

# Tommaso Di Francesco

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<https://tommasodf.github.io>

## Research Interests

Macroeconomics, Behavioral Economics, Non-linear Dynamics

## Education

- 2025\* **Ph.D.**, Economics, University of Amsterdam. Joint with Ca' Foscari University of Venice  
Advisors: Cars Hommes (UVA) and Paolo Pellizzari (UNIVE)  
EU MSCA programme Economic Policy in Complex Environments (EPOC)
- 2020 **M.A.**, Economics and Finance, Ca' Foscari University of Venice
- 2017 **B.Sc.** Economics and Management, University Tor Vergata or Rome

## Research

### Job Market paper

#### Sticky Information across the Wealth Distribution

I analyze a macroeconomic model in which agents have sticky expectations. On the empirical side, I provide evidence of a departure from rationality in household expectations collected from survey data. Moreover, I show that this departure results in sticky expectations that are heterogeneous across agents. This heterogeneity is driven by wealth differences. This finding is incorporated into a Heterogeneous Agents New Keynesian (HANK) Model to revisit monetary policy. Quantitative analysis shows that the model is able to match the empirical evidence of the hump-shaped response of inflation to a monetary policy shock with micro-evidence of households' expectations from survey data.

### Working papers

#### Sentiment-Driven Speculation in Financial Markets with Heterogeneous Beliefs: A Machine Learning Approach

(with Cars Hommes)

We study an heterogeneous asset pricing model in which different classes of investors coexist and evolve, switching among strategies over time according to a fitness measure. In the presence of boundedly rational agents, with biased forecasts and trend following rules, we study the effect of two types of speculation: one based on fundamentalist and the other on rational expectations. While the first is only based on knowledge of the asset underlying dynamics, the second takes also into account the behavior of other investors. We bring the model to data by estimating it on the Bitcoin Market with two contributions. First, we construct the Bitcoin Twitter Sentiment Index (BiTSI) to proxy a time varying bias. Second, we propose a new method based on a Neural Network, for the estimation of the resulting heterogeneous agent model with rational speculators. We show that the switching finds support in the data and that while fundamentalist speculation amplifies volatility, rational speculation has a stabilizing effect on the market.

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\*Expected.

## Work in Progress

### (Mis)information Diffusion and the Financial Market

(with Daniel Torren Peraire)

This paper investigates the interplay between information diffusion in social networks and its impact on financial markets with an agent based model (ABM). Agents receive and exchange information about an observable stochastic component of the dividend process of a risky asset à la Grossman and Stiglitz (1980). A small proportion of the network has access to a private signal about the component, which can be clean (information) or distorted (misinformation). Other agents are uninformed and can receive information only from their peers. All agents are Bayesian in updating their beliefs, but in a behavioural way. They adjust their beliefs according to the confidence they have in the source of information. We examine, by means of simulations, how information diffuses in the network and provide a framework to account for delayed absorption of shocks, that are not immediately priced as predicted by classical financial models. We show the effect of the network topology on the resulting asset price and offer an interpretation for excess volatility with respect to fundamentals, persistence amplification and leptokurtosis of returns.

## Research Experience

2020                      Research Assistant, VERA Centre, Your University, (Advisor: Prof. Roberto Casarin)

## Teaching

### Ca'Foscari University of Venice

2019, 2022            Teaching Assistant, Optimization (EM2Q12)  
2019                    Teaching Assistant, Financial Mathematics (ET0046)  
2019                    Tutorial Assistance, Mathematics For Economics (ET0047)

### University of Amsterdam

2024                    Tutorial Assistance, Mathematics 1 for Economics (6011P0236Y)  
2024                    Tutorial Assistance, Microeconomics (6011P0139Y)

## Programming

Python, Julia, R

## Other Experience

2019-2020            Financial Consultant, Ernst&Young, Milan, Italy

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