Sabbatical Report of Dr. Edward J. Sullivan

During my 2009 Fall semester sabbatical, I engaged in three research projects. First, I was able to successfully revise my paper "A.D. Roy: The Forgotten Father of Portfolio Theory," for publication in the peer-reviewed *Research in the History of Economic Thought and Methodology*. My paper is currently scheduled to appear in the 2011/Volume 29-A issue of the journal. Second, I prepared grounding research on Bruno de Finetti, a mathematician who made some early contributions to the development of portfolio theory. Third, I was able to begin converting my student-faculty research project, "Fitting Queuing Lines Models with Poisson Arrival Processes and Exponential Service Time Distributions**"** from an academic presentation into a case study. A brief description of each project is provided below.

In 1952, Harry Markowitz published a ground-breaking paper on portfolio selection. In that article, he proposes that optimal portfolios could be constructed using expected return and the variance of the return. About three months later, A. D. Roy published a paper that argues for portfolio selection also using the mean-variance criterion. In essence, these economists developed the same theory of portfolio selection at the same point in time, independently of each other. Yet, in 1990, Harry Markowitz was awarded the Nobel Prize in Economics for his development of portfolio theory, while Roy received no such honor. In addition to uncovering new biographical information, in my paper, "A.D. Roy: The Forgotten Father of Portfolio Theory," I explore the contributions of Roy in detail and compare them to the Markowitz analysis. Further, an argument is made that Roy's curious inclusion of the Safety First Principle as part of his methodology for portfolio selection is attributable, at least in part, to his traumatic wartime experience. In an effort to avoid disaster in an "uncertain and ruthless world," Roy's Safety First constraint leads to significant differences from Markowitz's analysis. Nonetheless, both economists deserve equal recognition for developing the mean-variance criterion that established portfolio theory as a major field of study in financial economics.

While researching the Roy paper, I became intrigued with the problem of assigning subjective probabilities to uncertain outcomes – an essential requirement in portfolio theory. In my readings on Roy, I found repeated references to an Italian mathematician named Bruno de Finetti (1906-85), who made some important contributions to economic theory and the portfolio selection problem. In particular, de Finetti urged a Bayesian approach to probability formation at a time when it was downplayed by economists in the 1930s and 1940s. Further, he utilized a mean-variance approach to decision making under uncertainty *a decade before* the work of Roy and Nobel laureate Harry Markowitz. During my sabbatical, I was able to extend my literature search on de Finetti's work.

My student-faculty research project brought my scholarship home. Located on the campus of Lebanon Valley College, Cup O' Joe was a café that served over 5,000 customers per month. Besides offering coffee, lattes, and espressos, Cup O' Joe served a variety of other beverages, snacks, and sandwiches. In this case study, queuing line models are fitted for this business using survey data. Using a Poisson arrival process and an exponential distribution to describe service time, the operating characteristics for one

and two-channel systems are estimated. Further, an economic analysis is performed to determine the more efficient system. While the two-channel system does reduce the waiting time significantly, my student Lauren Throne and I find that, economically, the one-channel system is more efficient. Soon to be in case study form, I am revising this piece for publication.

Please see the attached supporting documents.