ECON 5213: ADVANCED ECONOMETRICS

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Problem Set #1

PART I: ANALYTICAL QUESTIONS

Note, again, that while I am not giving you a long homework here, it is expected that you will read and learn on your own, both **theory** and **Stata**. If you are unfamiliar with the theoretical concepts covered in class, please look for materials (especially examples) on undergrad statistics to refresh your memory. Please also share with us any useful ones that you find. Work hard!

Question 1. [Probability Axioms and Their Implications]. In class, we present three axioms for probability theory.

(1) Show that **countable additivity** imply **finite additivity**.

$$\Pr[A_1 \cup A_2 \cup \cdots \cup A_k] = \sum_{i=1}^{k} \Pr[A_i]$$

whenever $A_1, \ldots, A_k$ are disjoint (or pairwise mutually exclusive).

(2) Show

$$\Pr[A^c] = 1 - \Pr[A]$$

where A^c is the complementary set of A.

(3) Show that for two sets A and B that are not necessarily mutuatlly exclusive

$$\Pr[A \quad \text{or} \quad B] = \Pr[A] + \Pr[B] - \Pr[A \quad \text{and} \quad B]$$