Inventory Management in Times of Environmental Uncertainty

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In the decade since the credit crisis, businesses have been adapting to a new reality. Uncertainty has increased in areas that were long considered stable. Until recently, firms doing business in Britain were mainly concerned with making strategic decisions with little to no information on fundamental issues such as the future customs regime. Similarly, American companies were defining business strategies during an ongoing and uncertain trade war with China. Then, at the start of 2020 the covid19-crisis exploded and the world changed overnight. Brexit, trade wars, and covid19 introduced different shocks to the worlds' supply chains. From a modelling perspective, these shocks represent nonstationary uncertainty. Their impact is hard to predict (hence, uncertain) and they change the underlying structure of the system (hence, non-stationary). Such newfound uncertainty requires a new decision-making paradigm. Statistical models, using past data to predict future behaviour, are powerless under such conditions. This project focuses on the question how inventory decisions can be adapted to accommodate this new reality. Machine-learning techniques will be implemented within inventory models to support decision-making under non-stationary uncertainty.