

# Accepted Manuscript

Quantum-like model of subjective expected utility

Irina Basieva, Polina Khrennikova, Emmanuel Pothos, Masanari Asano,  
Andrei Khrennikov

PII: S0304-4068(18)30017-X  
DOI: <https://doi.org/10.1016/j.jmateco.2018.02.001>  
Reference: MATECO 2218

To appear in: *Journal of Mathematical Economics*



Please cite this article as: Basieva I., Khrennikova P., Pothos E., Asano M., Khrennikov A.,  
Quantum-like model of subjective expected utility. *Journal of Mathematical Economics* (2018),  
<https://doi.org/10.1016/j.jmateco.2018.02.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Quantum-like model of subjective expected utility

January 19, 2018

Irina Basieva<sup>1</sup>, Polina Khrennikova<sup>2</sup>, Emmanuel Pothos<sup>1</sup>, Masanari Asano<sup>3</sup>,  
Andrei Khrennikov<sup>4</sup>

<sup>1</sup> Department of Psychology, City University, London, UK

<sup>2</sup> School of Business, University of Leicester, LE1 7RH, UK

<sup>3</sup> Liberal Arts Division, National Institute of Technology, Tokuyama College, Gakuendai, Shunan, Yamaguchi 745-8585 Japan

<sup>4</sup> International Center for Mathematical Modeling, Linnaeus University, Växjö, S-35195, Sweden; National Research University of Information Technologies, Mechanics and Optics, St. Petersburg 197101, Russia  
Andrei.Khrennikov@lnu.se

## Abstract

We present a very general quantum-like model of lottery selection based on representation of beliefs of an agent by pure quantum states. Subjective probabilities are mathematically realized in the framework of quantum probability (QP). Utility functions are borrowed from the classical decision theory. But in the model they are represented not only by their values. Heuristically one can say that each value  $u_i = u(x_i)$  is surrounded by a cloud of information related to the event  $(A, x_i)$ . An agent processes this information by using the rules of quantum information and QP. This process is very complex; it combines counterfactual reasoning for comparison between preferences for different outcomes of lotteries which are in general complementary. These comparisons induce interference type effects (constructive or destructive). The decision process is mathematically represented by the comparison operator and the outcome of this process is determined by the sign of the value of corresponding quadratic form on the belief state. This operational process can be decomposed into a

Download English Version:

<https://daneshyari.com/en/article/11004880>

Download Persian Version:

<https://daneshyari.com/article/11004880>

[Daneshyari.com](https://daneshyari.com)