
RESEARCH THEORIES IN MANAGEMENT SCIENCE III (SPECIFIC TRACK)

Professor: **ALVARO ARENAS**

E-mail: arenas@faculty.ie.edu

COURSE OVERVIEW

According to the Financial Times, the ability to understand and analyze data is among the most wanted skills in MBA and Master students. It is also, among the skills most difficult to find by employers.

This course will enable students to develop the skills to transform data into knowledge to make better decisions in business, policy or personal situations. Evidence based decision-making is a process for making decisions that is grounded in the best available data analysis. It crucially depends on the ability to infer causal relations from data. This courses provides the core tools for such analyses.

Whether students anticipate producing or consuming data analytics, the course provides the concepts to identify problems and a framework to solve them. That framework is Econometrics: modern empirical methods used by economists.

Specifically we will develop the foundations of Econometrics and regression analysis. We offer some theory, but mostly practical examples. Our main goal is to go beyond correlations. To implement a whole toolkit aimed at providing credible answers to difficult causality questions. This toolkit will be extremely useful in your career. Big data and technology generate tons of new data. It is essential to have the skills to avoid pitfalls in data analysis and make solid decisions.

Moreover, Econometrics is fun and great conversation for cocktail parties or gatherings with friends. See for example the best-seller book *Freakonomics* and its associated movie and blog in the New York Times.

PRE-REQUISITES

The course has been designed for an audience not familiarized with Econometrics. **THUS, THERE ARE NO PRE-REQUISITES**, other than the willingness to work hard and learn. The emphasis will be on developing a basic “working knowledge” of the main concepts and techniques commonly used in facts-driven decision making.

LEARNING OBJECTIVES

After taking this course the students will understand the difference between correlation and causality. They will understand why an ordinary regression may be biased analysis for decision making. Then they will be equipped with the core tools for correct causal analysis.

Along the way the students will also master the art and science of presenting data analysis.

EMPLOYABILITY

This course will help students targeting any professional career. Decision making is more successful when it is based on data. But this requires to understand when the data say something correct about the underlying causal mechanisms and when these data just reflect a spurious correlation.

For example, the correct answer to all of the following questions involves a precise analysis of causality: Are the changes in the sales of a company caused by the new marketing campaign or by the business cycle? Should a political candidate in an election campaign prioritize debates with other candidates or meetings with voters? Are the changes in the demand for mortgages faced by a financial institution due to badly designed products or to price-competition from FinTech rivals? What cost-cutting measures are more efficient in raising revenue?

Corporations, consulting companies, policy institutions, financial firms and households use the tools studied in this course. For example, firms from Silicon Valley and Wall Street are the main employers of workers with econometric skills to analyze data. Quantitative skills are increasing in importance!

READINGS

We will rely on articles posted on Campus Online and teaching slides. For those interested in a textbook, we are partial to Angrist & Pischke's "Mastering Metrics" and Wooldridge's "Introductory Econometrics". These books are available in the library.

Also a very useful reading is Roberts, Michael R., and Toni M. Whited, 2013, "Endogeneity in Empirical Corporate Finance," *Handbook of Economics of Finance*, Volume 2, Part A, 493-572. You may use the SSRN version that is free.

SOFTWARE

We will use EXCEL and STATA. We will learn to use Stata, which is a straightforward but powerful statistical software package. This is a valuable tool to go well beyond Excel in your analysis of data. Stata can be accessed for free from IE Cloud Apps: <https://cloudapps.ie.edu/vpn/index.html>

You will need to connect with your IE user and password. Guidelines: <https://it.ie.edu/services/detail/Cloudapps>

PROGRAM

SESSION 1

Causality vs. Correlation

Here we will discuss why correlation is not causation. What is each concept really capturing? We will discuss cases when the two concepts are used as synonyms to mislead.

SESSION 2

Presenting economic data

We will study how to present and communicate data and empirical analysis. For example, ways to avoid ugly charts and graphs. We will discuss the do's and don'ts of PowerPoint presentations.

SESSION 3

Regression Basics: Why and How?

We will cover the basics of regression analysis (OLS, Ordinary Least Squares) and then some useful advanced topics. We will analyze how linear tools can capture non-linearities. Why dummy variables are not dummy at all...

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SESSION 6

The pitfalls of regression analysis

We will analyze the main reasons why OLS can be biased. That is, wrong on average. We will study many examples. These sessions will illustrate why causality and correlation differ and when OLS is causal and when it is not.

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SESSION 8

Instrumental Variables

We will discuss this useful technique to infer causal relations. As usual, we will stress examples from Management, Economics and Finance.

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SESSION 12

Regression Discontinuity

We will analyze this other causality technique and see applications.

SESSION 13

Differences-in-Differences

This is one of the key tools to think about causality. It mixes graphs with regression analysis. We will cover it in depth with the help of numerous examples.

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SESSION 15

Recap and final presentations

We will devote the last session to recap and presentation of the final projects

EVALUATION CRITERIA

Course grades will be determined by a weighted average: a final project (40%), homework or assignments (40%), and class participation (20%).

Criteria	Percentage	Comments
Individual Presentation	40 %	

Individual Work	40 %	
Class Participation	20 %	

