

Mathematical models for the formation of financial bubbles

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The notion of an asset price bubble has two ingredients. One is the observed market price of a given financial asset, the other is the asset's intrinsic value, and the bubble is defined as the difference between the two. The intrinsic value, also called the fundamental value of the asset, is usually defined as the expected sum of future discounted dividends. In the first part of the talk we study a flow in the space of equivalent martingale measures and focus on the corresponding shifting perception of the fundamental value of a given asset in an incomplete financial market model. This allows us to capture the birth of a perceived bubble and to describe it as an initial submartingale which then turns into a supermartingale before it falls back to its initial value zero. In the second part of the talk we examine the impact of overconfidence on bubbles formation in the framework of reduced-form models for credit risk. We assume that the wealth associated to a defaultable asset may be strongly affected by the trading activity of overconfident investors, who believe the asset to be safe and provoke an alteration of its estimated value. Since the value process changes under this influence, the underlying pricing measure has also to readapt determining a switch in the space of the equivalent martingale measures. In this way we provide a constructive approach to explain bubbles formation as well as motivate a dynamics in the space of equivalent martingale measures at micro-economic level.