Small area estimation applications in the US Census Bureau

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We first discuss the problem of small area employment estimation that arises in the context of two important sample surveys of the U.S. Census Bureau ---- Annual Survey of Public Employment and Payroll (ASPEP) and Current Population Survey (CPS). The direct survey-weighted estimates of employment for small domains are highly variable. In this talk, we illustrate a small area estimation methodology to estimate employment by combining ASPEP with the previous census records using an empirical best prediction (EBP) methodology. The employment data are usually subject to skewness and heteroscedasticity and thus the well-known EBP methodology based on unit level linear mixed normal model does not fit well. In order to get around the problem, we apply a unit level linear mixed normal model on the log-transformed employment. We evaluate different competing estimates using the census data.

Key words: Borrow Strength, EBLUP, Heteroscedasticity, Linear Mixed Model