The Price of Independence in an Echo Chamber with Dependence Ambiguity

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Abstract

How much should we pay to remove the interdependence of biased information sources? This question is relevant in both statistics and political economy. When there are many information sources or variables, their dependence may be unknown, which creates multivariate ambiguity. One approach to answer our leading question involves use of decoupling inequalities from probability theory. We present a new inequality, designed to cope with this question, which holds for any type of dependence across information sources. We apply our method to a simple formalization of a political echo chamber. For a given set of marginal information, this bound is the sup over all possible joint distributions connecting the marginals. Our method highlights a price to pay for facing summed dependent (multivariate) data, similar to the probability premium required for univariate data. We show that a conservative decisionmaker will pay approximately 50% more than if the data were independent, in order to freely neglect the correlations.

Keywords: Multivariate Ambiguity; Decoupling Inequality; Echo Chamber; Independence

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