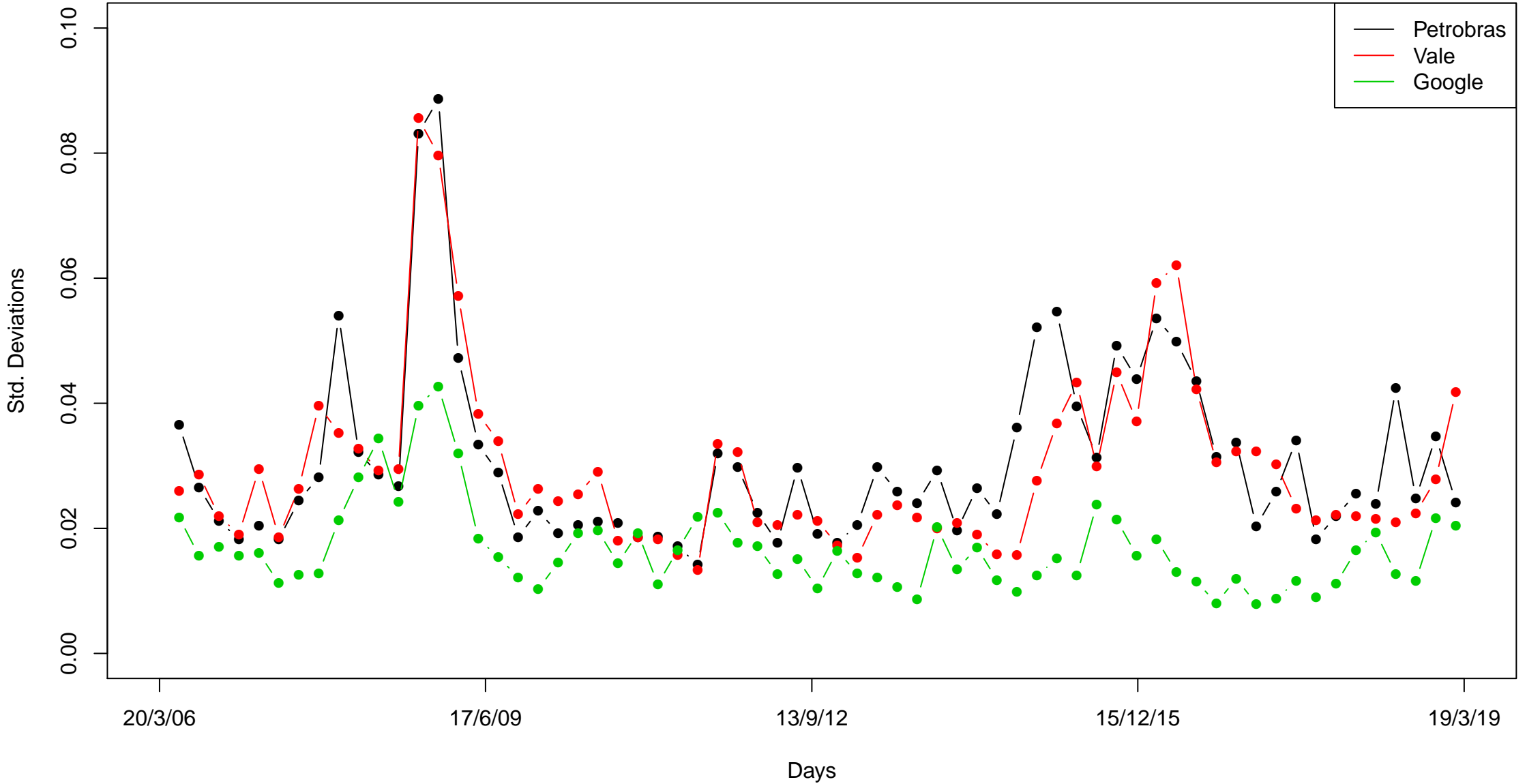
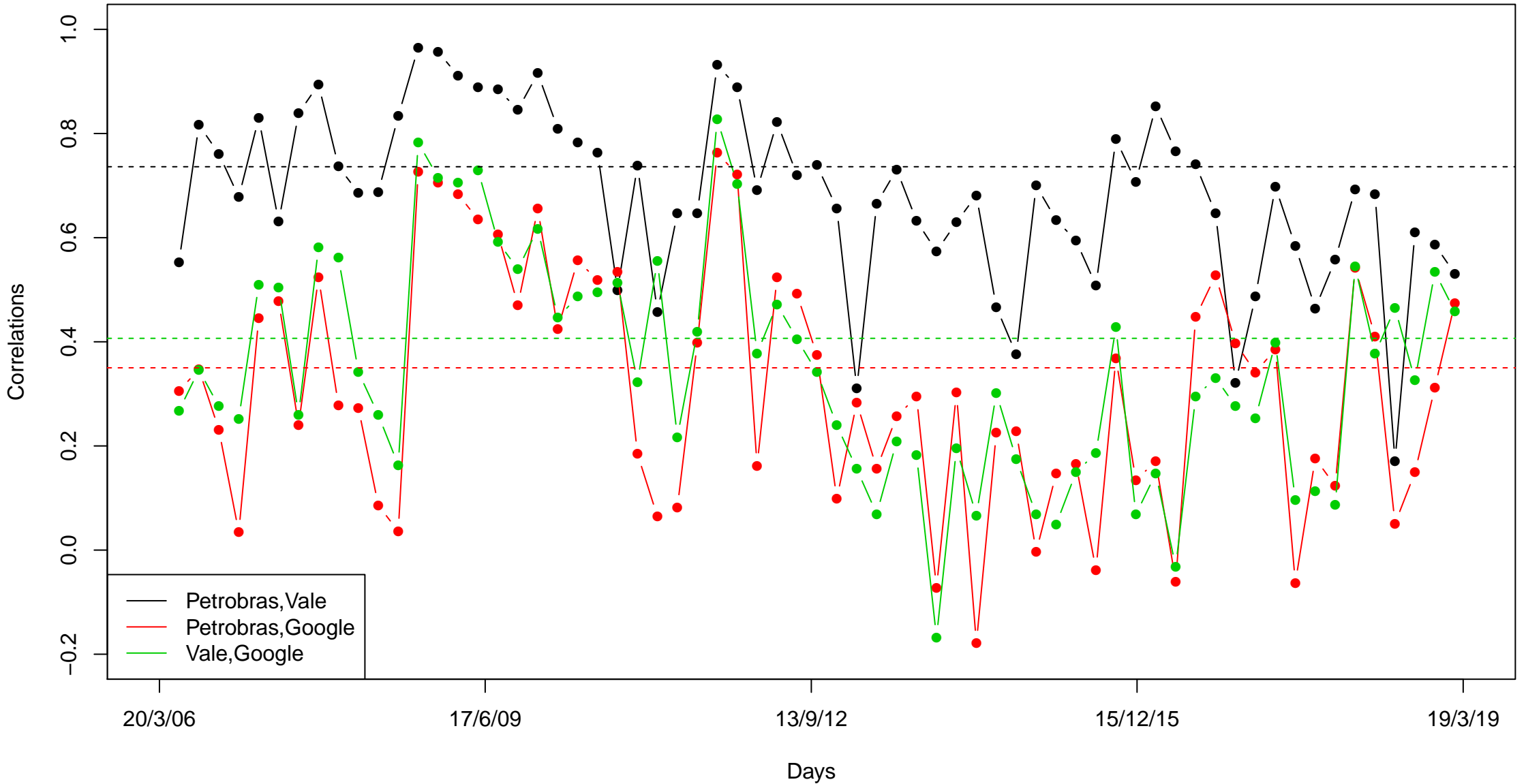
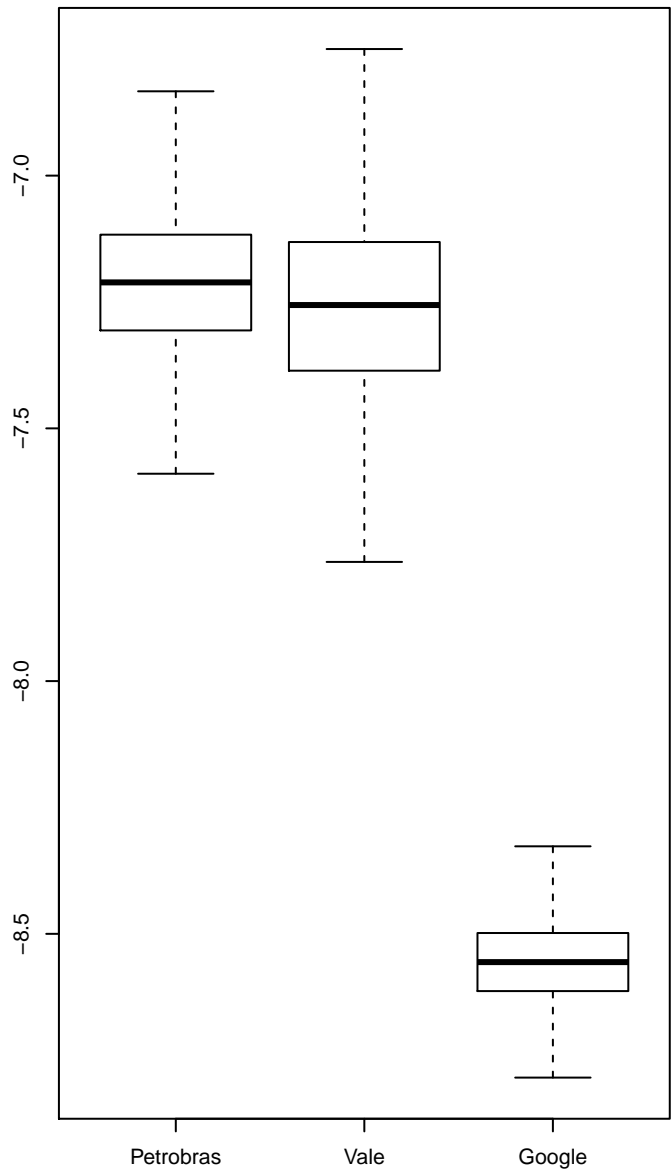
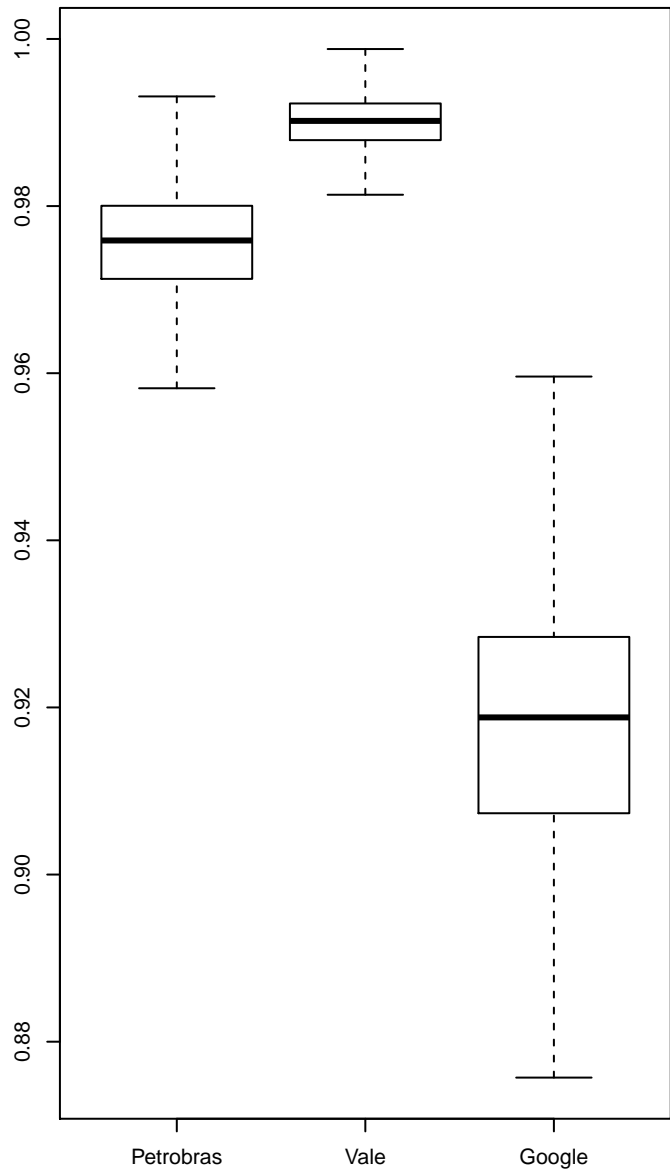
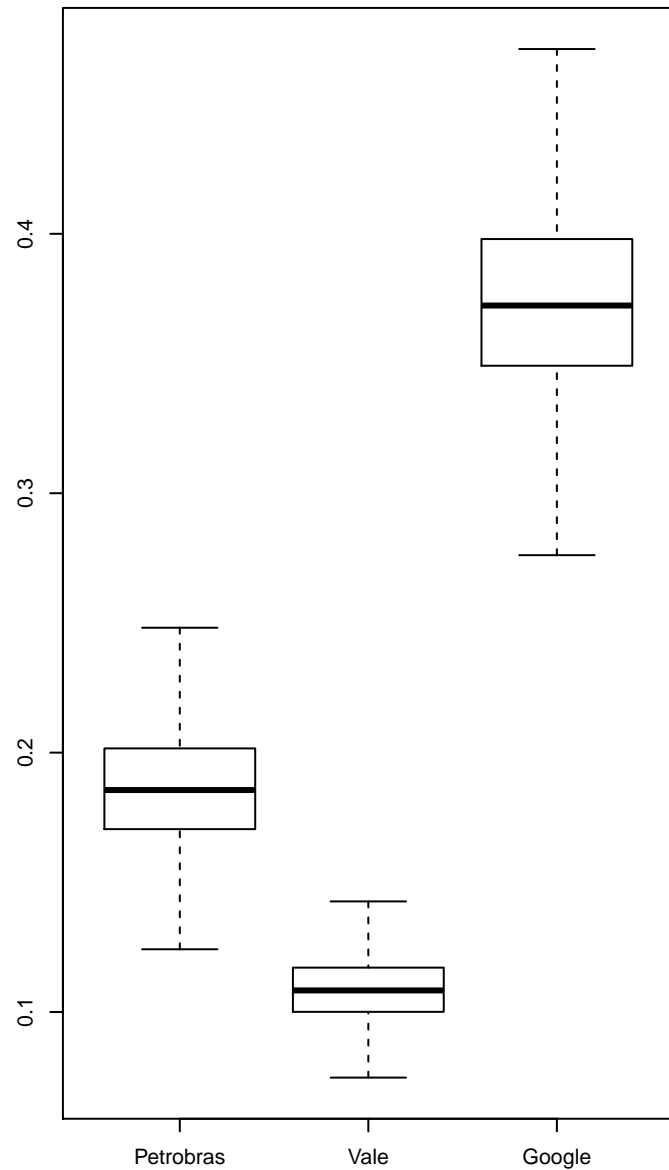


# Sample standard deviations 50 observations

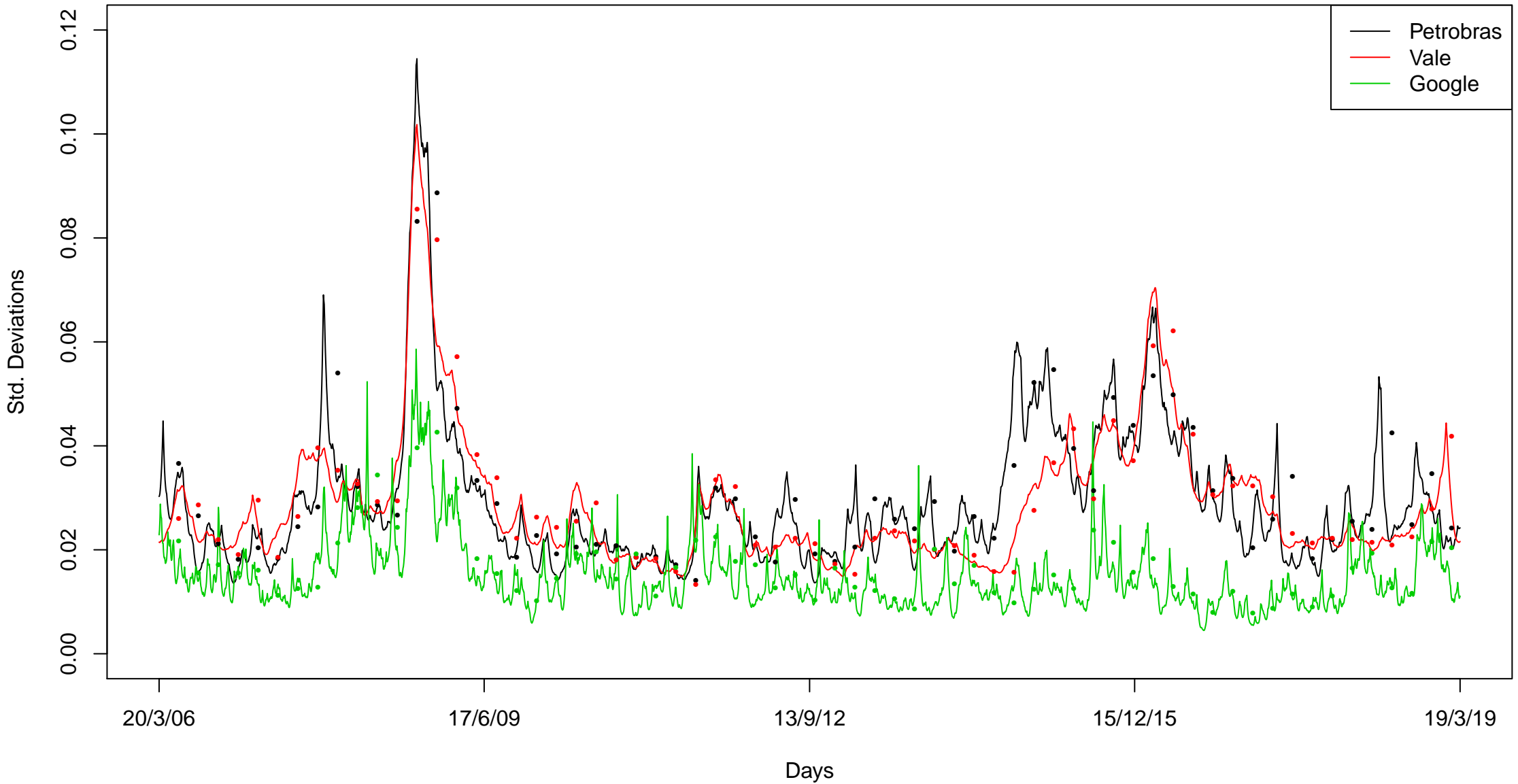


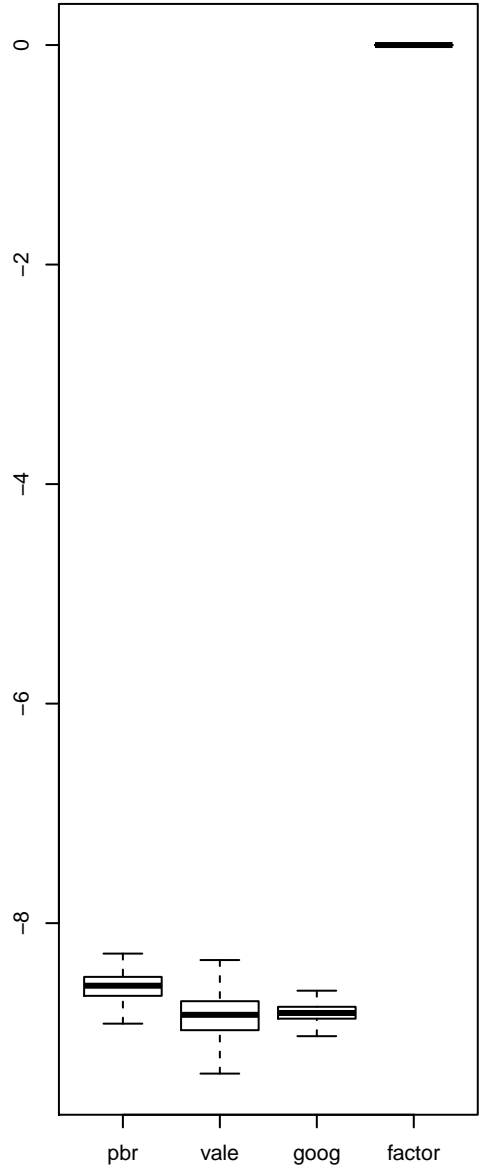
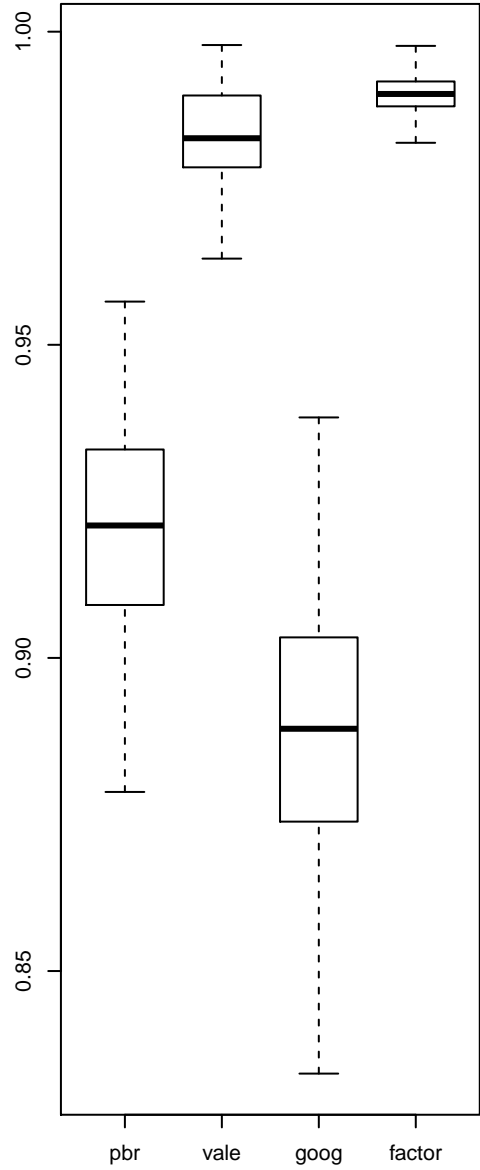
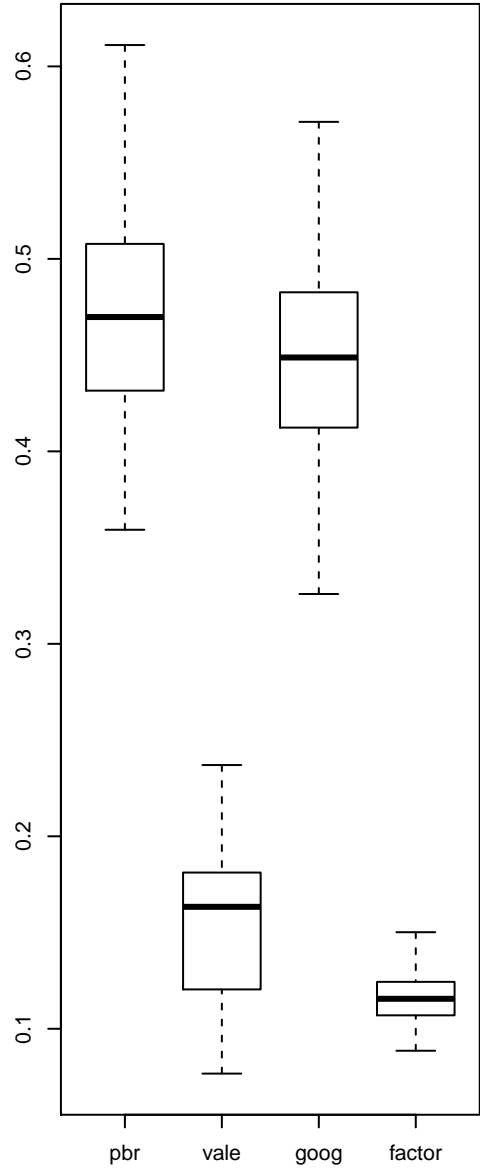
# Sample correlations 50 observations



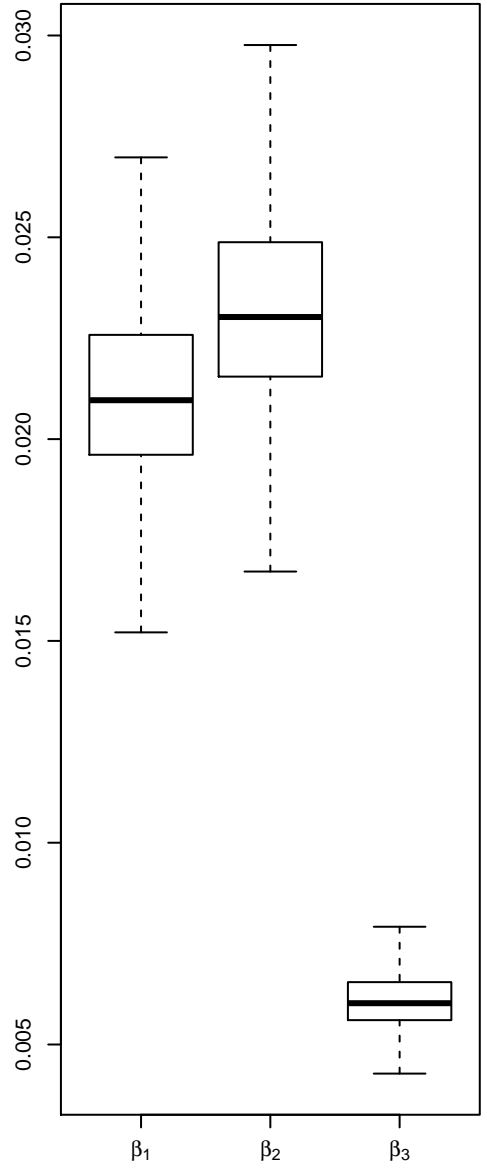
$\mu$  $\phi$  $\sigma$ 

# Univariate SV models

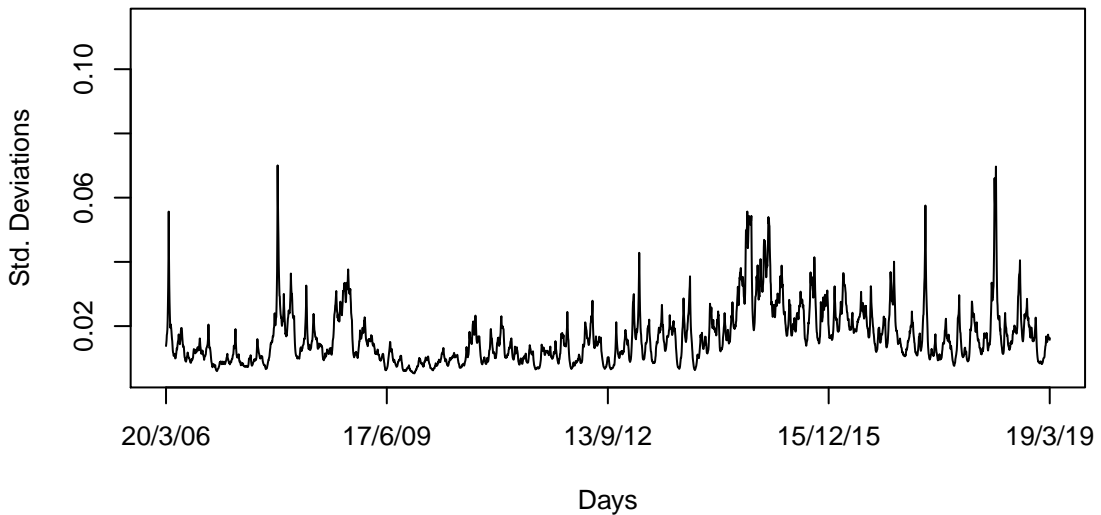


$\mu$  $\phi$  $\sigma$ 

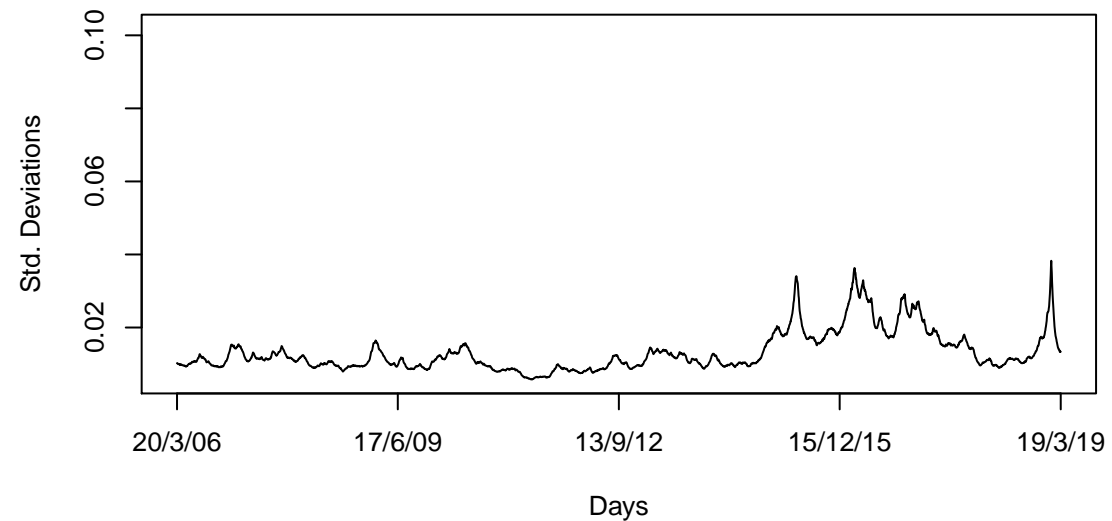
Loadings



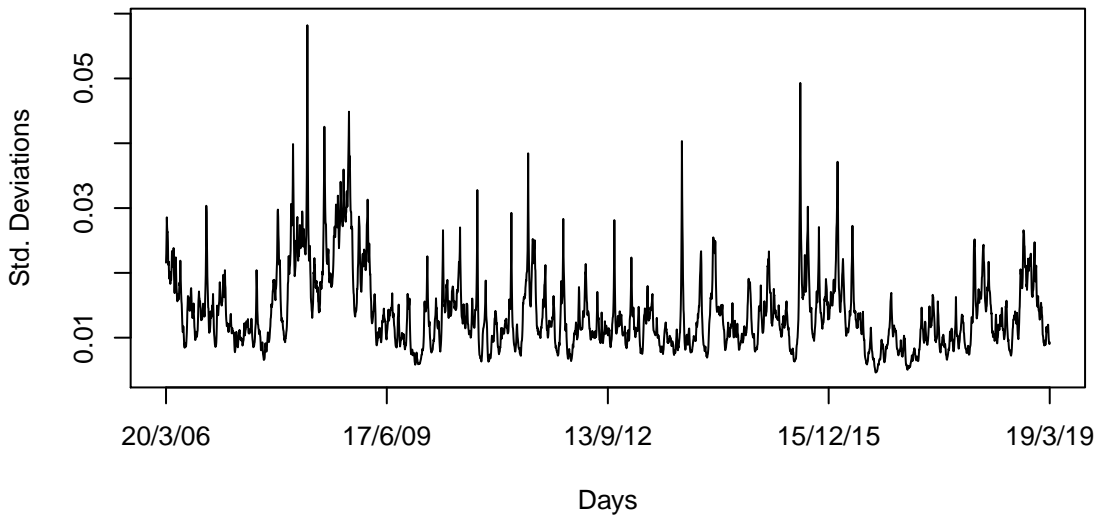
**Idiosyncratic factor 1**



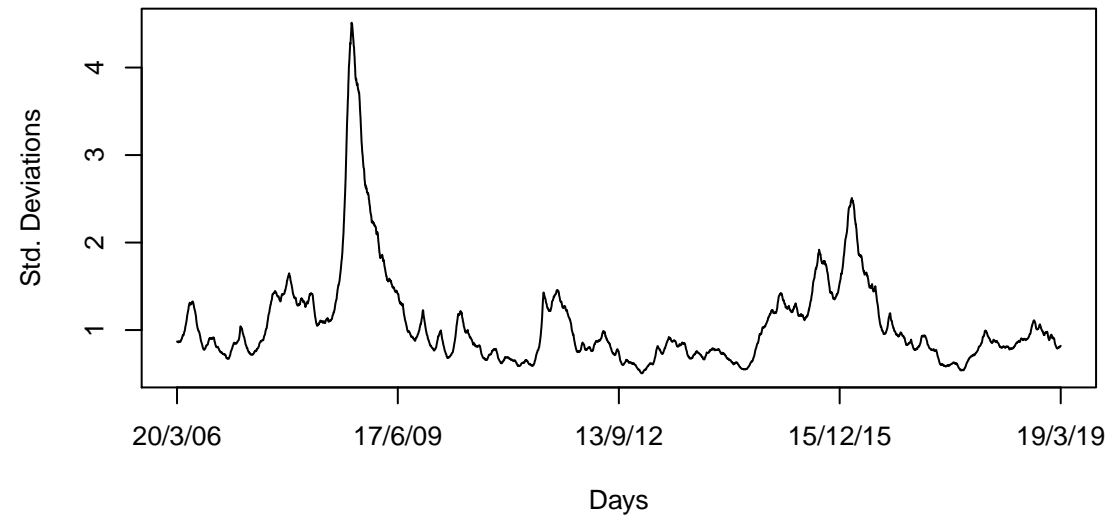
**Idiosyncratic factor 2**



**Idiosyncratic factor 3**

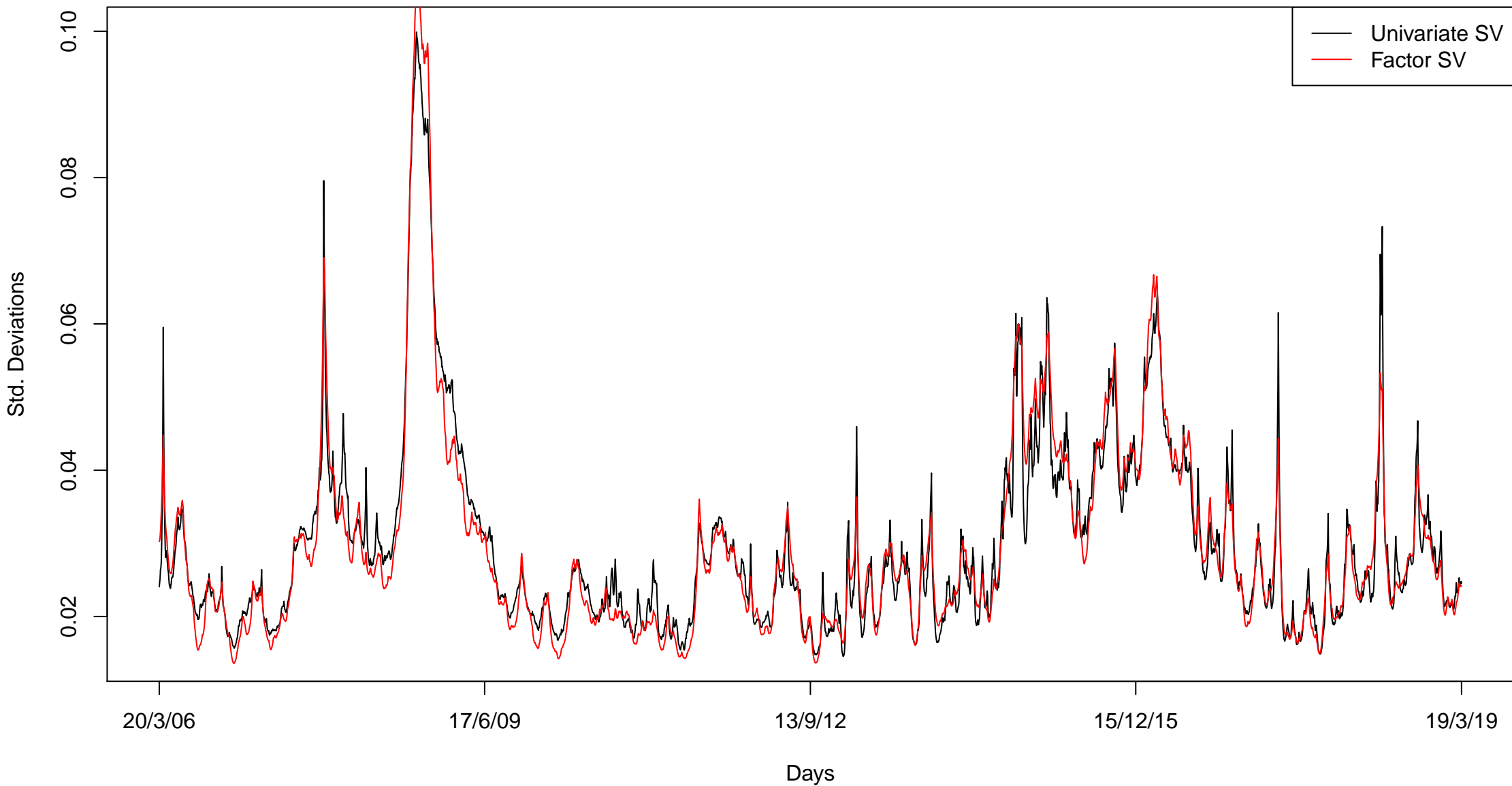


**Common factor**

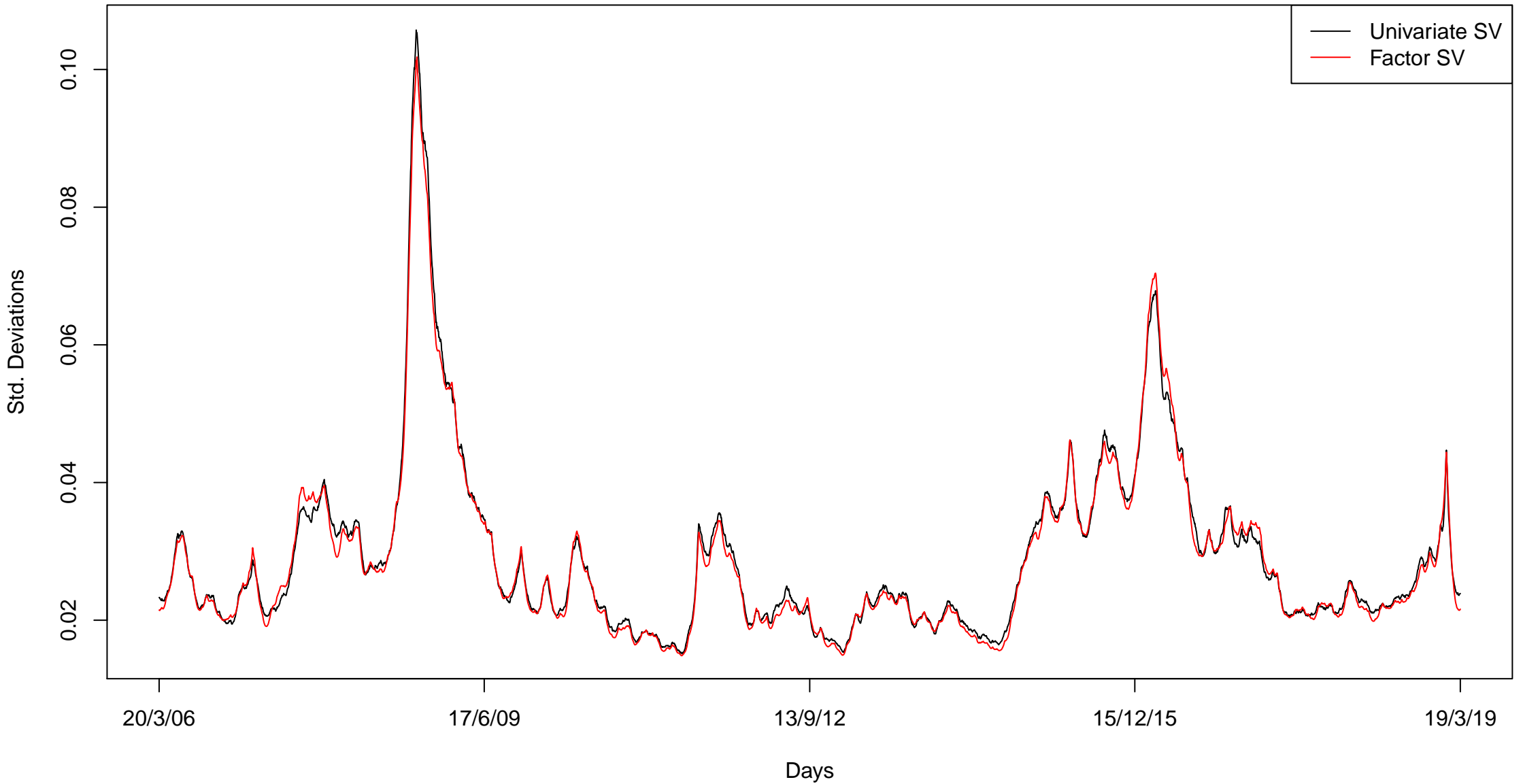




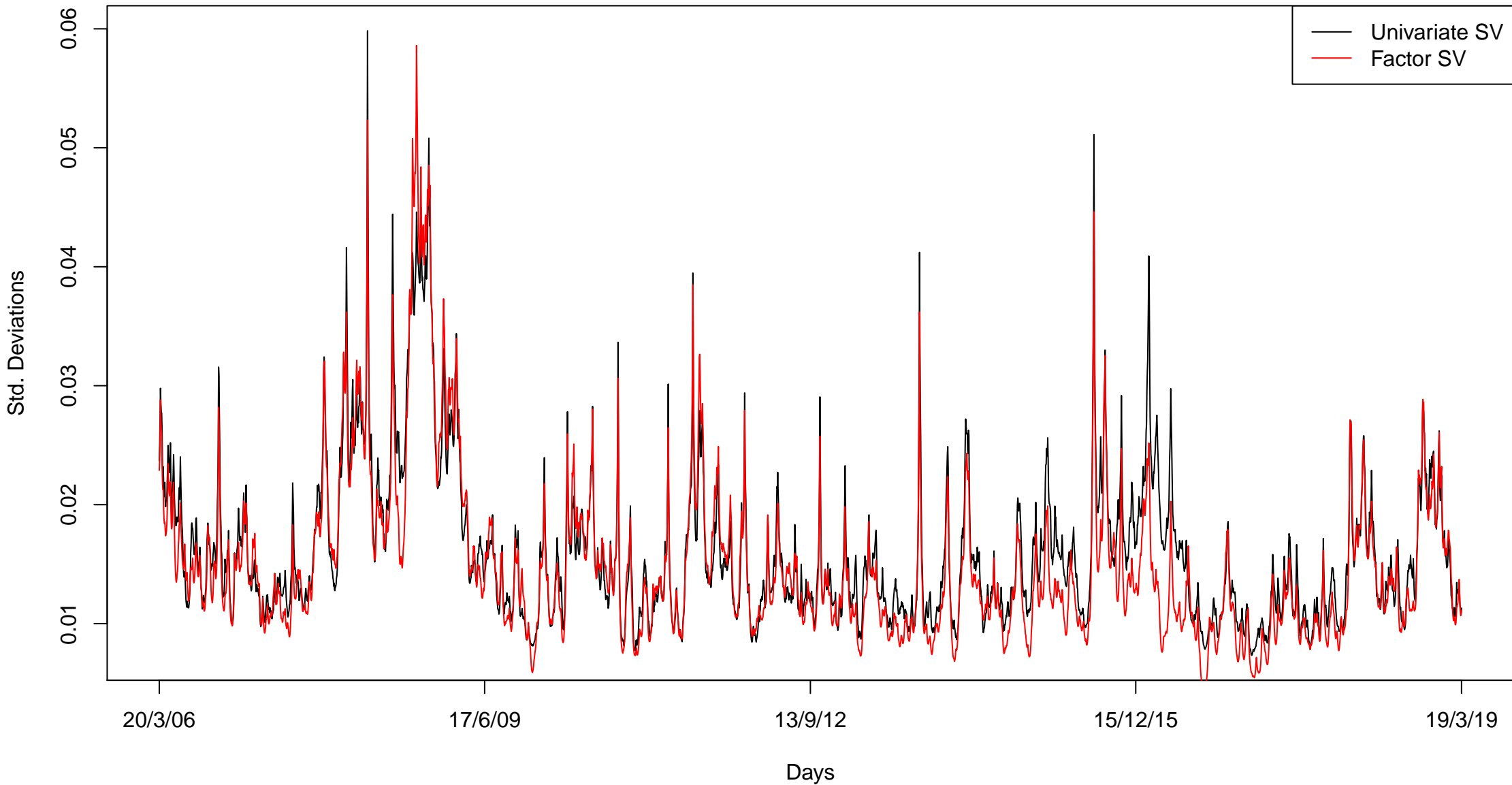
# Petrobras



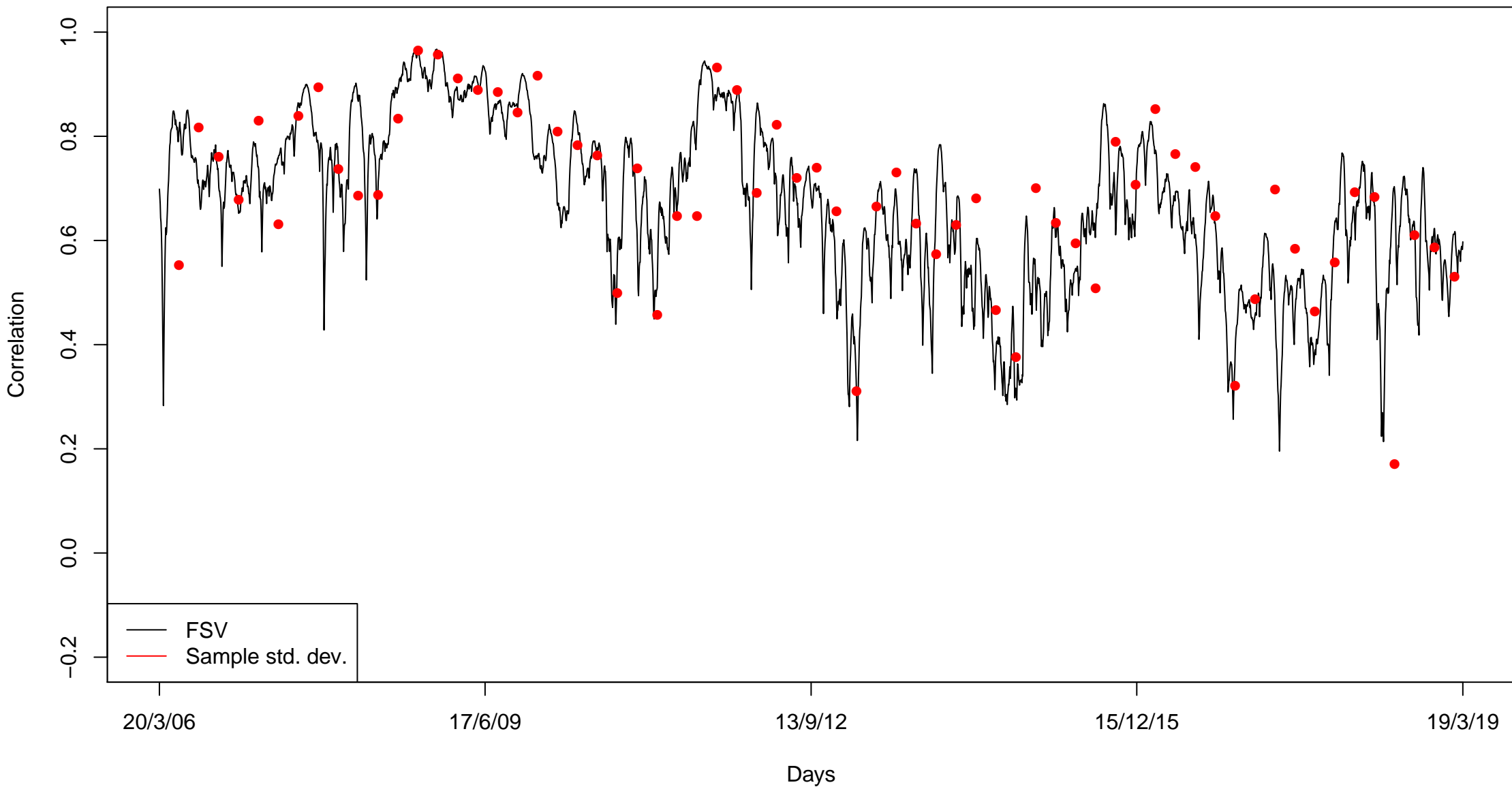
# Vale



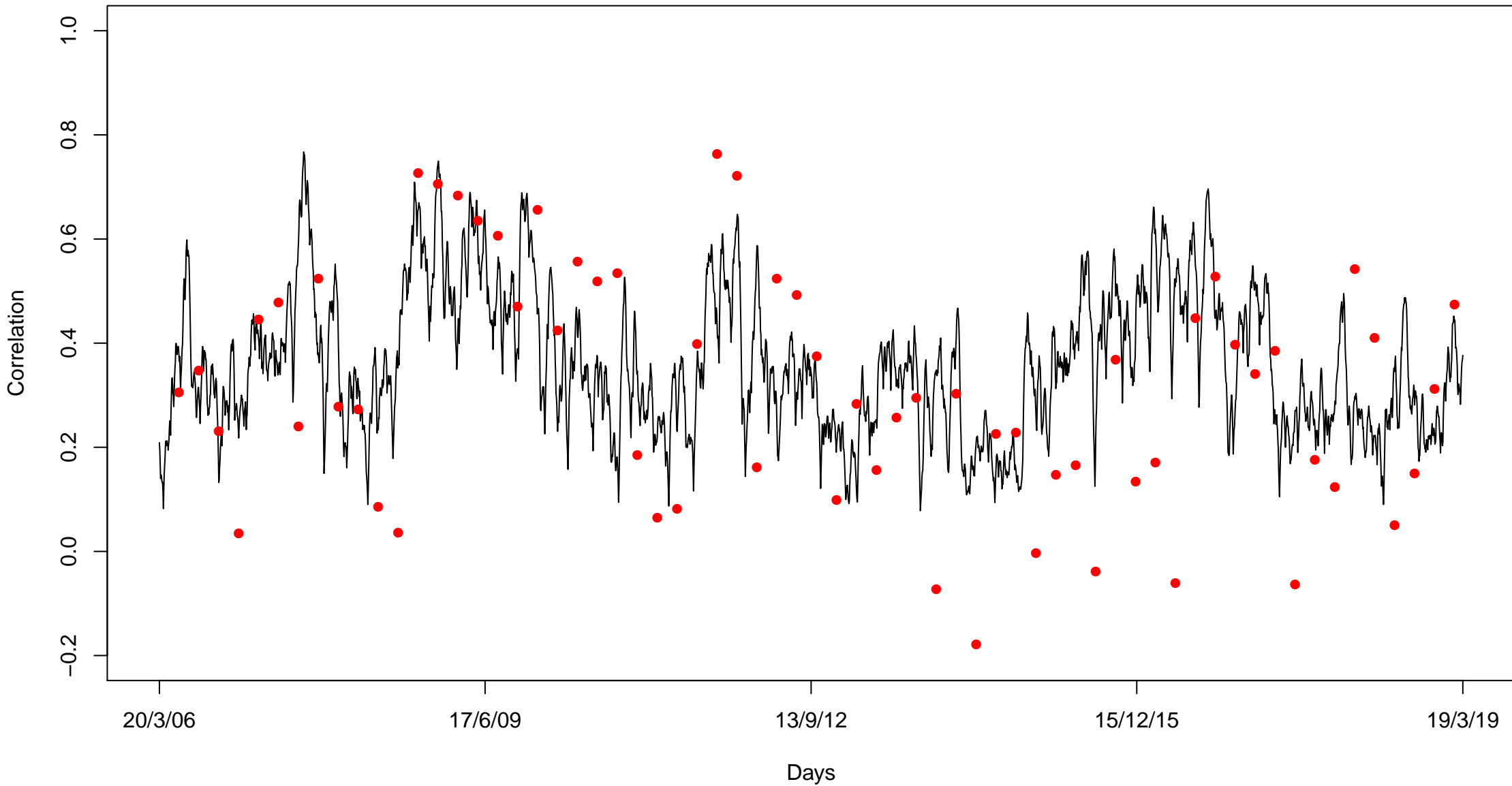
# Google



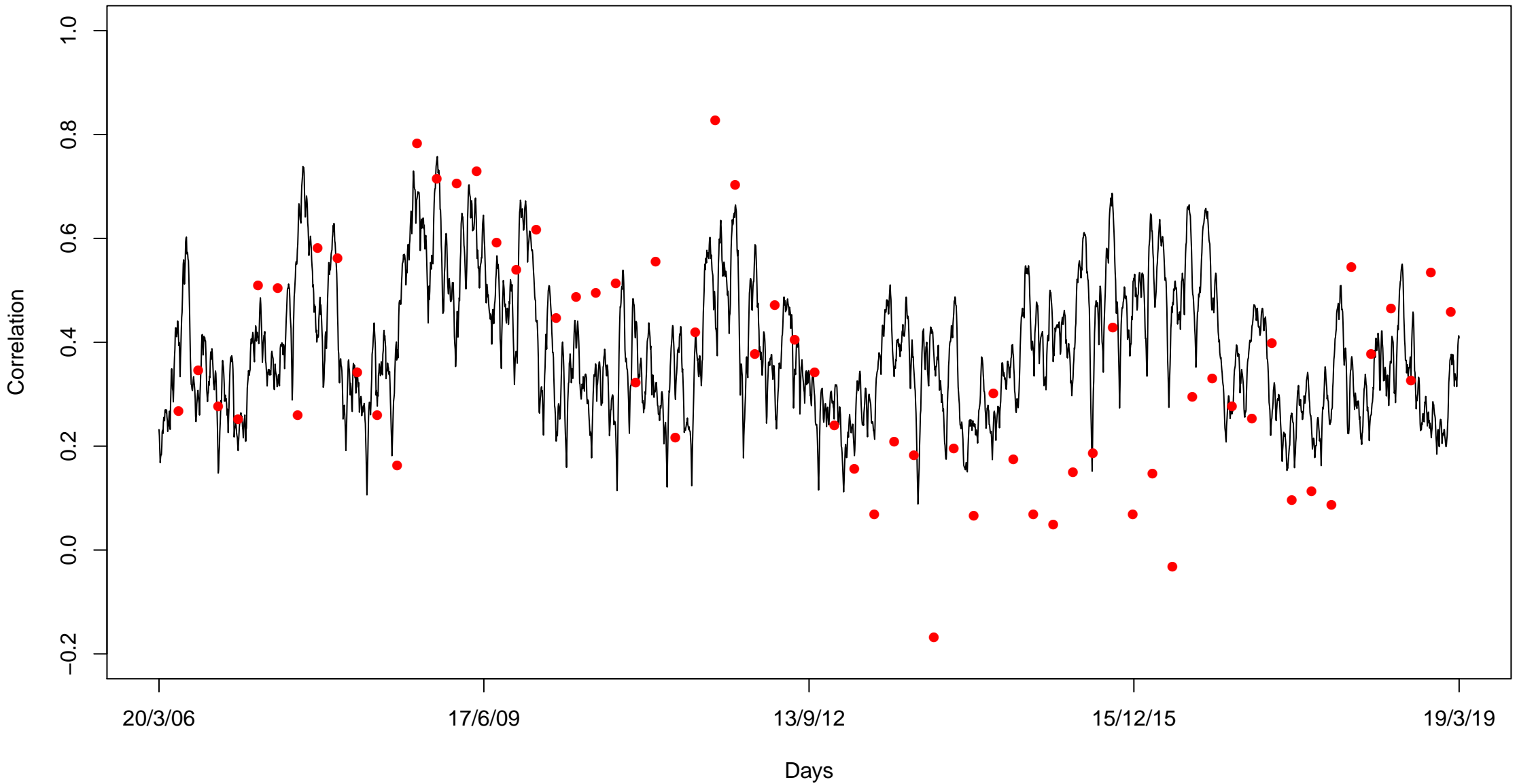
# Petrobras – Vale

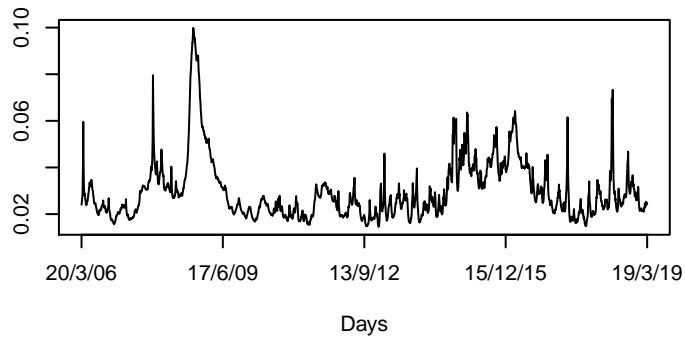
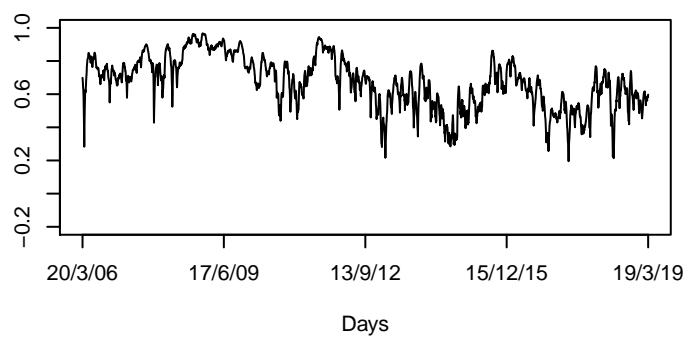
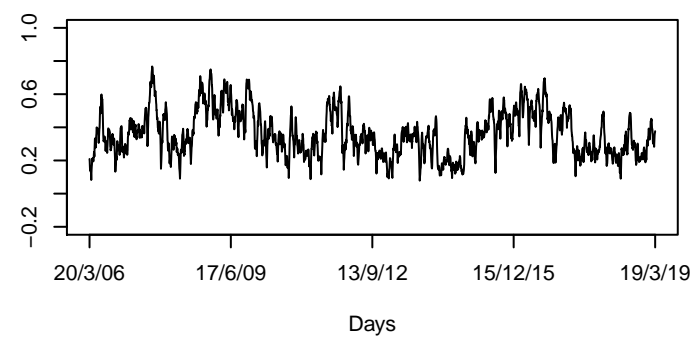
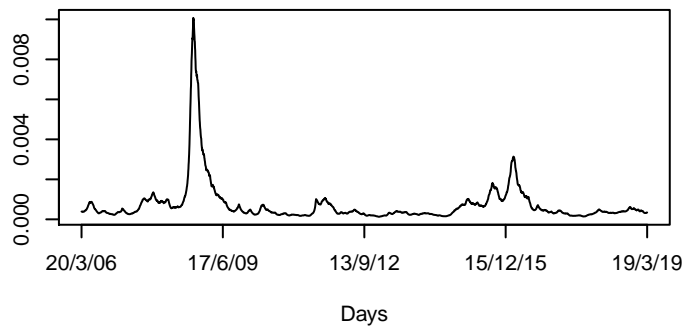
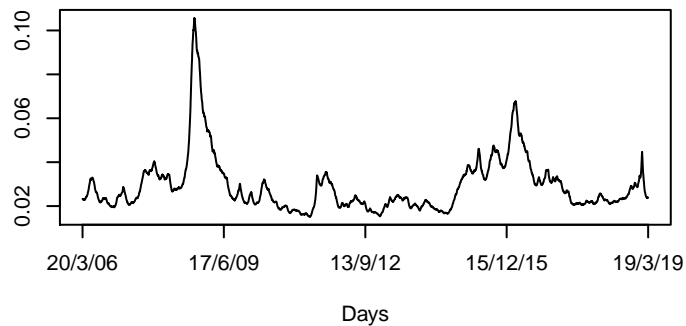
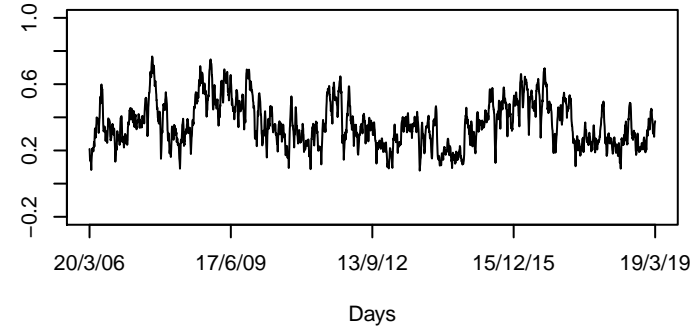
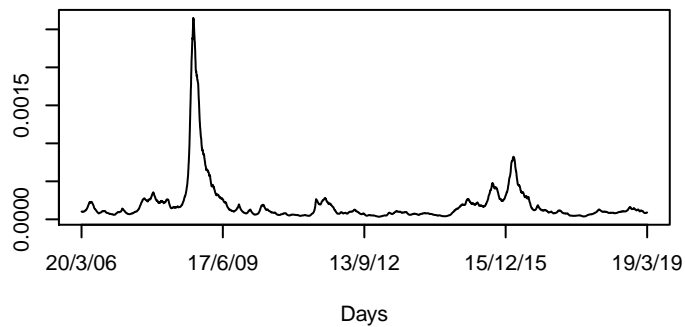
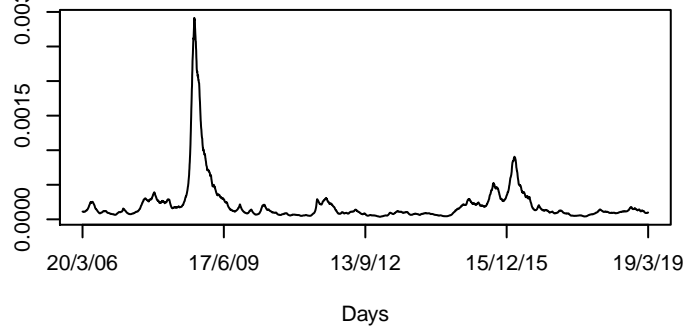


### Petrobras – Google



# Vale - Google



$\sigma_1$  $\rho_{12}$  $\rho_{13}$  $\sigma_{21}$  $\sigma_2$  $\rho_{23}$  $\sigma_{31}$  $\sigma_{32}$  $\sigma_3$ 