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ON THE BIOLOGICAL FOUNDATION OF RISK PREFERENCES

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This paper considers a continuous-time biological model in which the growth rate of a population is determined by the risk attitude of its individuals. We consider choices over lotteries which determine the number of offspring and involve both idiosyncratic and aggregate risks. We distinguish between two types of aggregate risk: environmental shocks and natural disasters. Environmental shocks influence the death and birth rates, while natural disasters result in instantaneous drops in population size. Our main result is a utility representation of the evolutionary optimal behavior. The utility is additively separable in the two types of aggregate risk. The term involving environmental shocks is a von Neumann-Morgenstern utility which induces the same attitude towards both idiosyncratic and aggregate risk. The term involving disasters cannot be interpreted as an expected utility maximization and induces less tolerance towards aggregate risk.