



University of
Central Arkansas™

DEPARTMENT OF MATHEMATICS MASTER THESIS DEFENSE

- Speaker:** Kaiyi Chen, Graduate Student
Department of Mathematics
- Title:** The Time Variation Paths of Factors Effecting
Bank Stock Returns
- Date:** Tuesday, August 4, 2015
- Time:** 12:00—1:00 p.m.
- Place:** MCS 212

ABSTRACT: The ordinary least squares (OLS) model, which generates time independent coefficients, is not a reasonably satisfactory approximation to model data with time-varying variables. Such data arise in natural and social sciences. An extension of an OLS model is a flexible least squares (FLS) model in which time dependent (referred also as time varying paths) coefficients are recursively estimated by minimizing the sum of the squared regression residuals and the sum of the squared dynamic errors. Over the past few decades, FLS models have been used extensively by econometricians and statisticians in various applications. In this work, we implemented the FLS method in R to identify time varying paths of factors affecting bank stock returns. In particular, we analyzed the effect of the independent variables S&P 500 index, long term government bond rates, and median sale prices of new houses on the bank stock returns (dependent variable). We collected monthly data for these variables from public domains for the period November 1990 through November 2014. For this time period, we developed a procedure to find suitable sub-intervals by comparing FLS coefficients to their OLS counterparts to get more insight of the effect of the independent variables on the dependent variable. These findings suggest that, on the bank stock returns, (1) the market performance, based on S&P 500 index, had significant positive impact during the entire period November 1990 through November 2014. (2) the long-term government bond rates had significant positive impact during November 1990 through May 2006 and had no significant impact during June 2006 through October 2008 and had significant negative impact during November 2008 through November 2014, and (3) the sale prices of new houses had no significant impact during the period November 1990 through January 1994 and had significant positive effect during February 1994 through November 2014. These mixed impacts of the independent variable reflect the impact of the events, which occurred during the period November 1990 through November 2014, on the bank stock returns.