University of Victoria | Graduate Studies

Notice of the Final Oral Examination for the Degree of Master of Arts

of

MATTHEW JOYCE

BSc (University of Victoria, 2011)

"Bivariate Extreme Value Analysis of Commodity Prices"

Department of Economics

Monday, April 10, 2017
9:00AM
Business & Economics Building
Room 371

Supervisory Committee:
Dr. David Giles, Department of Economics, University of Victoria (Supervisor)
Dr. Judith Clarke, Department of Economics, UVic (Member)

External Examiner:
Dr. Farouk Nathoo, Department of Mathematics & Statistics, UVic

Chair of Oral Examination:
Professor Andrew Newcombe, Faculty of Law, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

The crude oil, natural gas, and electricity markets are among the most widely traded and talked about commodity markets across the world. Over the past two decades each commodity has seen price volatility due to political, economic, social, and technological reasons. With that comes a significant amount of risk that both corporations and governments must account for to ensure expected cash flows and to minimize losses. This thesis analyzes the portfolio risk of the major US commodity hubs for crude oil, natural gas and electricity by applying Extreme Value Theory to historical daily prices returns between 2003 and 2013. The risk measures used to analyze risk are Value-at-Risk and Expected Shortfall, with these estimated by fitting the Generalized Pareto Distribution to the data using the peak-over-threshold method. We consider both the univariate and bivariate cases in order to determine the effects that price shocks within and across commodities will have in a mixed portfolio. The results show that electricity is the most volatile, and therefore most risky, commodity of the three markets considered for both positive and negative returns. In addition, we find that the univariate and bivariate results are statistically indistinguishable, leading to the conclusion that for the three markets analyzed during this period, price shocks in one commodity does not directly impact the volatility of another commodity's price.