

## IV Seminario de Inferencia Estadística en Áreas Pequeñas

### PROGRAMA:

9:30-10:30h. **Some current lines of research in small area (domain) estimation.** *Nikos Tzavidis* (Southampton Statistical Sciences Research Institute, U.K.).

Abstract: In this talk I will present some current lines of research in small area (domain) estimation. I will start the talk with recent research in domain estimation for business surveys. Random effects models with 'complex' variance structures and outlier-robust estimation for random effects models will be discussed. In addition, random effects models that use parametric assumptions other than Gaussian will be presented and the role of design-based estimation will be investigated. In the second part of the talk I will focus on the estimation of small area poverty (deprivation) indicators, which is another area that has attracted a fair amount of interest in recent literature. A review of current methodologies for small area poverty mapping will be presented. Current small area poverty mapping methodologies focus exclusively on estimating income deprivation. In many instances, however, practitioners are interested in more complex, multidimensional measures of deprivation that extend well beyond income deprivation incorporating other dimensions such as health, education and social security. The role that generalised linear random effects models can play in estimating complex deprivation indicators will be discussed in an attempt to identify potential synergies with researchers in Spain. Whilst presenting the aforementioned areas of current research, I will also describe the synergies between the Southampton Statistical Sciences Research Institute and National Statistical Offices in the UK and in Europe that aim at developing and practically implementing small area estimation methods for the production of official statistics.

10:30-11:30h. **Estimation of labour force indicators in counties of Galicia using a multinomial mixed model with correlated time and area effects.** *Esther López-Vizcaíno* (Instituto Galego de Estatística, Spain)

Abstract: The unemployment rate in Spain in the fourth quarter of 2011 reached 22.9%, 13 points higher than in 2008 and the unemployment rate in women reached 23.32%, 11 points higher than in 2008. In Galicia (Spain) the labour market situation is not very different, the unemployment rate is 18.3% almost 10 points higher than in 2008 and unemployment people has increased in 132 000 people. The Spanish government in 2012 predicts an unemployment rate of 24.3% with a destruction of 630 000 jobs. In this situation, besides having global measures to measure unemployment, it is necessary to have indicators, like totals of employed, unemployed and inactive people or unemployment rates, to assess the impact of employment policy at local level. The objective is to estimate these indicators in counties of Galicia using small area estimation techniques. Traditional small area estimators borrow strength either from similar small areas or from the same area across time, but not both. Recently, however, several contributions to borrow strength simultaneously across both space and time have been developed. We propose a multinomial logit mixed model with correlated time and area effects to obtain small area estimates of labour force totals and unemployment rates in Galicia. The fitted model is then used to estimate the totals of employed and unemployed people and the unemployment rates of Galician counties.

Model-based estimates tend to be biased, so the estimates accuracy is a fundamental issue. For this reason we calculate the mean squared error and we propose estimation procedures by using analytical expressions and parametric bootstrap.

11:30-12:00h. Café-Descanso

12:00-13:00h. **AIC-based selection criteria and testing for zero variance in Fay-Herriot Model.**  
*Domingo Morales* (Universidad Miguel Hernández de Elche, Spain)

Abstract: The selection of an appropriate model is a fundamental step of the data analysis in small area estimation. In the first part of the talk, bias corrections to the Akaike information criterion, AIC, and to the Kullback symmetric divergence criterion, KIC, are derived for the Fay-Herriot model. Furthermore, three bootstrap-corrected variants of AIC and of KIC are proposed. The performance of the eight considered criteria is investigated with a simulation study and the obtained results prevent against using the classical AIC. In the second part, the nonstandard problem of testing if the random effect variance is zero is addressed. The likelihood ratio test and the residual likelihood ratio test are proposed and their finite sample distributions are derived. Finally, their behavior under simulated scenarios is analyzed and an application to real data is presented.

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