The whole exam is about automobiles. You have been hired by Ford to estimate the demand for new cars. Ford has three sources of information about car demand.

a) In one data set, they observe aggregate sales of each brand of each car by metropolitan area and by quarter over 10 years.

b) In the second data set, they observe purchases of automobiles of a random sample of 10000 people at a particular time period.

c) In the third data set, they observe purchases of automobiles of a random sample of 1000 people over a ten year period.

For sample (a), there is no demographic information about individual car purchasers, but the data can be merged with other data on the distribution of demographic characteristics for each metropolitan area from other data sources.

For the other two samples, there is some demographic information on each member of the sample.

A. Describe the advantages and disadvantages of each data set. Be as precise as possible.

B. For two out of the three data sets, write down a model of purchases and describe how to estimate the parameters of your model with the data you have. Write down a likelihood function or a set of moment conditions.

C. Ford is worried that the national unemployment rate affects consumer confidence and that affects auto purchases. Describe how such a concern affects your estimation procedures in part (B) and how it affects the distributional properties of your estimators. Be as precise as possible.