

## **COLLOQUIUM SERIES: SPRING 2016**

# **QUASI-LIKELIHOOD ESTIMATION OF A CENSORED AUTOREGRESSIVE MODEL WITH EXOGENOUS VARIABLES**

### **Abstract:**

Maximum likelihood estimation of a censored autoregressive model with exogenous variables (CARX) requires computing the conditional likelihood of blocks of data of variable dimensions. As the random block dimension generally increases with the censoring rate, maximum likelihood estimation becomes quickly numerically intractable with increasing censoring. We introduce a new estimation approach using the complete-incomplete data framework with the complete data comprising the observations were there no censoring. We introduce a system of unbiased estimating equations motivated by the complete-data score vector, for estimating a CARX model. The proposed quasi-likelihood method reduces to maximum likelihood estimation when there is no censoring, and it is computationally efficient. We derive the consistency and asymptotic normality of the quasi-likelihood estimator, under mild regularity conditions. We illustrate the efficacy of the proposed method by simulations and a real application on phosphorus concentration in river water. An accompanying R package will also be introduced.

**[www.stat.uiowa.edu](http://www.stat.uiowa.edu)**

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### **WHEN**

**January 28, 2016  
3:30 p.m.**

### **WHERE**

**61 Schaeffer Hall**

### **RECEPTION**

**241 Schaeffer Hall  
3:00 p.m.**

