A model of subjective supply-demand: the minimum Fisher information solution.

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The present authors have put forward a projective invariant model of rational trading (Information Theory Model of Markets \([1]\)) that implies a model for subjective demand/supply profiles if one considers the closing of a position as a random process. Such models, although simple and elegant, have several drawbacks from the theoretical point of view. As games, they do not have any natural “quantum” version. (“Quantization” often suggests ways of avoiding paradoxes in game theory due to absence of limitations of the classical theory of probability. This approach has interesting consequences in decision sciences, cf. for example papers by E. Haven and A. Yu. Khrennikov.) Such a possibility would be welcome because non-gaussian shape of the of the demand (supply) curve suggests the existence of Giffen goods \([2]\). Obstacles in quantization of such models can be overcome by replacing the maximum Boltzmann/Shannon entropy principle with the requirement that the Fisher information gets its minimum (a discussion on the connection between the principle of minimum of Fisher information and equations of quantum theory can be found in \([3]\)). In this way a simple method of quantum-like reformulation game theory models that stem from statistical considerations. We would like to present the analysis of a subjective variant of rational repeated trading model \([4]\). In this model, the trader gets the maximal profit intensity when the probability of transaction is \(\approx 0.5853\). There is also an interesting phase transition if this probability falls to \(\frac{2}{\pi} \approx 0.28\). We will present a comparison with the model based on the Maximum of Entropy Principle. To the best of our knowledge, this is an analysis that shows concrete situation in which trader profit optimal value is in the class of price-negotiating algorithms (strategies) resulting in non-monotonous demand(supply) curves of the Rest of the World (collective opponent). Our model suggests that there might be a new class of rational trader strategies that neglect the supply-demand profile of the market. This class emerges when one (tries to) minimize the information that strategies reveal.

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