**BACKGROUND INFORMATION**

**Overview**

Congratulations! The prestigious consulting firm of Gu’s Econometric Consulting Services (GECS) has hired you. Your first task involves providing econometric advice and analysis in an ongoing legal case in Sydney, Australia. A chemical firm (ChemXcom) has been found guilty of various offences under the Federal Government’s Environment Protection and Biodiversity Conservation Act. These offences relate to illegal dumping of chemicals and the resultant pollution associated with one of the firm’s plants in a particular area in the outer suburbs of Sydney over the period 2008 to 2011. While guilt has been determined, the Court has not yet assessed damages. One aspect of damages is a claim for compensation being made by people in the affected community where the evidence being presented is in terms of the alleged impact on housing prices.

Not surprisingly in such cases, there is considerable disagreement between both sides of the case in terms of the amount of damages. Again, ChemXcom has accepted the guilty verdict and they do not intend to appeal. The case is now about quantum – how much will the firm be liable for in terms of damages?

The judge in the case is not convinced that the damages amount to $48,000 per household, which is the initial claim submitted by the plaintiffs. She is also not satisfied with the quality of the econometric work produced by Cowgate Consulting Group (CCG) on behalf of the defendant. She has called in GECS to act as the independent arbitrator who will report directly to her. In outlining what is required, the judge has stressed that the central question to be addressed is:

*In the affected community, what was the impact on housing prices that can be attributable to the pollution and degradation of the environment caused by ChemXcom?*

GECS has been provided with a report from CCG, retained by the defendant, together with the data on which the CCG’s analysis was based.

**Attachment 1: CCG Report**

The PDF file *Main\_CCGreport.pdf* contains the report submitted by CCG on behalf of the defendant.

**Attachment 2: CCG Data**

The Stata file *Main\_CCGdata.dta* stores the data used in the CCG report. You will find 142 observations on 11 variables, which include:

id: a house identifier

yr: year of sale

area: area of house (square meters)

size: size of block of land (square meters)

age: age of house (years)

distance: distance of house from ChemXcom plant (kilometers)

rooms: number of rooms in house

brooms: number of bathrooms in house

crate: neighbourhood crime rate (annual number of offences per 1000 people)

air: annual air quality index

price: real sale price of house (in ‘000s of 2010 dollars)

**TASK**

Produce a written report which addresses the judge’s question. As part of your report, you must:

 confirm whether you can replicate Table 1, equation (2), and equation (3) reported by the defendant’s consulting firm, CCG;

 critically evaluate their econometric approach;

 propose your own econometric approach which addresses the limitations that you have identified;

 report and discuss new estimation results based on your own approach;

 and outline any additional data that you require to improve the quality of your econometric analysis.

**GENERAL TIPS**

 Your report can follow any structure as long as you express your ideas clearly in academic English. You can include an executive summary if you think it will help you to communicate your ideas effectively. If you would like further guidance on how to write an empirical research report, you can consult “Chapter 19. Carrying Out an Empirical Project” in the required textbook for this module, *i.e.*, *Introductory Econometrics* (7th ed.) by Jeffrey M. Wooldridge.

 In your critical evaluation and econometric analysis, you should focus on issues that enable you to demonstrate your understanding of the content taught in this module. For example, you can consider whether the CCG’s justification for their model specification is tenable given the algebraic and statistical properties of the OLS estimator; whether the CCG has paid due attention to omitted variable bias; and whether the CCG has followed an appropriate approach to hypothesis testing.

 Your additional data requirements must be stated as precisely as possible. For example, you must not simply write that you require an instrumental variable: You must name what instrumental variable you have in mind, summarise what you will use it for, and explain why you expect it to be relevant and exogenous.

Please be reminded that the CCG report is not a model answer to this assignment: The judge is not satisfied with their report.

Assignments should be typed in Arial, using 1.5 spacing and an easy-to-read 12-point font.

**MARKING GUIDELINES**

Performance is judged against the following criteria:

 Relevance to question(s)

 Organisation, structure and presentation

 Depth of understanding

 Analysis and discussion

 Use of sources and referencing

 Overall conclusions

The word count should include all the text (plus endnotes and footnotes), but exclude diagrams, tables, bibliography, references and appendices.