ENDOGENEITY IN MANAGEMENT RESEARCH: PROBLEMS AND SOLUTIONS

Doctoral seminar
Course syllabus[1]

Instructor: John Antonakis john.antonakis@unil.ch
Credits: 3 credits ECTS
Class time: 29 October from 0900-1300 & 1400-1800
30 October from 0800-1300 & 1400-1800 (note earlier start)
Meeting: By appointment
Language: English

Objective: The development of advanced statistical tools and procedures and software programs has made it easy to estimate complex structural equation and regression models. Unfortunately, though, many management researchers using these tools use them incorrectly and report endogeneity-plagued estimates (i.e., estimates that are confounded). The purpose of this seminar is to familiarize the students with the problem of endogeneity and how to deal with it. We will examine this problem from various perspectives with tools commonly used by management researchers to ensure that studies are correctly designed and estimates that are reported are endogeneity free and unconfounded. Topics that we will focus on include measurement errors, common methods variance, 2SLS, mediation, SEM, and panel data (fixed vs. random effects).

Readings: There is only one pre-reading (one article) that is compulsory. Post-workshop readings have to be done after the class is finished (a quick scan of these readings prior to the class being held will be useful).

Evaluation: The final student individual mark[2] will consist of class participation (10%), and a project broken up in two parts: critique (70%) and proposal (20%). Note: Students who do not submit the project on the given deadline given receive a zero for the project. The assessment must be submitted in English. Students who fail the course will redo the assessment which will count 100% of the final resit mark. The project must be sent to me by e-mail by Friday 18 December 2015 at 15h00.

Project: Note: the project brief will make more sense to you after you have partaken in the seminar. Please ensure to send your project in **one** file (and not separate files), and to follow these formatting guidelines: Text is double-spaced, using Times New Roman font (12 points) with default margins (2.5cm all around). Include a cover page (not counted in the page requirement) indicating your name. The project is in divided into two parts:

[1] I reserve the right to change the scheme of work and course content, depending on time constraints or other unforeseen circumstances, with the intent of maximizing student learning outcomes.

[2] The total mark will be rounded. The rounding procedure, after the decimal point, is as follows: (a) marks between .25 and .74 are rounded to .50; (b) marks between .01 to .24 are rounded down to .00 (of the next whole number); (c) marks over .75 are rounded up to .00 (of the next whole number). Also, students can only resit the final exam if they failed the course; they may not retake the exam merely to improve their mark.

Part 1 of the project: You are required to write a maximum critique of 2 pages per article critiqued. The articles to be critiqued include the following (thus, this part of the project is a maximum of 6 critiques * 2 pages = 12 double-spaced pages):

1. Palmatier, R. W., Jarvis, C. B., Bechkoff, J. R., & Kardes, F. R. (2009). The Role of Customer Gratitude in Relationship Marketing. Journal of Marketing, 73(5), 1-18.

2. Messersmith, J. G., Patel, P. C., & Lepak, D. P. (2011). Unlocking the Black Box: Exploring the Link Between High-Performance Work Systems and Performance. Journal of Applied Psychology, 96(6), 1105-1118.

3. Wiengarten, F., Pagell, M., Ahmed, M. U., & Gimenez, C. 2014. Do a country's logistical capabilities moderate the external integration performance relationship? Journal of Operations Management, 32(1–2): 51-63.

4. Henri, J.-F. & Journeault, M. 2010. Eco-control: The influence of management control systems on environmental and economic performance. Accounting, Organizations and Society, 35(1): 63-80.

5. Priesemuth, M., Schminke, M., Ambrose, M. L., & Folger, R. (2014). Abusive supervision climate: A multiple-mediation model of its impact on group outcomes. Academy of Management Journal, 57(5), 1513-1534.

6. Ferraro, R., Escalas, J. E., & Bettman, J. R. (2011). Our possessions, our selves: Domains of self-worth and the possession-self link. Journal of Consumer Psychology, 21(2), 169-177.

Please (a) follow the formatting guidelines, (b) clearly list (number) each of the pitfalls and each of the solutions, and (c) submit the critiques in the order in which I have listed them in the syllabus. For each paper critiqued:

1. Explain the basic model that was estimated by the authors (20% of mark)
2. Discuss critical errors that the authors made (40% of mark)
3. Explain how the model could be estimated to ensure correct identification of the causal effect (40% of mark).

The following paper is essential background reading for the critiques (you are required to read this paper *after* the seminar is completed):

7. Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. The Leadership Quarterly, 21(6). 1086-1120.

Pull out a few of the papers that Antonakis et al. (2010) coded, read them, and see what critical errors we found. Note: There may be several problems and issues with each of the papers. Please focus on identifying the major ones. Do not spend time talking about very minor ones like:

- they did not use a robust variance estimator
- they did not check for heteroskedasticity
- they did not rely on the chi-square test of fit in the SEM

- they used CFI or RMSEA (or the like) to evaluate model fit
- they did not correct for measurement error
- (in the case of endogenous regressors) recommend that the researchers should have used "instruments" (say rather which instruments they should have used)
- they could have used a Monte Carlo (to do what?)

Comments of the sort listed above, even if correct, will not give you any marks (so do not even bother making them). Look for issues that render estimates inconsistent. If you give several substantive (i.e., about 5-6) examples of problems and tangible ways to deal with them you will receive full marks for the paper critique. We will give you progressively fewer marks as the substantive content of the critique is reduced. Note, too, that describing the paper is only 20% of the mark, and the rest is on the critical errors and solutions; so please do not spend too much space on describing the basic model that was estimated. Please ensure you put the meat where the meat is needed.

To get an idea of what "substantive" means, read the following paper, which on first reading may look like a very strong paper, particularly because it was published in a top journal:

8. Christian, M. S., & Ellis, A. P. J. (2011). Examining the effects of sleep deprivation on workplace deviance: A self-regulatory perspective. Academy of Management Journal, 54(5), 913-934.

However, here are some important issues with the paper that could have been critiqued:

Study 1

1. The sample self-selected, particularly to work shift; thus, there is a potential grouping variable (which is endogenous) and which is not controlled for using some sort of IV procedure.
2. The data are all self-reported data, which creates a problem of common methods variance (in addition to the untrustable data on the dependent variable). It would have been better to split the data-gathering and having bosses or peers report on the DVs.
3. Reverse causality is possible in the sense that those who are irritable and aggressive may sleep less; the way to deal with this is to randomize to sleep deprivation condition or to find instruments (e.g., age, personality might predict sleep).
4. The estimator is not an IV-estimator; it was estimated with OLS (and to the extent that the mediator is endogenous, failure to use an IV estimator will engender inconsistent estimates). Thus, they should have used 2SLS or ML (with disturbances correlated).

Study 2

5. There is a confound in the manipulation (i.e., sleep deprivation with putting people in a group all night long—being in a group, when in a difficult situation, could have made grumpy)—this confound induces endogeneity. Thus, the control group should have had this manipulation too (or the experimental group should not have had it).
6. The regressors are endogenous; thus, their effects on outcome must be tested with an IV estimator (as per (4) above).
7. Related to the above, the problem with testing the whole model with an IV estimator is that it is impossible to do because the system of equations is under-identified (i.e., DF = -1); the model is thus not causally identified. Thus, they should have included more exogenous variables as instruments or manipulated a second variable (crossing it with sleep deprivation).

8. There are omitted control variables (e.g., sex, age, etc.) that are not included in the regression model. The controls are essential because of the small sample size it is possible that randomization to treatment (across sex, age, personality, what have you) is not perfect.

So, the above are examples of "meaty" comments. Thus, please ensure to make tangible and context-specific recommendations that are of substance.

Part 2 of the project: You are required to write a maximum of 2 pages, describing a tangible quantitative research project that you intend to undertake. Identify what potential threats to endogeneity there are and how you will deal with them via the design of the study and via the estimation method.

Important: For all work you do, please submit original work. Please cite correctly where relevant and do not plagiarize; I have failed students in the past for plagiarism (and have a good nose for it) so please do not even let it cross your mind to use someone else's work without correct attribution.

Scheme of work

Thursday 29 October 2015
Morning Topic:
Endogeneity: Introduction, measurement error.

Afternoon Topic:
2SLS and Mediation

Required pre-reading:
9. Sturm, R. E., & Antonakis, J. (2015). Interpersonal Power: A Review, Critique, and Research Agenda. Journal of Management, 41(1), 136-163.

Require post-workshop readings
10. Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2014). Causality and endogeneity: Problems and solutions. In D. V. Day (Ed.), The Oxford Handbook of Leadership and Organizations (pp. 93-117). New York: Oxford University Press.

11. Bascle, G. (2008). Controlling for endogeneity with instrumental variables in strategic management research. Strategic Organization, 6(3), 285-327.

12. Duncan, G. J., Magnusson, K. A., & Ludwig, J. (2004). The Endogeneity Problem in Developmental Studies. Research in Human Development, 1(1&2), 59-80.

13. Hamilton, B. H., & Nickerson, J. A. (2003). Correcting for endogeneity in strategic management research. Strategic Organization, 1(1), 51-78.

14. Larcker, D. F., & Rusticus, T. O. (2010). On the use of instrumental variables in accounting research. Journal of Accounting and Economics, 49(3), 186-205.

15. Shaver, J. M. (2005). Testing for mediating variables in management research: Concerns, implications, and alternative strategies. Journal of Management, 31(3), 330-353.

Friday 30 October 2015
Morning Topic:
SEM: maximum likelihood and 2sls estimation.

Afternoon Topic:
Panel data (random vs. fixed)

Required pre-reading:
None.

Required post-workshop readings:
16. Bollen, K. A. (1996). An alternative two stage least squares (2SLS) estimator for latent variable equations. Psychometrika, 61, 109-121.

17. Bollen, K. A., & Brand, J. E. (2010). A General Panel Model with Random and Fixed Effects: A Structural Equations Approach. Social Forces, 89(1), 1-34.

18. Halaby, C. N. (2004). Panel models in sociological research: Theory into practice. Annual Review of Sociology, 30, 507-544.

19. MacCallum, R. C., & Austin, J. T. (2000). Applications of Structural Equation Modeling in Psychological Research. Annual Review of Psychology, 51(1), 201-226.

20. Tomarken, A. J., & Waller, N. G. (2005). Structural Equation Modeling: Strengths, Limitations, and Misconceptions. Annual Review of Clinical Psychology, 1(1), 31-65.

Recommended books:
The below is highly recommended:

Bollen, K. A. (1989). Structural equations with latent variables. New York: Wiley.

The next is more basic, but a good reference guide (release is scheduled for Nov. 2015; else buy the previous edition):

Kline, R. B. (2015). Principles and practice of structural equation modeling (4th ed.). New York: Guilford Press.

Readings and datasets
These will be made available, two weeks before the course begins, to students who have Registered for the course.