

HERCMA 2001  
E. A. Lipitakis (Editor)  
2001, L.E.A.  
Printed in Hellas

D BUSINESS

# USING SAMPLING TECHNIQUES TO ESTIMATE THE DE JURE POPULATION OF GREECE AND APPORTION PARLIAMENT SEATS AMONG ELECTORAL DISTRICTS

Vasilis Michalacopoulos and Evdokia Xekalaki

*Abstract*— During the last ten years there has been much heated debate in academic journals, the popular press, and governments about the use of sampling methods to estimate the de jure population for each prefecture or district of a country, on the basis of which the allocation of parliament seats is made or/and national funds are distributed. The allocation of parliament seats was the original purpose for which decennial population censuses were established for most of the democratic countries. However, given that population censuses are carried out every ten years, it is obvious that many of the national election results are based on data that do not represent the real status of the population distribution at the time of the election. The aim of this paper is to explore the possibility of utilizing estimates of the size of the de jure population of a country for such purposes. An estimation procedure is proposed and studied. The implications of using the resulting estimates on the allocation of parliament seats are examined in the case of two national elections that took place in Greece a little while before or following the 1991 census in the years 1989, and 1993. In particular, using stratified proportional allocation, several samples of size 10000 are taken from the 1991 Population Census Data Base of the National Statistical Service of Greece. The use of ARIMA modeling is then considered in estimating the size of the de facto population for each electoral district for a specific year between two successive decennial censuses and determining the respective size of the de jure population. The apportionment of the Hellenic Parliament seats corresponding to the de jure population of each electoral district, as estimated by the sample for the year 1991, is compared to the official apportionments that the above elections resulted in on the basis of the complete census results considered in each case.

*Keywords*— population census; sampling from population census data; de jure population; de facto population; elections.