國 立 中 央 大 學

統 計 研 究 所

學 術 演 講

主 講 人：張 政 教授（中國人民大學統計與大數據研究院）

講　　題：**A Unified Framework for Efficient Estimation of General Treatment Models**

時　　間：**108年01月08日（星期二）** **上午11：00～12：00**

地　　點：中央大學鴻經館**M429**室

茶　　會：**上午 09：30～10：00**　　地　點：鴻經館 **510** 室

ABSTRACT

This paper presents a weighted optimization framework that unifes the binary, multivalued, continuous, as well as mixture of discrete and continuous treatment, under the un-confounded treatment assignment. With a general loss function, the framework includes the average, quantile and asymmetric least squares causal effect of treatment as special cases. For this general framework, we first derive the semiparametric efficiency bound for the causal effect of treatment, extending the existing bound results to a wider class of models. We then propose a generalized optimization estimation for the causal effect with weights estimated by solving an expanding set of equations. Under some sufficient conditions, we establish consistency and asymptotic normality of the proposed estimator of the causal effect and show that the estimator attains our semiparametric efficiency bound, thereby extending the existing literature on efficient estimation of causal effect to a wider class of applications. Finally, we discuss estimation of some causal effect functionals such as the treatment effect curve and the average outcome. To evaluate the finite sample performance of the proposed procedure, we conduct a small scale simulation study and find that the proposed estimation has practical value. To illustrate the applicability of the procedure, we revisit the literature on campaign advertise and campaign contributions. Unlike the existing procedures which produce mixed results, we find no evidence of campaign advertise on campaign contribution.

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