SPS5062 Quantitative Data Analysis 2

2024-2025 Academic Year
Semester 2
Course Guide

COURSE CONVENER

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Office Hours: Tuesdays, 4pm-5pm in Adam Smiith Building 814 or by appointment.

Please notify the course convener in person or by email if you plan to attend office hours on any given day.

MEETING TIMES and LOCATIONS

Lectures are held Tuesday 12pm (noon) – 2pm at JAMES WATT STH: 355. Check My Campus for updates.

Labs are held on Tuesday 2pm-4pm as follows:

14 Jan   JMS: 407 TEAL RM
21 Jan   ST ANDREWS: 202 TEAL RM
28 Jan   JMS: 407 TEAL RM
04 Feb ST ANDREWS: 202 TEAL RM
11 Feb JMS: 407 REAL RM
18 Feb JMS: 407 TEAL RM
25 Feb JMS: 707 TEAL RM
04 Mar JMS: 707 TEAL RM
11 Mar JMS: 707 TEAL RM
18 Mar JMS: 707 TEAL RM
25 Mar JMS: 707 TEAL RM

Check My Campus for updates.

Attendance and participation at all lectures and seminars is expected.

COURSE DESCRIPTION

This course examines tools for analysing quantitative data beyond the basic linear model, as covered in SPS5033 Quantitative Data Analysis. Students will gain expertise in managing common problems in data analysis, such as violated assumptions and missing data, and complex data formats, such as panel data. Topics will include binomial, multinomial, and count data; generalised linear models; fixed and random effects in panel data; and simultaneous equation models (such as instrumental variables estimators).

REQUIREMENTS OF ENTRY

Completion of SPS5033 Quantitative Data Analysis or equivalent

COURSE AIMS

1. Students will strengthen and expand their facility in identifying appropriate models for complex quantitative data.
2. Students will strengthen and expand their understanding of the assumptions of advanced regression models.
3. Students will strengthen and expand their facility in estimating advanced regression models.
4. Students will strengthen and expand their ability to evaluate regression results, as well as diagnose and correct potential problems.
5. Students will strengthen and expand their ability to write about advanced regression analysis.
6. Students will strengthen and expand their ability to make effective presentations about advanced regression analysis.
7. Students will strengthen and expand their ability to utilize R statistical packages for advanced regression analysis.

INTENDED LEARNING OUTCOMES

1. Identify appropriate models for complex quantitative data and state the assumptions of these models;
2. Estimate, evaluate, write about, and present about advanced regression models for binomial, multinomial, proportional, and count data; generalised linear models; fixed and random effects in panel data; and multiple equation models (such as instrumental variables estimators); and
3. Use R statistical packages correctly to estimate and evaluate advanced regression models.

COMPUTER REQUIREMENTS

This course will work with the R statistical software on the computer, which can be downloaded here: https://www.r-project.org/.

The course assumes competence in basic statistics and the use of R. Please notify the course convener of any problems or concerns with these requirements.

ASSESSMENT

Students will complete **three team problem sets** related to the topics of the course for 40% of the summative assessment due at 12pm (noon) on **4 February, 25 February**, and **18 March**, respectively. Normally, the work on these problems will be undertaken in teams assigned during lab sessions. The sets will require students to execute statistical models using R and provide concise, written interpretations of the results. Each problem set will be weighted equally (13.33% each). Teams should submit assignments by email to the course convener.

Students will conduct an **individual quantitative data analysis project** related to one of the topics addressed in the course for 60% of the summative assessment due at 12pm (noon) on **21 April**. They will choose a dataset (which **cannot** be the American National Election Study – ANES), research question, dependent variable, and independent variables and apply the skills acquired in the course

to the data in order to answer the research question. The students will produce a paper of 3,000 words (excluding references and R code), in which they focus on the statistical analysis and present the results. Each paper must contain an advanced regression model and diagnostic analysis. Individual papers should be submitted through Moodle.

Each student will have **10 minutes** to present their research and analysis related to the individual quantitate analysis in class on **25 March**. The course convener will provide formative feedback to each student.

COURSE SCHEDULE

Unless otherwise indicated, all readings come from Julian J. Faraway, *Extending the Linear Model with R*, Second Edition (Boca Raton: CRC Press, 2016).

14 Jan – <u>Week 01: Properties of Estimators / Regression Basics</u>
- Faraway (2016), Chapter 1

21 Jan – <u>Week 02: Binary Regression Models</u>
- Faraway (2016), Chapter 2, 3, and 4

28 Jan – <u>Week 03: Count Regression Models</u>
- Faraway (2016), Chapter 5

04 Feb – <u>Week 04: Multinomial Regression Models</u>
- Faraway (2016), Chapter 7
- **First Team Assignment Due at 12pm (noon)**

11 Feb – <u>Week 05: Generalised Linear Models</u>
- Faraway (2016), Chapters 8 and 9

18 Feb – <u>Week 06: Random Effects</u>
- Faraway (2016), Chapter 10

25 Feb – <u>Week 07: Longitudinal Regression Models</u>
- Faraway (2016), Chapter 11
- **Second Team Assignment Due at 12pm (noon)**

04 Mar – <u>Week 08: Simultaneous Equation Models</u>
- Jerry A. Hausman, "Specification and Estimation of Simultaneous Equation Models," *Handbook of Econometrics* 1 (1983): 391–448.

11 Mar – <u>Week 09: Bayesian Models</u>
- Faraway (2016), Chapter 12

18 Mar – <u>Week 10: Missing Data Models</u>
- Amanda N. Baraldi and Craig K. Enders, "An introduction to modern missing data analyses," *Journal of School Psychology* 48, 1 (2010): 5–37.
- **Third Team Assignment Due at 12pm (noon)**

25 Mar – <u>Week 11: Student presentations</u>
- Each student has 10 minutes to present their project.

21 Apr – Week 12: Student submit final individual project
- Submission due through Moodle at 12pm (noon) on Tuesday 16 April.

PENALTIES

Word limits for all assessed work include footnotes/endnotes but not bibliography (appendices, where applicable, are also excluded). Students should clearly state the word count on the cover sheet of their assessed work. Students who submit an essay which is significantly under/over the word limit will be penalised: 1 point in the 22 scale for being over/under the word limit by 10-15 per cent, 2 points for 15-20 per cent, 3 points for 20-25 per cent, 4 points for 25-30 per cent, and so on.

Failure, without good reason, to submit your essay on time will result in the loss of 2 points per working day (so, not including weekends) up to five working days. After five working days, failure to submit the essay will result in the award of an 'H' grade (0) for the essay and may result in the refusal of credit for the course. YOU MUST SUBMIT AN ESSAY IF YOU WANT TO GET CREDIT FOR THIS COURSE. For more information on the university-wide penalty system, visit https://www.gla.ac.uk/media/Media_124293_smxx.pdf.

Please read the criteria for written and oral assessment (below). The Moodle page should be consulted for further information about submission of assessed/non-assessed work, Turnitin, marking conventions, penalties, extensions, and other matters. Exchange or disability students might have special assessment arrangements. Please contact the lecturer.

EXEMPTION FROM LATE PENALTIES

Deadlines for written assignments are strictly enforced. The hand-in date specified for your assessments is the final date that you may submit your work without receiving a penalty (unless you have been granted an extension). However, the option to submit your work earlier is available to you with the online Turnitin submission portal and the plagiarism checking portal being open in advance. You are encouraged to make use of this and plan your work schedule carefully, to avoid last minute assessment congestion.

In exceptional circumstances, students may need to apply to defer their coursework deadline (or to have late penalties lifted). Note, however, that extensions, even short ones, are NOT an entitlement. They are to be granted only if the person responsible for granting the extension is satisfied that the 'candidate submitting the application has been prevented by circumstances beyond his or her control from submitting the relevant work on time' (University Calendar, 16.28b). Extension requests will be considered only when a medical or serious personal problem that stands in the way of timely submission can be convincingly demonstrated. Essay deadline 'congestion,' time-management issues or computer problems will NOT be considered.

All requests for an extension—regardless of length—must be submitted before the essay due date. Late requests will be accepted only 'where the circumstances preventing the candidate from submitting work on time have also prevented application for a deferral of the deadline for submission' (University Calendar, 16.28d). When requesting an extension, students need to submit a completed extension request form, as well as relevant medical or other appropriate evidence for extensions for longer than 5 days.

We would like you to consider carefully if a short or longer extension is in your best interest, as it might impact your ability to submit subsequent assessments on time. You are informed of your deadlines at the beginning of the term, and it is your responsibility to plan your work accordingly. Extensions and Good Cause are not to be considered time management tools. If you are unsure whether an extension is right for you, or if you need guidance to plan your academic work, please do not hesitate to contact your academic adviser or course/programme convenor. The SRC has some high-level guidance on this in student-friendly language: Late Submission of Coursework: https://www.glasgowunisrc.org/advice/academic/late-submission/.

SHORT Extension request for up to 5 working days

If an illness or other adverse circumstances prevent you from submitting your assessment on time, you can request a short extension of up to 5 working days. Contrary to a Good Cause request, you are not required to provide evidence for a short extension, but you do need to explain in your request why you believe an extension is necessary.

Please submit your extension request within 10 working days of the assessment's due date. Extension requests submitted AFTER the deadline might lead to late submission penalties.

Please use this form to request an extension, and allow a minimum of one working day for a response: Student Forms Portal (uipath.com)

Extension Request for longer than 5 days

To request a coursework extension for longer than 5 days, please submit a Good Cause Claim on MyCampus: Go to your 'Student Centre' and select 'My Good Cause' from the Academics menu. Guidance for students on reporting good cause is available at https://www.gla.ac.uk/media/media_420013_en.pdf. Please include any important or sensitive information - it will be treated sympathetically and confidentially. If you miss an examination due to adverse circumstances, you should submit a Good Cause Claim instead of an Absence report.

Student Guidance on the Absence Policy and Reporting is available at https://www.gla.ac.uk/myglasgow/senateoffice/policies/studentsupport/absencepolicy and further guidance is at https://www.gla.ac.uk/media/media_129312_en.pdf. This sets out whether you need to submit an absence report or whether you need to submit a good cause claim. Please note that good cause requests submitted without details or supporting evidence will automatically be declined.

Further information about Short Extension and Good Cause regulations can be found on the University website: University of Glasgow - MyGlasgow - Academic Policy & Governance - Policy, Strategy and Regulations - Assessment - Good Cause FAQs

PLAGIARISM

Plagiarism is presenting someone else's ideas (including lectures) or written work (including Internet material, books, articles, theses, dissertations, and essays) as if one's own, without proper acknowledgement. Remember that even paraphrasing someone else's ideas means that you must give proper credit to your source to avoid plagiarism. The University Calendar says that it is "considered as an act of academic fraudulence and is an offence against University discipline." The University Calendar sets out the procedure that a Head of Subject must follow if plagiarism of assessed work is suspected.

The presentation of someone else's essay is obviously fraudulent, but the dividing line between your own work and that of your sources is less clear. The solution is always to acknowledge your sources and to use quotations when repeating exactly what someone else has said. Generally, you should avoid excessive paraphrasing of others' writings, even with acknowledgement; it does not demonstrate that you have understood the material you are reproducing. For more information
http://www.gla.ac.uk/myglasgow/leads/students/plagiarism/

TURNITIN

You are required to upload your essay to Turnitin. Turnitin is intended to support students in their avoidance of plagiarism and to support staff in their detection and prevention. Failing to upload a copy before the deadline might mean that your essay is considered as not submitted. HARD COPIES OF ASSIGNMENTS ARE NO LONGER ACCEPTED.

Information about Turnitin, how to upload your work and how to interpret your originality reports is available in the course Moodle page. Please read this material thoroughly before submission and note that if you want to submit a draft version to Turnitin, you MUST do this at least 24 hours before or it is highly likely you will NOT be able to see the Originality Report before the submission deadline. Note that the draft does NOT replace the submission of the final version. If there is no submission to Turnitin, your essay will not be graded.

In any case, whatever the results on Turnitin it is only a tool. In the end, avoiding plagiarism means understanding how to reference properly and in what circumstances you must do this, always being careful to correctly attribute ideas and evidence to their original sources, and not using another person's words or statements too directly unless they are being given as an acknowledged quotation. Turnitin will also help your tutors and Course Convenors decide whether a piece of work should be flagged up for essay writing skills support, or investigated for possible plagiarism. You can also get advice on how to improve your writing here
http://www.gla.ac.uk/myglasgow/leads/students/writingstudyadvice/socialsciences/.

FEEDBACK

You will experience a range of opportunities for feedback throughout the course. Feedback is given in various formats and from different sources.

You will receive verbal feedback from instructors and your class colleagues in class discussions/presentations.

You will receive written feedback on your formative assessment and your summative assessment. It is your responsibility to read your feedback carefully and consider the recommendations as to how you can develop your work. Please note that the marks provided for summative assessments are provisional until confirmed by our External Examiners at the Exam Board.

You are strongly encouraged to make use of staff regular office hours, which provide many opportunities throughout the semester for guidance on the course material and further feedback on your assessed work. If you cannot attend regular office hours, you can e-mail to make an appointment for another time, or you might be able to receive feedback via e-mail.

You can also make use of the support available for students provided by the Learning Enhancement & Academic Service (http://www.gla.ac.uk/myglasgow/leads/aftoolkit/resources/students/).

We are committed to returning course work with written feedback to students within three working weeks of the submission date. In very rare circumstances, course instructors may be unable to meet this date. On these rare occasions, the course convenor will contact all students in the course to explain the reason for the delay and when the course work will be available for students to pick up.

GUIDE TO MARKING

Marking is done on the university's 22-point scale (see below). You will receive a feedback sheet telling you what we are assessing. Exchange or disability students might have special assessment arrangements - please contact the course convenor.

Guide to Essay Marking

Did the essay answer the question? This refers to the focus and scope of the discussion. *For example: Did the essay address all parts of the question? Did it miss some key points? Did it digress from the topic?*

Did the author demonstrate knowledge of the relevant literature? This refers to the author's ability to relate course material to the question. *For example: Does the author display a good understanding of the key concepts and texts, and their limitations?*

Is the argument convincing? This refers to the quality and structure of the argument and the author's clarity of expression. *For example: Is the argument logically sound? Is it original? Is it supported by evidence? Is it expressed clearly?*

Essay Summative Assessment

Grade	Mark	Description
A1 A2 A3 A4 A5	22 21 20 19 18	**Excellent performance is characterised by most but necessarily all of the following:** Clear, comprehensive answer that displays sound critical thinking and insights Relevant evidence and readings from the course, and perhaps beyond, are cited accurately with very few errors. All key points are addressed fully Originality, creativity, and independent judgement are present
B1 B2 B3	17 16 15	**Very good performance is characterised by most but not necessarily all of the following:** Clear answer that fully addresses the key points Sound reasoning that displays a good understanding of the subject matter Relevant evidence and course readings are used with few errors Less critical thinking, originality, and insight than in an excellent performance
C1 C2 C3	14 13 12	**Good performance is characterised by most but not necessarily all of the following:** Answer displays a basic understanding of the subject matter Evidence of reading from course materials, but some points may not be fully relevant Little in the way of an argument or critical thinking Some errors may be present
D1 D2 D3	11 10 9	**Satisfactory performance is characterised by most but not necessarily all of the following:** Only a modest understanding of the subject matter is displayed Modest evidence of reading from course materials, with the inclusion of a few relevant points Many errors may be present
E1 E2 E3	8 7 6	**Weak performance is characterised by most but not necessarily all of the following:** Failure to answer question, though there may be an answer to a similar question Little evidence of any understanding of the subject matter is displayed Significant errors may be present
F1 F2	5 4	**Poor performance is characterised by most but not necessarily all of the following:**

F3	3	Failure to answer question directly
		Very little evidence of any understanding of the subject matter is displayed
		Many significant errors are likely to be present
G1	2	**Very poor performance is characterised by most of the following:**
G2	1	Failure to answer question
		No evidence of any understanding of the subject matter is displayed
H	0	**Absence of positive qualities**

NETIQUETTE: ONLINE NORMS

The course will be delivered face-to-face on campus in 2024/25 (unless Government guidance changes) but may also include some online elements.

The University of Glasgow will use Zoom for the delivery of any online activities. The general expectation is that users engage in an online class with the same respect, politeness, and professionalism that they would exhibit in a real-life classroom. We will apply the following basic principles in which users (instructors and students) are asked to:

- Add a photo to their Zoom profile (strongly encouraged)
- Have their real name (not their GUID) in their profile.
- Turn their cameras on where possible throughout the duration of synchronous activities. We understand that sometimes users might not be able to use the camera and the course convenor should be informed via chat box (private message) at the beginning of the class session.
- Mute their microphones unless you are speaking to avoid background noise.
- Be on time, or better, be early: punctuality is crucial for online classes.
- Use the Chat box ONLY for course related communication.
- Be careful about using potentially inflammatory language in the chat box e.g. all caps and exclamation points in written text. Written text can be easily misread and misunderstood. Remember to quickly check your comment before sending it.