

Summer 2014

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## Abstracts from the Colloquium: Summer 2014

Date	Speaker and Title	Time/Location
Thursday, Jun 12	Fatimah Alshehri and Najlaa Khudher, University of Dayton Decoding with the Golay and Extended Golay Codes	2:00 PM, SC 320
Monday, Jul 7	Jiaqi Li, University of Dayton Valuing corporate pension risk: Evidence from analyst earning forecasts	10:30 AM, SC 320
Tuesday, Jul 29	Elizabeth Nehring, University of Dayton The Effects of an Algebra and Functions Content Course for Pre-Service Middle School Teachers on Mathematical Conceptual Knowledge, Math Anxiety and Self-Efficacy	12:00 PM, SC 306
Tuesday, Jul 29	Richelle Zbinden, University of Dayton Do the results of the ACCUPLACER placement exam and Algebra 2 final grades influence one another?	12:30 PM, SC 306
Tuesday, Jul 29	Chris Lammlein, University of Dayton The Effect of PowerPoint Presentations on High School Precalculus Students' Academic Success	1:00 PM, SC 306
Wednesday, Jul 30	Brian Krilov, University of Dayton A Comparison of Day Ahead Price Forecasting in AEP Dayton Hub Using GARCH and ARMAX Modeling Techniques	4:00 PM, SC 320

### Decoding with the Golay and Extended Golay Codes

Fatimah Alshehri and Najlaa Khudher

**Abstract:** Coding theory is one of the most interesting and applied areas of mathematics and informatics. All real systems that work with digitally represented data, as CD players, TV, fax machines, internet, satellites, mobiles, require to use error correcting codes because all real channels are, to some extent, noisy. In this talk, we will discuss two special codes, namely the Golay code and the Extended-Golay code. We will also discuss decoding using these two codes. The extended Golay code, was in fact used in the Voyager spacecraft program which in the early 1980 brought us those marvelous close-up photographs of Jupiter and Saturn.

### Valuing corporate pension risk: Evidence from analyst earnings forecasts

Jiaqi Li

**Abstract:** Pension risk represents an important aspect of corporate risk, and it has become an imperative issue in light of the recent financial crisis. This study examines whether stock analysts – a group of sophisticated information intermediary in the financial market – are able to fully incorporate pension risk into their stock valuation. Using pension beta as a unique measure of pension risk (Jin, Merton, and Bodie, 2006), we find that analysts generally have lower valuation (P/E multiples) for firms with high pension risk. Furthermore, an improvement in pension information transparency has helped analysts appropriately understand pension risk effect. Finally, the recent crisis has heightened analysts'

attention on pension risk, and prompted analysts to lower their valuation more for firms with risky pension plans.

### **The Effects of an Algebra and Functions Content Course for Pre-Service Middle School Teachers on Mathematical Conceptual Knowledge, Math Anxiety and Self-Efficacy**

Elizabeth Nehring

**Abstract:** The purpose of this research was to study the effects of an algebra and function content course for pre-service middle school teachers on their mathematical content knowledge. Hypotheses were that students' conceptual content knowledge would increase while their math anxiety & level of self-efficacy would not. Fifteen students at the University of Dayton in the Math 215 course participated in this pre-test, post-test design study. In addition to a demographic survey the Mathematics Teaching Efficacy Belief Instrument (MTEBI) for inservice teachers developed by Enochs and Riggs (1995) as modified by Dr. Krakowski (2014) as well as the Aiken Revised Math Anxiety Scale were used. Students performed significantly higher on the post test than they did on the pretest. The t-tests were significant at  $< 0.001$  level.

### **Do the results of the ACCUPLACER placement exam and Algebra 2 final grades influence one another?**

Richelle Zbinden

**Abstract:** The ACCUPLACER college placement test is a common method for community colleges and other two-year institutions to place incoming students into developmentally appropriate classes. There is evidence that suggests if students heed the recommendations produced by their score on this test, they will succeed in that particular entry-level course. The purpose of this study is to determine if a similar correlation, or relationship, can be drawn regarding the scores from the arithmetic and elementary algebra portions of the ACCUPLACER test and success in a high school Algebra 2 course. The definition of success, for the purpose of this study, will be a 70% or higher.

### **The Effect of PowerPoint Presentations on High School Precalculus Students' Academic Success**

Chris Lammlein

**Abstract:** A primary goal for any teacher is to improve the quality of the learning experience for their students. The purpose of this study was to determine if the use of PowerPoint will lead to improved academic success. Experimental design was a quasi-experimental simple crossover with carryover in which each participant served as his or her own control. Data was recorded from students' post-test scores at the end of each of four chapter tests. Results from this study indicate no statistically significant difference between the use of PowerPoint versus "Chalk and Talk" to prepare for tests.

### **A Comparison of Day Ahead Price Forecasting in AEP Dayton Hub Using GARCH and ARMAX Modeling Techniques**

Brian Krilov

**Abstract:** The aim of this paper is to construct several modeling techniques for forecasting day ahead prices in the PJM RTO. Specifically, the two models studied to achieve this aim are an Autoregressive Moving Average with Exogenous Variables model (ARMAX) and the Generalized Autoregressive Conditional Heteroskedacity model (GARCH). Though previous studies have focused on specific markets within the PJM RTO and have done so with some success, this paper will focus entirely on AEP Dayton Hub's day ahead market. In this study, these approaches rendered very different outcomes, likely as a result of the characteristics of electricity prices. The ARMAX model, though successful in producing

similar out-of-sample results as the GARCH model, was ultimately unreliable because of the confidence intervals associated with the model's predictions. The GARCH model on the other hand passed the appropriate diagnostic checks with much narrower confidence intervals. The following paper summarizes both previous efforts made on this topic and the collaborative effort put forth in recent months to reflect these efforts. The final section of the paper will offer conclusions and further recommendations for improving the accuracy of these models.