

**Switching Meta-Regression Model in High Dimensional Data**

A dissertation presented by

**IVY CORAZON L. ANCOG**

to the

**School of Statistics**

in partial fulfillment of the requirements

for the degree of

**Doctor of Philosophy (Ph.D.) in Statistics**

School of Statistics

University of the Philippines

Diliman, Quezon City

**April 2017**

## **Abstract**

A semiparametric mixed switching meta-regression model with fixed covariates (possibly high dimensional) and a random component resulting from a regime switch is postulated. The model is estimated through a hybrid of cubic smoothing splines and restricted maximum likelihood estimation embedded in the backfitting algorithm. Regime switch is identified through a support vector machine classifier. For high dimensional data, sparse principal component (SPC) analysis is used in dimension reduction. The effect is then incorporated into the model through a nonparametric function. Simulation study exhibits relative advantage of the model over a purely parametric model especially when there is misspecification error.

**Keywords:** semiparametric model, meta-regression, support vector machine, sparse principal component analysis, restricted maximum likelihood estimation