

FINANCIAL ENGINEERING BASED ON TELEMATICS-BASED HEDGING OF OPERATIONAL RISKS WITHIN THE PARADIGM OF NEURO-FINANCIAL THEORY

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The risk management market suffers from limited capacity and high costs of traditional insurance, especially for hard to observe operational risks of enterprises. The market segment of Alternative Risk Transfer and usage based insurance is growing, but the available instruments provide limited event coverage and depend on subjective expert judgement in claims settlement, which amplifies moral hazard and increases transaction costs. A concept of telematics based hedging is proposed, in which operational risks are transformed into parametric derivatives built on a system of Key Risk Indicators (KRI), for example an Asset Health Index (AHI) constructed as an aggregated indicator linked to the probability of asset failure or degradation, whose dynamics are used as an underlying process for calculating contract payoffs. The payoff structure is specified by analogy with option strategies, including bull spreads, which limit the hedger's losses and generate a controlled exposure for the speculator.

According to the "neurofinancial theory" (Rogov, 2003), the activation function of the output layer of neurons is isomorphic to the payoff function of an option portfolio (for example, rectifier / long call, sigmoid / bull spread). This approach allows one to specify the payoff structure of the emerging market through the parameters of a neural network. Within this neurofinancial framework, AI agents act both as carriers of expectations and as mechanisms for verifying the occurrence of events via hardware oracles embedded in smart contracts. The reallocation of part of enterprises' operational risks to a pool of investors through a portfolio of index contracts is analysed, as well as the attractiveness of such instruments for different groups of market participants. Scenarios for integrating the proposed mechanism into the existing ART and reinsurance infrastructure and its impact on the availability of hedging for small and medium sized businesses are discussed.