Schrödinger type of equation for subjective identification of supply and demand curves

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The present authors have put forward in a series of papers [1-4] a quantum game theory based model of market prices movements. The use of quantum-like formalism for modeling supply and demand strategies must certainly be justified. This is one of the aims of the paper: we present a construction of an equation of Schrödinger type that is based on postulates of pure market nature, see also [5,6]. Our arguments have roots in Fisher approach to information measures [7] and the subjective demand/supply models [8]. This new approach implies an information theoretical arguments for financial risk definition as the second cumulants of the random variable being the logarithm of price. The value of information (and the corresponding risk taken by the agent), measured in terms of logarithmic prices, equals to the total transactional costs [9] the agents must bear to determine market supply/demand curves. This value depends on agent's strategy and the profits or loses of informational nature balance. Alternatively, we obtain finance theory based validation of Fisher approach to information measures. Our results shed new light on the recently emerging awareness of the necessity of perceiving information as a sort of capital and the needs of appropriate changes in the conception of a market. Various analogies between quantum physics and market phenomena can be found. Prognoses concerning the evolution of real market games can be made. Such quantum-like models have their counterparts based on probability theory and therefore one can try to determine which approach offers a better representation of the market. Moreover, we envisage interesting possibilities that might result from quantum information theory and proliferation of new quantum technologies.

Keywords
Fisher information, entropy, quantum finance, investment strategies

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