# RAHUL MUKHERJEE

**Indian Institute of Management Calcutta, India**

# PREDICTING A FUTURE OBSERVATION: A RECONCILIATION OF THE BAYESIAN AND FREQUENTIST APPROACHES

## Abstract:

Predicting a future observation on the basis of the existing observations is a problem of compelling practical interest in many fields of study including economics and sociology. Bayesian predictive densities, obtained via a prior specification on the underlying population, are commonly used for this purpose. This may, however, induce subjectivity because the resulting predictive set depends on the choice of prior. Moreover, one can as well consider direct frequentist methods which do not require any prior specification. This can again entail results differing from what Bayesian predictive densities yield. Thus there is a need to reconcile all these approaches.

The present article aims at addressing this problem. Specifically, we explore predictive sets which have frequentist as well as Bayesian validity for arbitrary priors in an asymptotic sense. Our tools include a connection with locally unbiased tests and a shrinkage argument for Bayesian asymptotics. Our findings apply to general multiparameter statistical models and represent a significant advance over the existing work in this area which caters only to models with a single unknown parameter and that too under certain restrictions. Illustrative examples are given. Computation and simulation studies show that our results work very well in finite samples.

## Keywords:

Asymptotic theory, locally unbiased test, posterior predictive density, shrinkage argument

**JEL Classification:** C11, C15