This paper resolves a question proposed in Kardaras and Robertson (2012): how to invest in a robust growth-optimal way in a market where precise knowledge of the covariance structure of the underlying assets is unavailable. Among an appropriate class of admissible covariance structures, we characterize the optimal trading strategy in terms of a generalized version of the principal eigenvalue of a fully nonlinear elliptic operator and its associated eigenfunction, by slightly restricting the collection of non-dominated probability measures. (Received September 12, 2012)