ECONOMICALLY CONSISTENT VALUATION FOR INCOMPLETE MARKETS WITH BUBBLES

M. HERDEGEN

ABSTRACT. We propose a valuation rule for incomplete financial markets with bubbles. This rule only depends on primary properties of the market, which have a direct economic interpretation, and not on dual objects like equivalent local martingale measures. The main idea is that in order to consistently value a contingent claim, the market extended by the value process of the contingent claim should satisfy the same good properties as the original market. Using our valuation rule, we fully characterise all economically consistent values for a contingent claim. We show that simply taking the expectation of a contingent claim under an equivalent local martingale measure is economically inconsistent for bubble markets; one has to add a local martingale correction term. This term is bounded by a minimal and a maximal local martingale corresponding to the contingent claim and the equivalent local martingale measure. Perhaps surprisingly, for complete markets, an economically consistent value of a contingent claim is in general not unique. However, uniqueness of economically consistent values for call and put options holds for complete markets if the bank account is maximal, in the sense that the buy-and-hold strategy of the bank account cannot be improved without risk by trading dynamically over time. Even without maximality of the bank account, our approach produces option values in the model which satisfy put-call parity; this also extends to incomplete markets. Finally, we compare our results to existing ideas and approaches and explain among others which of the two existing formulas for the call price in the CEV model (Hull 2003, Heston et al. 2007) is economically consistent in our sense. The talk is based on joint work with Martin Schweizer.