BOSTON COLLEGE
Department of Economics

EC 370.01: Sports Econometrics (Fall 2014)
253 O’Neill Library: T Th (12 – 1:15)

Christopher Maxwell       Maloney Hall, 337
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http://www.cmaxxsports.com      x2-8058

Course Description: This applied economics course explores various aspects of the economics of sports and sports leagues, with a predominant focus on empirical analysis. The course is data-driven and built around a series of empirical analyses. Those analyses address a wide variety of sport-related topics, perhaps including:

- forecasting team performance,
- the efficiency of wagering markets,
- the drivers of home field advantage in sports,
- the business and economics of professional team sports,
- measuring parity in sports leagues,
- the importance of population in driving competitive imbalance,
- the efficacy of leagues’ competitive balance initiatives,
- peer effects in team performance,
- the relationship between performance and player compensation,
- understanding the drivers of ticket prices,
- valuing draft picks,
- and so forth.

This is not a sports history or trivia class.

Prerequisites: Intermediate Microeconomics (EC201 or EC203) and Econometrics (EC228 and/or EC327). Students are expected to know how to run simple econometric models (OLS) and to be comfortable with interpreting regression results.

This course will make extensive use of both Excel and Stata:

- You should have worked with Stata in your Econometrics course. At the start of the semester, we will review how to access and run Stata through BC’s apps server. You may prefer to use a different statistical package, such as SPSS or SAS, to do your empirical work. That’s fine, as the languages are fairly interchangeable.

- This course also makes extensive use of Excel. You should not take this course if you do not have strong Excel skills. To brush up on your Excel skills, you might look at the materials assembled by the ITS department: http://www.bc.edu/offices/its/tandc/training/course_materials.html.

Unfortunately, the features offered by Excel differ somewhat across platforms and over time. For this course, you may need to install the Analysis ToolPak and the Solver Add-in if your
Excel does not already offer those features. Let me know if you need help with these installations.

After a review of Simple Linear Regression (SLR) and Multiple Linear Regression (MLR) models, we will turn to some of the empirical methods (perhaps new to you) featured in this course. Topics will include:

- Dummy (independent) variables and functional forms (percentile dummies, polynomials and splines)
- Binary dependent variables and Maximum Likelihood Estimation (MLE) (eg logit, probit models); models with ordered dependent variables (eg ordered logit and probit) …and perhaps multinomial logit models
- Non-linear (NL) econometric models and the importance of The Residual

The emphasis will be on getting the empirical analysis right… and not gratuitously on just being sophisticated or complicated for its own sake. Wherever possible, we’ll illustrate each method with multiple applications working with sports-related data… often with examples in both Excel and Stata.

Texts:


BlackboardVista: In previous semesters, all handouts, exercises, exercise answers, data, etc. were eventually posted to the course’s BlackboardVista site. However, Boston College has now migrated away from BBVista to a new course management system called Canvas. That migration has not gone smoothly for my courses. And so while I can guarantee that materials will eventually be posted somewhere in some manner, said location and manner is yet to be determined.

Accommodations: If you are a student with a documented disability seeking reasonable accommodations in this course, please contact Kathy Duggan (x2-8093; dugganka@bc.edu) at the Connors Family Learning Center regarding learning disabilities and ADHD, or Paulette Durrett, (x2-3470; paulette.durrett@bc.edu) in the Disability Services Office regarding all other types of disabilities, including temporary disabilities. Advance notice and appropriate documentation are required for accommodations.

Academic Integrity: You will be held to Boston College’s standards of academic integrity. If you have any questions as to what that means, please go to [http://www.bc.edu/offices/stserv/academic/integrity.html](http://www.bc.edu/offices/stserv/academic/integrity.html).
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Course Structure: There are five components to the course; they are (%s of course grade are in parentheses):

1. Mid-Term Exam (33% total)
2. Optional Final Exam (details below)
3. Five Exercises (44% total; 12% for Ex. #1 and 8% each for the four others)
4. Research Paper (18%)
5. Tuesday Topics/Participation (5%)

1. Mid-Term Exam (33% total): This in-class exam is currently scheduled for:
   - Thursday, October 23rd
   The exam date may slip if we are behind schedule. Exam grades are curved.

Optional Final Exam: If you take the Optional Final Exam (which will cover the entire semester) your Final Exam grade counts for 22% of the course total, and your Mid Term grade will be worth 11%. You must commit to taking the Final Exam at the time you pick up the exam (conditional course grades, assuming that you are not taking the Final Exam, will be posted on BlackboardVista by the end of the day, Monday, Dec 15th.
   - The Final Exam is scheduled for: Friday, December 19th at 12:30 PM.
   Only in extraordinarily compelling situations will I even consider the possibility of a “make up” exam. It is your responsibility to plan your schedule accordingly (I note that all of the exam dates have been set).

2. Exercises: Exercises count towards 44% of your course grade (Ex #1, the Sports League Challenge, runs for most of the semester and counts towards 12% of your course grade; the four other exercises are worth 8% each). If we do not get through as many exercises as anticipated, the course grade weights may be changed. Final grades on exercises are curved.

   In many cases, there are faster and slower ways to complete the exercises. Let me know if progress is painfully slow, and I’ll be happy to make suggestions to help speed things up. No late work accepted.

   These will often (but not always) be team assignments (usually with two students per team) lasting about two weeks. I will assign the teams, which will change from exercise to exercise. Here’s the list of current exercise candidates (and proposed schedules):

   a. The Sports League Challenge (mid-Sept – mid Nov)
      The first SLC (0_SamePops) is pre-season and does not count towards your grade. The remaining five SLCs last 10 seasons each, with all seasons run at noon on the given day:
      Here’s the anticipated schedule:
      - 0_SamePops: Th 9/11 – T 9/16: (pre-season; all teams at pop=4.7M)
      - 1_NBAPops: W 9/17 – F 9/26
      - 2_RevShare: W 10/1 – F 10/10
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b. **The Pythagorean Theorem: Make it Better** (distributed: 9/9; due: 9/25)
   MLB, NBA, NFL, NHL and European football/soccer

c. **Umpire/Referee Bias and Home Field Advantage** (distributed: 9/30; due 10/16)
   MLB (balls and strikes) and European football/soccer (fouls, cards, and stoppage time)

d. **Forecasting Performance** (distributed: 10/21; due 11/6)
   NCAA football: Forecasting wk 11 outcomes

e. **Wagering Market Efficiency** (distributed: 11/11; due 11/25)
   European football/soccer

**Exercise Quizzes:** For team exercises, there may be a short quiz after each exercise to make sure that all team members actively participated in the assignment. If they happen, those quizzes will count towards 40% of each exercise score.

3. **Research Paper:** The research paper is an empirical project and counts towards 18% of your course grade. This project will kick off after the first Mid Term. This is a team assignment (I will assign teams, which will likely have two team members).

There are two phases to this assignment. In the first phase, you will review and replicate a published empirical analysis of your choosing (the only restriction is that the published paper must be related to the material in this course). In the second phase, you will improve on that analysis in some way (by adding more data, changing the specification of the model, changing the estimation technique, and so forth):

**Replication** of a published empirical analysis

1. The published results: the published empirical results of interest (including the actual results to be replicated)
2. Your replication: your replication of those published results (present your results and compare them to the originals).

b. **Your Turn!** to improve upon that analysis.

1. How you made it better: your improvement on the published model/analysis.
2. Papers are due @ the final class (Dec 9th); if time permits, we will have in-class presentations on the 9th.

Papers should be concise and to the point; shorter is always better - please do not make them longer than necessary. I will say more about the format of the deliverables when teams are

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1 If you have any questions about relevance, just ask. The published paper that you are replicating must be published in an academic journal such as the *Journal of Sports Economics* or the *Journal of Quantitative Analysis in Sports*. If you have a particular paper in mind and are wondering whether it meets this criterion, just ask.
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assigned. I assume that most of you will successfully replicate the published empirical analysis, and so your grade on the research paper will depend more on *Your Turn* (how well you improve upon the published analysis).

*Empirical work is slow going. Be sure to leave yourself enough time to complete the assignment to your satisfaction.*

4. **Tuesday Topics**: These will typically take place at the start of class every Tuesday (if we need more slots, we’ll add some Thursday presentations). We’ll devote the first 10 minutes or so of class time to a discussion of a current relevant issue. Given the class size, the discussion will be led by a team of three students (team assignments will be distributed once the class list is finalized). The team leading the discussion may want to prepare a brief set of *talking points* to guide and focus the discussion. Presentations should include some of *your own* empirical analysis of the topic. To provide a sense of how this might work, I’ll do the first presentation. Presentations will be graded, and along with participation, count towards 5% of your course grade.

**Proposed Calendar**: The schedule will likely evolve as we work through the semester, but here’s a sense of the calendar as I see it at the start of the semester (#classes are in [ ]’s):

1. 9/2: Introduction

   **Part I: Econometrics**

2. 9/4-9/16 [3 classes]: Intro to the *Sports League Challenge*; Review of Simple Linear Regression (SLR) analysis (Note: BC has cancelled the 9/11 class (*Mass for the Holy Spirit*))
   a. The Pythagorean Theorem (MLB)
   b. Ticket prices (NFL)
   c. Point spreads (NCAA football and NFL)
3. 9/18-9/23 [2 classes]: Review of Multiple Linear Regression (MLR) analysis
   a. more of The Pythagorean Theorem (MLB)
   b. more of Ticket prices (NFL)
   c. Pay-Performance (NBA)
4. 9/25-9/30 [2 classes]: Dummy variables and functional forms (percentile dummies, polynomials and splines)
   a. even more of The Pythagorean Theorem (MLB)
   b. even more of Ticket prices (NFL)
   c. The Hot Hand (NBA)
5. 10/2-10/9 [3 classes]: Binary dependent variables and Maximum Likelihood Estimation (MLE)
   a. more of The Hot Hand (NBA)
b. Icing the Kicker (NFL)
c. Win Expectancy and Leverage (MLB)

6. 10/16-10/21 [2 classes]: Non-linear (NL) econometric models and *The Residual*
a. Draft pick valuation (NFL)
b. once again, The Pythagorean Theorem (MLB)
c. The Average Fan Model (MLB)

7. **10/23: Mid Term Exam** – SLR, MLR, MLE and NL models

**Part II: Selected Topics**

8. 10/28-11/4 [3 classes]: Ratings models
   a. Ratings Percentage Index (RPI) (NCAA basketball)
   b. Retrodictive and predictive models (NCAA football)
   c. Ordered logit and probit models (European Football)

9. 11/6-11/13 [3 classes]: Wagering market efficiency
   a. Point spreads and moneyline odds (NFL)
   b. Pari-mutuel odds (horse racing)
   c. More odds (European Football)

10. 11/18: Peer effects in performance
    a. Estimating production complementarities (NBA)

11. 11/20-12/4 [3 classes]: Competitive balance
    a. Theory and evidence (MLB, NBA, NFL, NHL and European football/soccer)

12. 12/9: Research Paper presentations

**Additional Resources**

- Rodney Fort: [https://sites.google.com/site/rodswebpages/codes](https://sites.google.com/site/rodswebpages/codes)
- John Vrooman: [http://www.vanderbilt.edu/econ/faculty/Vrooman/sports.htm](http://www.vanderbilt.edu/econ/faculty/Vrooman/sports.htm)
- Multi-author blog: [www.thesportseconomist.com](http://www.thesportseconomist.com)
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- SportsBiz: http://thesportsbizblog.blogspot.com/
- Sports Law: http://sports-law.blogspot.com/
- and http://www.cmaxxsports.com/misc/misc.html (you’ll find useful web pages devoted to MLB, the NBA, the NCAA, the NFL, and European football/soccer… and more)

and some books: