

## Business Statistics

Term One 2023/24

WARWICK BUSINESS SCHOOL

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### 20% Individual Assignment

#### 1500 words

This is a strict limit not a guideline. Any piece submitted with more words than the limit will result in the excess not being marked.

AI is permitted please read more below

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### The Scenario

In this assignment you will be analysing data on children living in low income households in London.

For this data, London is split into boroughs (large areas of London which usually have their own local council or local government) and then further sub-divided into wards. This data is provided across 8 years. It shows the counts for the number of children living in low income housing within each ward in London.

You are being asked to prepare a simple report answering specific questions.

### The Structure

The assignment should be completed in RMarkdown and knitted into a html file. Your submission should be a zip file containing the RMarkdown file and the html output it creates. When the RMarkdown file is re-run, it must produce the same html output that you submit.

This should have two parts. The first part should include the code that you produce to perform all stages of the data analysis. It should read in the datafile provided, check the integrity of data, calculate all of the statistics requested, and produce all of the figures/visualisations requested.

The purpose of this first part is that it could be shared with someone else who is not familiar with the data or project, but is expert in R and statistics. They should be able to see how you achieved your results, and if necessary, easily modify the code to work with new or updated data. Therefore, the appropriateness of your comments and data documentation will also be assessed.

The second part should be a short, polished and professional report presenting and interpreting the findings for an audience of managers or policy makers. You should assume that the managers/policy makers have a basic knowledge of the data and where it comes from, but are not experts in statistics

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or R. Therefore, in addition to reporting the results of statistical tests using standard reporting conventions, you should also state the results in plain English and say what they mean or what they tell us about the real scenario – in this case what they tell us about rates of children living in low income households. The visualisations and figures in this section should be as clear as possible and of publication standard.

The official word count for this assignment is 1500 words, but the written report should be *much* shorter than this. Since this is a code and analysis based assignment, the word count is not directly applicable in the way that it is for an essay. The word count is provided as a guide: that this assignment is assumed to be approximately the same amount of work as a 1500 word essay. The report should be short, succinct and clear in communicating the main results only of the elements requested in the assignment question. Including additional irrelevant information in the second section will have a negative impact on your mark.

## The Request

The company have requested the following:

### Children in low income homes by borough

Provide a table that shows for each borough: the average number of children in low income homes per ward across all years in the dataset, the standard deviation of children in low income homes per ward across all years in the dataset, the lowest number of children in low income homes recorded for a ward in any year, and the highest number of children in low income homes recorded for a ward in any year.

To clarify, there should be one row per borough in the table: “across all years” means that you should use all of the data from all of the years and all of the wards to calculate e.g. one mean.

For this table you should include all boroughs in the dataset.

### Exclude unusual boroughs

A small number of boroughs are unusual. They should be included for the table above, but should be excluded from all of the elements from this point onwards. The boroughs to be excluded are: City of London; Kensington and Chelsea; Kingston upon Thames; Richmond upon Thames; Westminster.

### Visualise data for different years

Create a visualisation that shows the distribution of children in low income households in wards for each year. This should be a plot such as a violin or jitter plot that shows the distribution of values for each year so that the reader can clearly see how this has changed. The plot should also clearly show a visual representation of the mean value and standard deviation for each year.

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### A t-test comparing earliest and latest year

Use a t-test to compare the children in low income households in wards in the earliest year in the dataset (2014) and the latest year in the dataset (2021).

You should report the results using Null Hypothesis Significance Testing, and the estimation approach.

### Available Support

The workshops and lectures in the first part of the term are specifically designed to support the tasks in this assignment. Engaging fully with those exercises will provide you with the skills and knowledge to complete this assignment.

You will be able to ask for any potential clarification on the assignment expectations during workshops, office hours, Q&A sessions, on the module forums, and via the module email address.

You may ask general questions about the topics and approaches, as these will be covered in the upcoming sessions. However, you may not ask any member of teaching staff for help with your submission or the specific code you generate for the assignment.

### Use of AI

Note that while AI is not strictly prohibited for this work, we strongly recommend that it is not used. The assignment questions have been tested in a variety of ways with AI tools and they have been found to provide answers that are poor, inappropriate for the module material and learning outcomes, or factually incorrect. You may be called upon to explain in a viva the purpose/function of your code, the meaning of the statistical results, and how the results justify any conclusions that are drawn.

*If you use a generative Artificial Intelligence (AI) in the process of completing this assessment you MUST set out clearly the following:*

*WHY you used a generative AI*

*WHAT it was used for*

*WHICH AI was used; and*

*If any generated content has been used directly in this submission, if so where.*

*Note that this declaration does NOT contribute towards the word count for the assessment.*

*You will also have to confirm in your declaration that the work remains yours and you have intellectual ownership of it. You may be called for viva or other interview to demonstrate such intellectual ownership. A failure to disclose the use of AI, or the use of a misleading description of its use may have significant consequences for your studies. As a result, keeping good records of your interactions is strongly advised.*

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**SUBMISSION DEADLINE: 12:00 (UK time) Thursday 2 November 2023**

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[Assignment Preparation](#) (found in your Masters Student Handbook Section 6.2b)

[Word Count Policy and Formatting](#) (found in your Masters Student Handbook Section 6.2c)

[Guidelines for Online Submission](#) (found in your Masters Student Handbook Section 6.2e)

*Your assignment cover sheet can be downloaded from this page.*

[ChatGPT and AI](#) (found in your Masters Student Handbook Section 6.1e)

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You must submit your completed assignment online via my.wbs. The submission deadline is visible on your my.wbs home page. Submission dates and times are serious deadlines which must be strictly adhered to. You must submit your document by 12:00 midday (UK time), if you submit later than 12:00:00 your submission will be late and penalty marks will be incurred.

A completed assignment coversheet must be included as the first page of your script (see section 6.2b/e). If you have reasonable adjustments, you should also provide the cover sheet from the Disability Team.

**Do not** include your name anywhere in the assignment, all marking is anonymous.

You should include your University ID number in the header on every page and number all pages in the centre footer, your document should be in A4 page layout, Arial font size 11pt with 1.5 line spacing and 2.54 margins (see section 6.2c).

My.wbs will only allow you to upload one file.

**The assignment should be completed in RMarkdown and knitted into a html file. Your submission should be a zip file containing the RMarkdown file and the html output it creates. When the RMarkdown file is re-run, it must produce the same html output that you submit.**

You should name your file as your Student ID number underscore Module Code, e.g., 1234567\_IB9XXX.

When submitting your assignment you will need to confirm that the work you are submitting is your own, that you have referenced your work and that you understand the [University Regulations with regard to Academic Integrity](#).

The University recognises an increasing number of technologies such as Artificial Intelligence and that they may be applicable in your completing this assessment. The assessment brief sets out specific requirements or restrictions, and your student handbook has further guidance and advice, see section 6.1e.

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You are reminded that the inappropriate use of such a technology may constitute a breach of University policy, such as the Proofreading Policy or Regulation 11 (Academic Integrity). If you breach these policies, it may have significant consequences for your studies. Please make sure you read and understand the assessment brief and how AI may or may not be used.

If a generative AI or similar is permitted and has been used you **MUST** make clear why you used such a tool or service, what you used it for and you will be obliged to confirm that you take sole ownership of any submitted work. As appendices, and as part of your submitted work, you must provide screenshots of the question and the AI-generated response, alongside an explanation of how the content has been utilised. You should note the relevant reference alongside each screenshot.

When you submit you must complete (physically or electronically) a declaration. This requires you to explain the use of any AI. Failure to disclose at the point of submission may be prejudicial in any later investigations should they arise.

Double check that you are submitting the correct file. You are responsible for ensuring that you submit the final version of your work.

By submitting your assignment, you confirm that you agree with the following statements:

- I have read the guidance on plagiarism/cheating provided in the Handbook, understand the University regulations and am aware of the potential consequences of committing plagiarism/cheating. This work is entirely my own in accordance with the University's [Regulation 11](#) and the WBS guidelines on plagiarism and collusion.
- All external references and sources are clearly acknowledged and identified within the contents.
- No substantial part(s) of the work submitted here has also been submitted by me in other assessments for accredited courses of study, and I acknowledge that if this has been done it may result in me being reported for self-plagiarism and an appropriate reduction in marks may be made when marking this piece of work.
- I understand that should this piece of work raise concerns requiring investigation in relation to the points above, it is possible that other work I have submitted for assessment will be checked, even if the marking process has been completed.
- I am aware that the University expects all proofreaders to comply with its policy in this area and I confirm that if I have used a proofreader, the proofreader was made aware of and has complied with the [University's proofreading policy](#)
- If this is a revision of a piece of previously submitted work, my Programme team and tutor are aware of this.

☐ I declare that these statements are true

Once you declare your agreement with the statements, it will not be possible to claim that you were unaware of these requirements in the event that your work is subsequently suspected of Academic Misconduct.

After submitting, please check the correct file has successfully uploaded, by opening the document link on the submission page and scrolling through the entire document.

You can retract your submission before the deadline to upload an updated file, the retraction button can be found in the same place you submit your assignment. Please upload your new document before the deadline, submitting after the deadline will attract late penalties.

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End

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