ABSTRACT PROGETTO DI RICERCA

The research programme refers to the Italian PRIN Project entitled "Fin4Green - Finance for a Sustainable, Green and Resilient Society – PROT. 2020B2AKFW" funded by the Italian Ministry of Education.

We plan to introduce new econometric measures of climate-related uncertainty and of its impact on financial markets. In particular, we aim at providing new indicators of climate uncertainty based on high-dimensional econometric models characterized by time-varying and potentially non-stationary volatility. We will also develop approaches to identify climate uncertainty shocks and to trace their dynamic effects on economic and financial variables. This will be done by relying both on the uncertainty measures developed by our team and on existing indices of climate-related news. New econometric models will be also introduced to study how climate uncertainty shocks and other climate-related shocks propagate across economic sectors and geographical regions, also to assess the extent to which climate related contagion may amplify the impact of shocks on financial markets and institutions.

The analysis will be completed by evaluating how the climate transitions risk and the related climate uncertainty are priced by financial markets, especially option markets. In this respect, using the relevant background on the econometric modelling of time series with non-stationary volatilities and correlations, we aim at developing a new framework where we distinguish between temporary (short-term) and permanent (long-term) components of climate-induced volatility of financial markets.

Finally, as climate change does not happen in isolation, but it compounds with other sources of risk and existing socioeconomic weaknesses, new methodological framework is required to account for structural breaks and non-stationary dynamics, especially in terms of volatility dynamics. Such non-linearities and non-stationarities, including the uncertainty related to the occurrence of disaster events, need to be accounted for by using novel robust (bootstrap) inference methods. Accordingly, it is possible to address the issue of 'compounding uncertainty', i.e., to analyze how aggregate uncertainty induced by climate change interacts with other forms of aggregate uncertainty (e.g., macroeconomic, financial and economic policy uncertainty). Investigating the interactions and commonalities across different types of uncertainty will help understanding the impact of uncertainty on the economic and financial systems.

These results will be particularly relevant for their policy implications in terms of impact of uncertainty (especially if induced by political changes) and will facilitate an orderly low-carbon transition of the financial systems.

PROGRAMMA DELLE ATTIVITA'

The candidate will participate in the definition of a novel concept of climate-related uncertainty and in the development of new econometric measures of climate-related uncertainty to analyze its impact on financial markets. The candidate will also contribute to software development and Monte Carlo experiments required by the innovative bootstrap methods to account for non-stationarities and long memory that characterize both climate and financial time series data.

The tentative schedule is as follows:

-The first two months will focus on literature review;

-The third month on data collection;

-Climate-related uncertainty and its impact on financial markets:

- Months 4-8 will be on the construction of the new measures and related econometric models;
- Months 9-12 will be about "stress" testing of the climate transition risk;
- Months 13-15 will focus on the analysis of how climate uncertainty are priced by financial markets;

-Measurement of compound risk:

- Months 16-20 will devoted to the definition of the new measures and related econometric models;
- Months 21-23 will focus on the analysis of how compound risk and 'compounding uncertainty' are priced by financial markets;

-Month 24 will be devoted to the last part of the project.