Nonparametric Estimation of the Switching Regression Model

by

Ruffy S. Guilatco

A thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Science (Statistics)

School of Statistics
University of the Philippines
Diliman, Quezon City

October 2010

ABSTRACT

High dimensional data often exhibit multicollinearity that affects stability of regression coefficients. We propose a switching regression model with high dimensional predictors. Estimation is done through nonparametric principal components regression to mitigate both the multicollinearity problem in high dimension and the suffering predictive ability in principal components regression. Nonparametric estimation of the regression in each regime will improve model fit that will produce reliable measures of impact in the counterfactual analyses. Simulation studies supported our claim that indeed, a nonparametric principal components switching regression model yields better predictive ability from the parametric counterpart. The predictive ability of the model is also robust to the nature of switch (endogenous or exogenous) between the two regimes.

Keywords: Switching regression model, high dimensional data, multicollinearity, principal components regression, nonparametric regression