Joint Risk & Stochastics and Financial Mathematics Seminar in 2019/20

first (small) step to bringing together techniques from stochastic control with

The Effects of Speculation on Constrained Households

We study how financial speculation affects households who do not participate in financial markets. We show that the consumption/wealth shares of households decrease because they forego they equity premium and pay the liquidity premium for cash (a negative inflation risk premium in our model) by putting all their savings in a short term bank account but not because investors are speculating. In an infinite horizon economy, non participation in financial markets would lead to consumption/wealth shares of households that go to zero whereas in our OLG model with finite life expectancy it only leads to a decrease in the households' average consumption share and thus allows us to study the effects of financial speculation on non participating households.

Interestingly, financial speculation in the stock market due to disagreement about

Solutions for Zero- Sum Two-Player Games with Noncompact Decision Sets
The classic theory of infinite zero-sum two-player games has been developed under the assumptions that either the decision set of at least one of the players is compact or some convexity/concavity conditions hold. In this talk we describe sufficient conditions for the existence of solutions for two -person zero-sum games with possibly noncompact decision sets for both players and the structure of the solution sets under these conditions. Payoff functions may be unbounded, and we do not assume any convexity/concavity-type conditions. For such games expected payoffs may not exist for some pairs of strategies. These results imply several classic facts, and they are illustrated with the number guessing game. We also describe sufficient conditions for the existence of a value and solutions for each player.

The talk is based on joint papers with Pavlo O. Kasyanov and Michael Z.

Thursday 10 October - Simone Scotti (Université Paris Diderot)

Alpha-Heston stochastic volatility model
We introduce an affine extension of the Heston model where the instantaneous variance process contains a jump part driven by α-stable processes with $\alpha\in(1,2]$. In this framework, we examine the implied volatility and its asymptotic behaviors for both asset and variance options. In particular, we show that the behavior of stock implied volatility is the sharpest coherent with theoretical bounds at extreme strikes independently of the value of $\alpha\in(1,2)$. As far as volatility options are concerned, VIX-implied volatility is characterized by an upward-sloping behavior and the slope is growing when α decreases.
Furthermore, we examine the jump clustering phenomenon observed on the variance marketand provide a jump cluster decompositionwhich allows to analyse the cluster processes. The variance process could be split into a basis process, without large jumps, and a sum of jump cluster processes, giving explicit equations for both terms. We show that each cluster process is induced by a first ``mother'' jump giving birth to a sequence of ``child jumps''. We first obtain a closed form for the total number of clusters in a given period.
Moreovereach cluster process satisfies the same α-CIR evolution of the variance process excluding the long term mean coefficient that takes the value 0.We show that each cluster process reaches 0 in finite time and we exhibit a closed form for its expected life time.We study the dependence of the number and the duration of clusters as function of the parameter α and the threshold used to split large and small jumps.

Joint work with Ying Jiao, Chunhua Ma and Chao Zhou