

# Indifference pricing for Contingent Claims: Large Deviations Effects

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In this talk, we consider utility indifference prices and optimal purchasing quantities for a non-traded contingent claim in an incomplete semi-martingale market with vanishing hedging errors, making connections with the theory of large deviations. This work is motivated by the recent explosive growth in the derivatives market; in particular we seek to explain why such positions are being taken and what the effects are in terms of pricing. To make the analysis tractable, we concentrate on sequences of semi-complete markets where for each  $n$  the claim  $h_n$  admits the decomposition  $h_n = D_n + Y_n$  where  $D_n$  is replicable and  $Y_n$  is completely unhedgeable in that the indifference price of  $Y_n$  for an exponential investor is its certainty equivalent. Under broad conditions, we may assume that  $Y_n$  vanishes in accordance with a large deviations principle as  $n$  grows. In this setting, we identify limiting indifference prices as the position size becomes large, and show the prices typically are not the unique arbitrage free price in the limiting market. Furthermore, we show that optimal purchase quantities occur at the large deviations scaling, and hence large positions endogenously arise in this setting.

Joint work with Konstantinos Spiliopoulos, Boston University.