



# THE UNIVERSITY OF CHICAGO

Department of Statistics

## MASTER'S THESIS PRESENTATION

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SEHWA KIM

Department of Statistics  
The University of Chicago

Estimation of Change Points in Multiple Regression Models—Restrictions of  
Bai's (1997) Method and Its Application for Extended Data

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Eckhart 110, 5734 S. University Avenue

### ABSTRACT

We study the change point estimation in multiple regression models mainly focusing on Bai's (1997) method. The Bai's method has strength in terms of practical implement. The method is efficient because the estimation of break points and the testing for them are combined in a single step using sup-Wald statistic test. On the other hand, the method has several restrictions as well. Based on the analysis for the same data set used in Bai (1997), we found evidence of the restriction. First, the method is very sensitive to the number of estimated parameters when the sample size is relatively small. Second, the method is also sensitive to the variable selection regardless of their statistical significance, this suggests that the variable selection should be carefully made for the usage of Bai's method. Last, the method can be less credible when the singular matrix problem exists, especially when the sample size is relatively small. Moreover, the singular matrix problem can be aggravated as more explanatory variables are added. We conducted the additional analysis on the longer period data in order to find evidence for the impact of the new discount window lending program on the relationship between the discount rate and the market interest rate. No evidence was found the impact of the new discount window lending program. However, we found evidence that the restrictions of the method regarding small sample size can be mitigated when the sample size is relatively large.

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