1063-60-31   **Mark Burgin** and **Gunter Meissner***, University of Hawaii, Shidler College of Business, 2404 Maile Way, Honolulu, HI 96822. *Mathematical Theory of Negative Probability and Models of Financial Processes.* Preliminary report.

Standard models of financial processes give only positive interest rates. However, negative nominal interest rates have occurred several times in the past in financial practice, as in the 2008/2009 global financial crisis, in Switzerland in the 1970s or in Japan in 2003. Negative probabilities allow economists to overcome shortcomings of standard models. However, in spite of numerous examples from physics and finance where negative probability has been successfully employed, there was no mathematical theory of negative probability taking values in classical number systems. In this work, a mathematical theory of probability that may take negative values is developed and studied in an axiomatic form, while its applications to financial problems in the context of the Black-Scholes-Merton framework are explained. Different properties of extended probability are obtained. Some of these properties are similar to properties of the classical probability, while other properties are essentially different. (Received July 09, 2010)