

CONTEXTUALITY IN FINANCIAL DECISION MAKING

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ABSTRACT

It has been shown that investors are prone to contextual information processing and contextual risk attitudes. Contextuality stems from framing and order effects in information presentation and evaluation. Framing and order of information trigger joint, versus separate evaluation of random variables, such as portfolio versus single stock assessment of returns. Order of processing of information signals can also produce different posterior beliefs about the financial market.

In real investment settings, the complexity of financial products and the surrounding ambiguity calls for a more general formalization of agents' belief formation than offered by the standard probability theory and dynamics models based on classical stochastic processes. The main advantage of quantum probability (QP) is that it can capture contextuality of beliefs through the notion of non-commuting prospect observables. QP has the potential to model myopia in asset return evaluation, as well as inter-asset valuation. Moreover, the interference term of agents' comparison state can provide a quantitative description of their vacillating ambiguity perception characterized by non-additive beliefs.

The main motivation for the application of QP mathematical framework as a mechanism of probability calculus under non-neutral ambiguity attitudes among agents coupled with a state dependence of their evolution is its ability to mathematically model belief formation under uncertainty and an interdependence of beliefs (e.g., regarding different securities in the market). Finally, we can ascertain that QP calculus provides a more complete operational model than the Bayesian update.

Keywords: contextuality, quantum probability, decision making, financial market