

# Pricing without martingale

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For several decades, the no-arbitrage (NA) condition and the martingale measures have played a major role in the financial asset's pricing theory. Here, we propose a new approach based on convex duality instead of martingale measures duality : our prices will be expressed using Fenchel conjugate and bi-conjugate. This naturally leads to a weak condition of (NA) called Absence of Immediate Profit (AIP). It asserts that the price of the zero claim should be zero or equivalently that the super-hedging cost of some call option should be non-negative. We propose several characterizations of the (AIP) condition and also study the relation with (NA) and a stronger notion of (AIP) linked to the no-free lunch condition. We show in a one step model that under (AIP) the super-hedging cost is just the payoff's concave envelop. In the multiple-period case, for a particular, but still general setup, we propose a recursive scheme for the computation of a the super-hedging cost of a convex option. We also give some promising numerical illustrations.