

Subjective modelling of supply and demand – quantum-like approach

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The so popular in economics curves of supply and demand [1] correspond to fundamental economics notions in a somehow transcendental way often neglecting their empirical verification. Various classes of models of supply/demand profiles of markets can be put forward by econometrics methods and, subsequently, their free parameters can be fitted. We propose a different approach that rejects the objectiveness (observer-independence) of supply and demand curves [2]. Agents determine their own subjective characteristics of their competitors and use them for optimization of profits. In a sense, they are in Plato's Cave observing shadows (that is transactions) of real world. Maximization of Fisher entropy instead of the Boltzmann/Shannon one could compensate for the lack of information that is not reflected in transaction data and can be used as a strategy selection criterion in market games when the agent negotiates prices with the Rest of the World (a collective opponent). This approach has its roots in the Information Theory Model of Markets [3] that is dual to the model of canonical portfolios [4]. In addition, it allows for a natural quantum-like description [5-8]. The price coordinates of supply and demand are not statistically independent – their dispersion relation fulfil sort of uncertainty principle. Therefore interesting analogies emerge and some paradoxical violations of market laws get information theory interpretation [9,10]. Of course, such quantum-like models have their counterparts based on probability theory and therefore, at least in principle, one can try to determine which approach offers a better representation of market behaviour. We envisage interesting possibilities that might result from quantum information theory and proliferation of (new) quantum technologies, e.g. quantum auctions [11].

Keywords

Fisher information, entropy, portfolio theory, investment strategies

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