

# Twan Mulder

## Personal Information:

Name: Twan Richard Mulder  
Date of Birth: 09-04-2002  
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GitHub profile: <https://github.com/trmulder>



## Education

- October 2024 – Present **MSc Statistical Science**  
*University of Oxford, Oxford, United Kingdom*
- Dissertation: Machine Learning & Return Predictability
- September 2020 – September 2024 **BSc Econometrics & Operations Research, Summa Cum Laude**  
*Erasmus School of Economics, Rotterdam, Netherlands*
- Specialization: Quantitative Finance (9.6/10.0)
  - Minor: Advanced Computer Science (9.7/10.0)
  - GPA: 9.11/10.0 (Top <1%)
- September 2020 – September 2024 **BSc Economics & Business Economics, Summa Cum Laude**  
*Erasmus School of Economics, Rotterdam, Netherlands*
- Specialization: Financial Economics (9.1/10.0)
  - GPA: 9.26/10.0 (Top <1%)

## Work Experience

- September 2022 – September 2024 **Research Assistant**  
*Erasmus School of Economics, Rotterdam, Netherlands*
- Supervisor: Prof. Philip Hans Franses
  - Topic: Forecasting time series data
- February 2022 – December 2022 **Teaching Assistant**  
*Erasmus School of Economics, Rotterdam, Netherlands*
- Courses: Programming, Probability theory

## Extracurricular activities

- September 2022 – September 2023 **Bachelor Honours Research Class**  
*Erasmus School of Economics, Rotterdam, Netherlands*
- September 2020 – August 2022 **Student investor**  
*B&R Beurs, Erasmus Investment Society*

## Professional Skills

- Programming languages:
  - R
  - Java
  - Python
  - MATLAB

- Languages:
  - Dutch
  - English

## Awards

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April 2021

**First-Year Cum Laude Certificate**

*Erasmus School of Economics, Rotterdam, Netherlands*

## Working Papers:

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### **Spectral Factor Model for Corporate Bonds: Separating Signal from Noise**

with Maria Grith and Prof. Patrick Verwijmeren (Erasmus School of Economics)

*Based on my bachelor thesis (Grade: 9.5/10.0)*

### Conferences:

Quantitative Finance and Financial Econometrics (QFFE) – Marseille, 3 – 6 June 2025

Society of Financial Econometrics (SoFiE), Main conference – Paris, 9 - 11 June, 2025

International Association for Applied Econometrics (IAAE) Annual Conference – Turin, June 25 - 27, 2025

World Congress of the Econometric Society (ESWC) – Seoul, Korea, 18 - 22 August, 2025.

### Abstract

This paper introduces the analysis of factor models in the frequency domain to the corporate bond pricing literature, using the spectral factor model developed by Bandi, Chaudhuri, Lo and Tamoni (2021). We decompose the bond market factor into orthogonal frequency-specific components, where the spectral betas capture frequency-specific systematic risk. Our findings reveal that an annual cycle component of the bond market factor—spanning 8 to 16 months—enhances the bond CAPM. Consistent with previous literature, we show that the liquidity risk factor in the four-factor model of Bai, Bali and Wen (2019) is the only factor adding incremental cross-sectional pricing power beyond the bond market factor. However, when the bond market factor is substituted by its annual cycle component, the liquidity risk factor loses its incremental pricing power. Supported by additional evidence, we conclude that the annual cycle component can be interpreted as the liquidity cycle of the bond market factor. Moreover, the results indicate that dimensionality reduction in factor models can be achieved, by separating signal from noise in the frequency domain.