4,]  0.000240 -2.08e-02 0.00939 -0.00028
```




Dynamic Conditional Correlations: EURO_10Yr
0.5
0.0
−0.5
2005
2010
2015
2020
EURO_10Yr_MSCI_ACWI
EURO_10Yr_MSCI_USREIT
EURO_10Yr_Oil_Brent


Dynamic Conditional Correlations: MSCI_USREIT
1.0
0.5
0.0
−0.5
2005
2010
2015
2020
MSCI_USREIT_EURO_10Yr
MSCI_USREIT_MSCI_ACWI
MSCI_USREIT_Oil_Brent



2. Conclusion