

WP 5 – MOBILE PHONE DATA IN OFFICIAL STATISTICS

WP5 Meeting

21/22 March 2018 in Madrid

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Mobile Phone Data

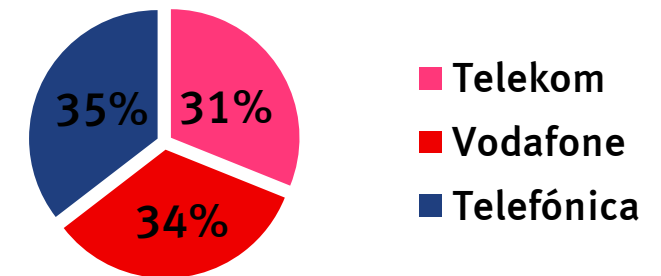
» Mobile Providers in Germany

- » Market share of 1/3 (state 3rd quarter 2017)
- » Cooperation Agreement with T-Systems

» Mobile Phone Data

- » For the federal state of North Rhine-Westphalia
 - Tailor-made data
- » Signaling data: anonymized and aggregated
 - depending on 3310 Motionlogic traffic cells (MLTC)
- » Statistical Week
- » Five different types of day: Monday, Tuesday to Thursday, Friday, Saturday, Sunday

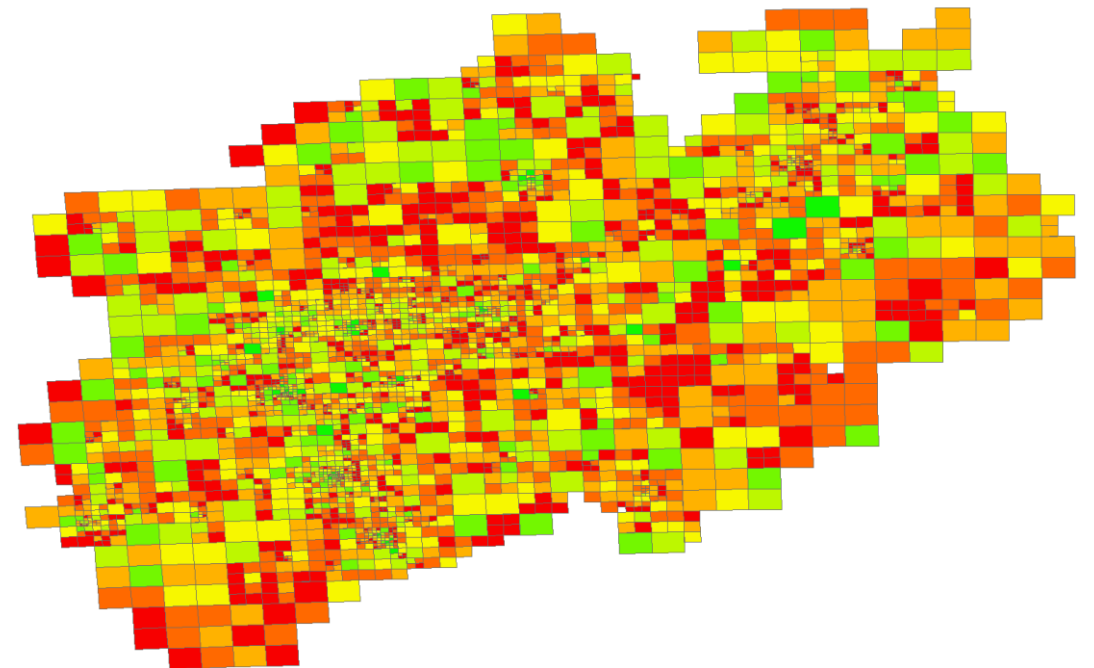
Market shares of German mobile providers (3rd quarter 2017).



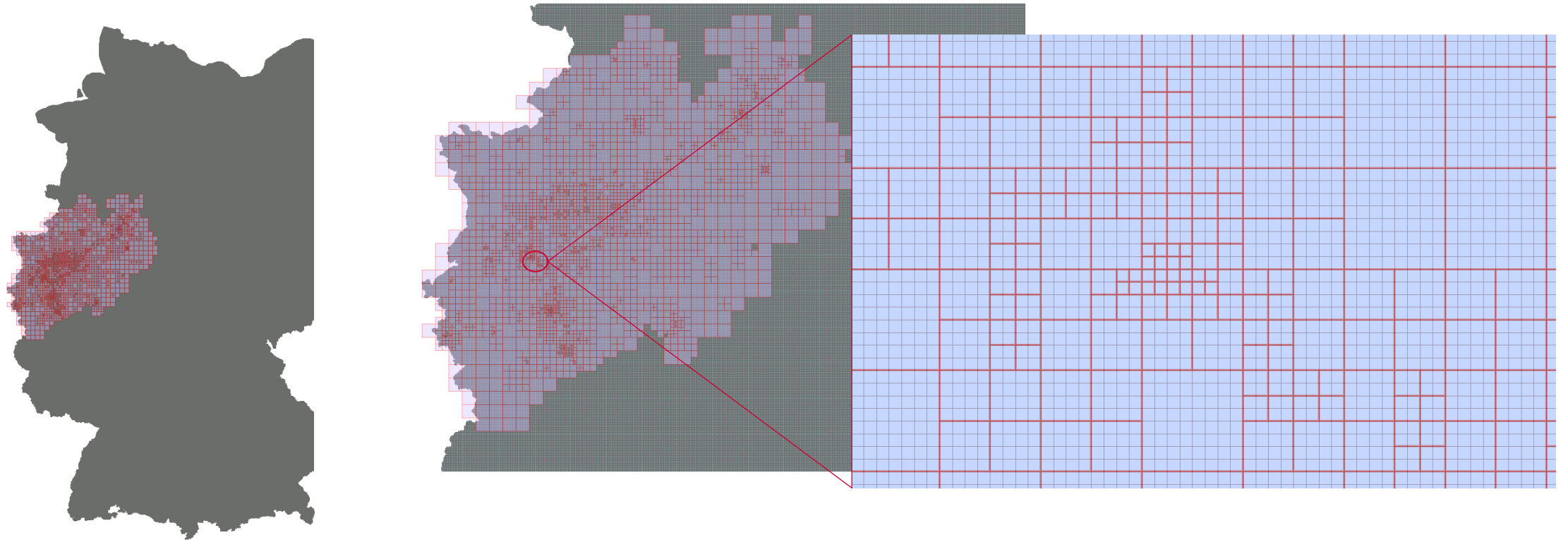
See Bundesnetzagentur:
https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktbeobachtung/D_utschland/Mobilfunkteilnehmer/Mobilfunknehmer.html?nn=268208

Mobile Phone Data

- » Evaluation period of 24 hours
- » Dwell time: 2 hours
- » Sociodemographic characteristics:
Gender, Age group, Nationality (Mobile
Country Code)
- » Minimum numbers of 30 mobile phone
activities ($K \geq 30$)

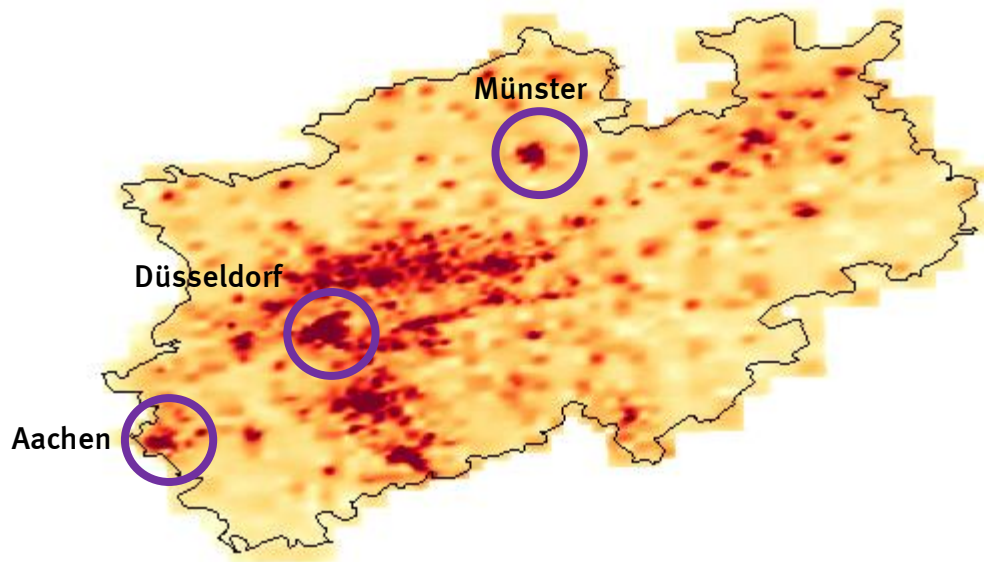


Comparison between mobile phone data and census data

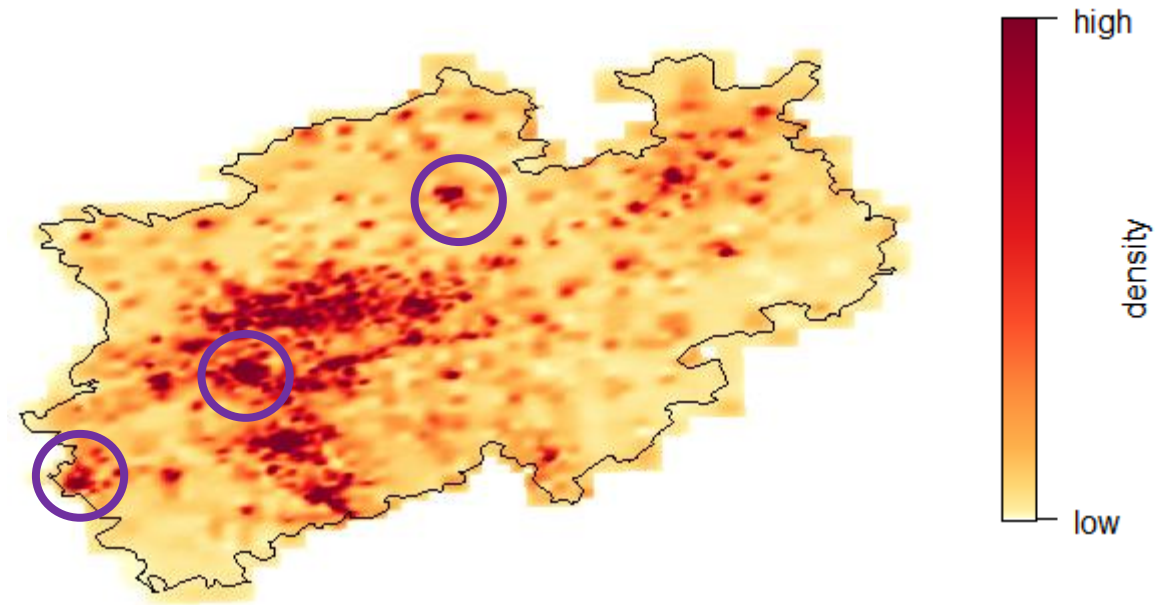


Kernel density estimation - Kernelheaping

Mobile phone activities on a statistical Tuesday to Thursday over a period of 11 a.m. to 2 p.m. according to districts

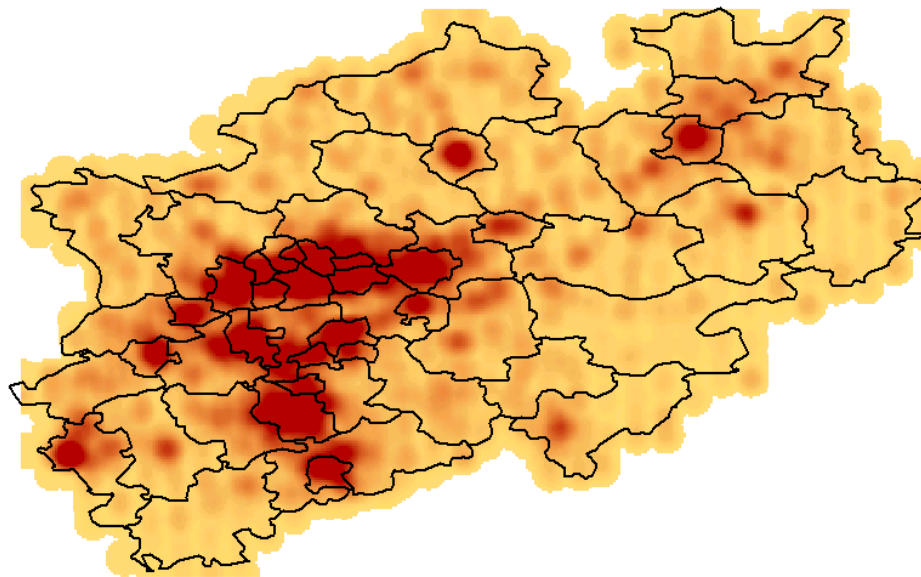


Mobile phone activities on a statistical Saturday over a period of 8 to 11 p.m.

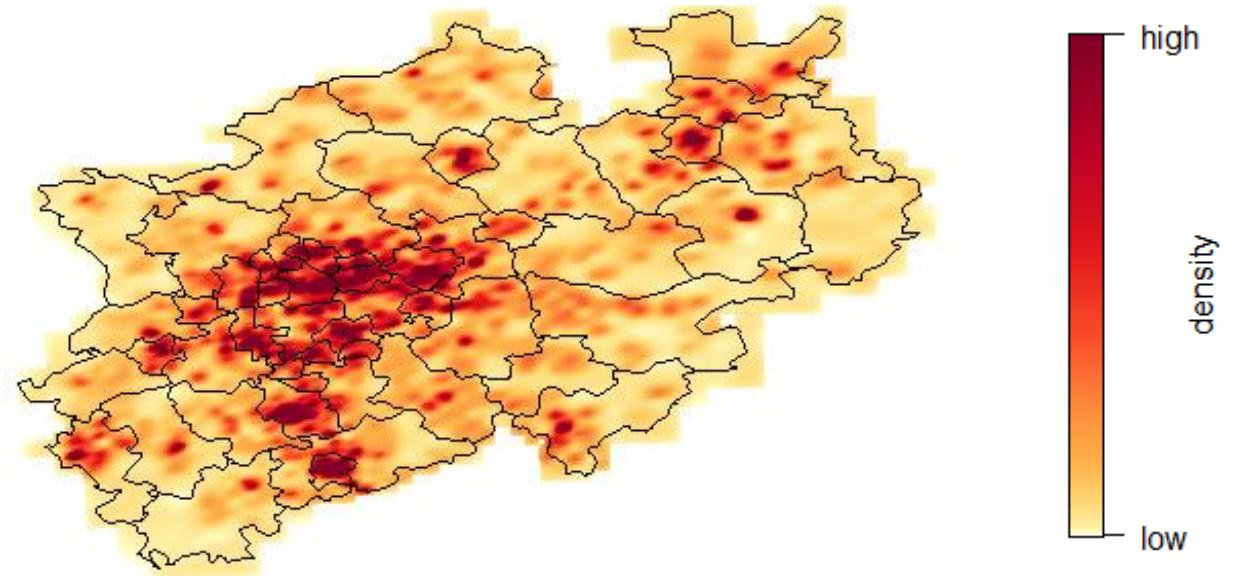


Kernel density estimation - Kernelheaping

Population of census 2011 in North Rhine-Westphalia according to districts

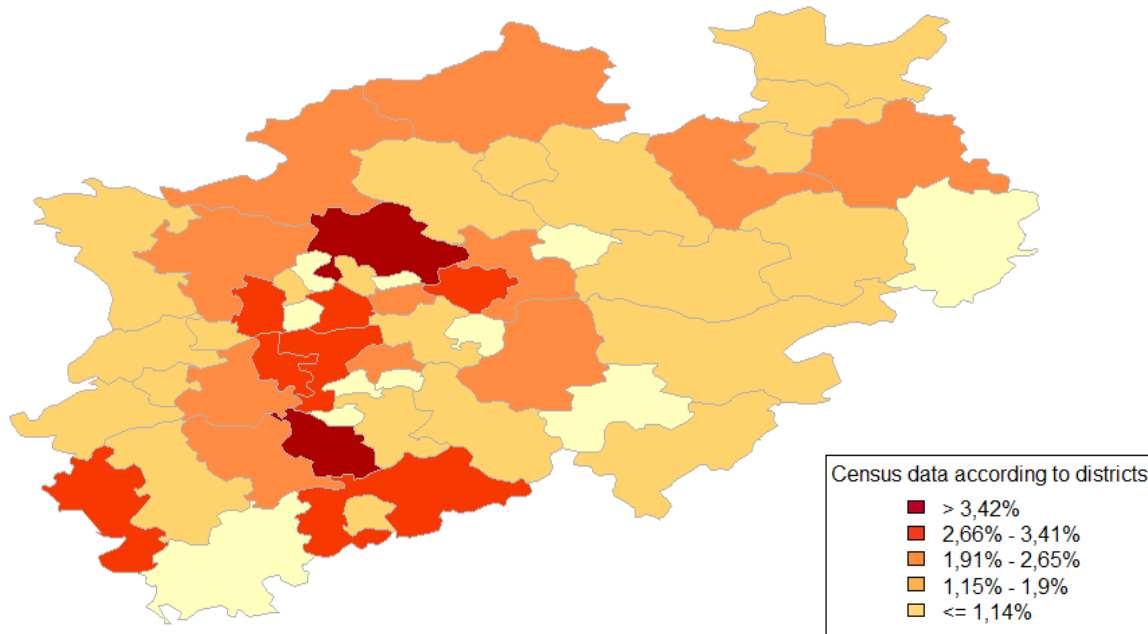


Mobile phone activities on a statistical Sunday over a period of 8 to 11 p.m. according to districts

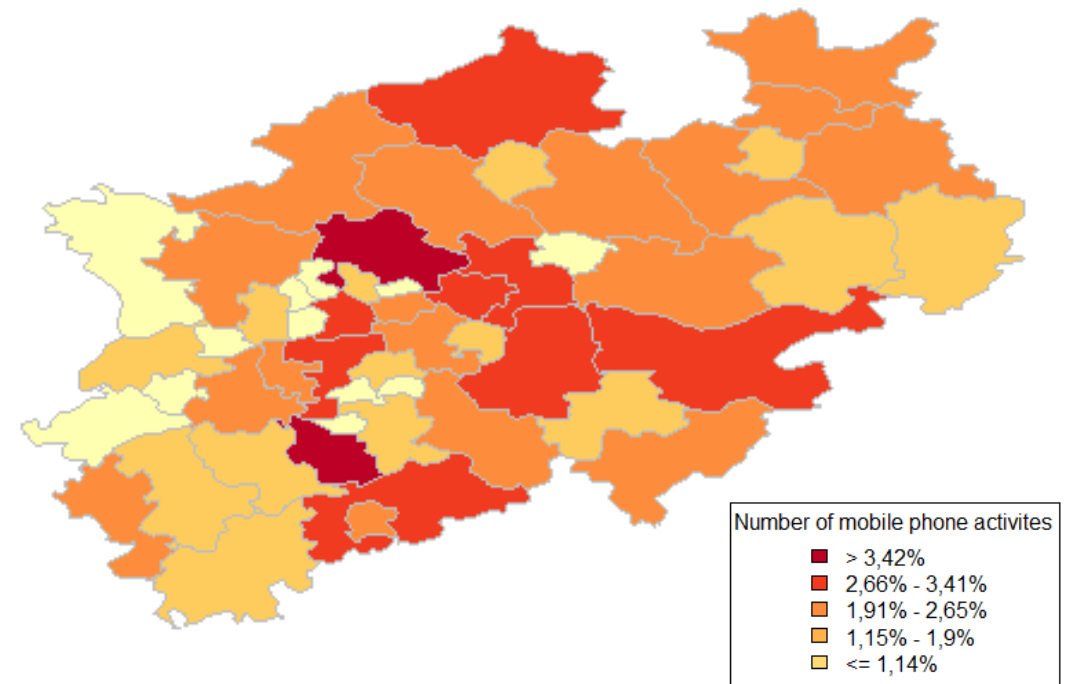


Comparison according to districts

Population of census 2011 according to districts



Mobile phone activities on a statistical Sunday over a period of 8 to 11 p.m. according to districts



Linkage of mobile phone data with indicators of the LFS

 Ref. Ares(2017)4591837 - 20/09/2017

Eurostat and DG Regional and Urban Policy grants for 2017

Call for proposals

City data from LFS and big data (ESSNET)

CCI 2016.CE.16.BAT.107



J. R. Statist. Soc. A (2017)

Constructing sociodemographic indicators for national statistical institutes by using mobile phone data: estimating literacy rates in Senegal

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Summary. Modern systems of official statistics require the accurate and timely estimation of sociodemographic indicators for disaggregated geographical regions. Traditional data collection methods such as censuses or household surveys impose great financial and organizational burdens on national statistical institutes. The rise of new information and communication technologies offers promising sources to mitigate these shortcomings. We propose a unified approach for national statistical institutes in developing countries based on small area estimation that allows for the estimation of sociodemographic indicators by using mobile phone data. In particular, the methodology is applied to mobile phone data from Senegal for deriving subnational estimates of the share of illiterates disaggregated by gender. The estimates are used to identify hotspots of illiterates with a need for additional infrastructure or policy adjustments. Although we focus on literacy as a particular sociodemographic indicator, the approach proposed is applicable to indicators from national statistics in general.

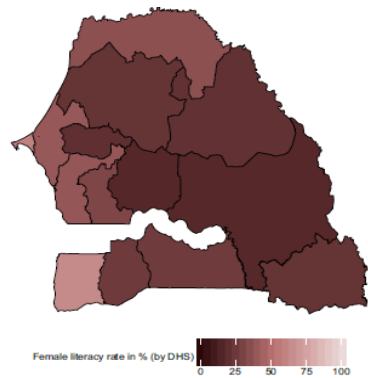
Keywords: Indicators; Model-based estimation; Official statistics; Small area estimation

1. INTRODUCTION

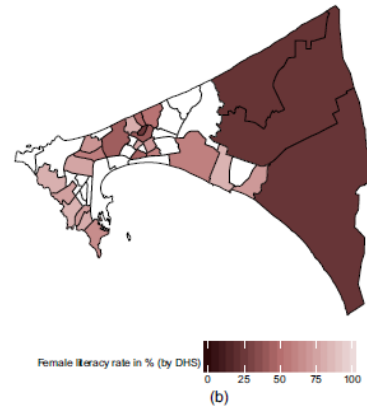
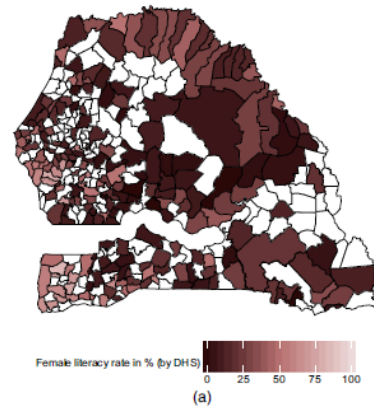
In accordance with Article 128 of the Financial Regulation we are pleased to invite you submit your application for the award of a grant in the framework of **Cross border a city statistics**.

Small Area Estimation

Desired: reliable estimates in a Small Area



Problem: the sample size within any particular small area may be too small



Including so-called auxiliary variables

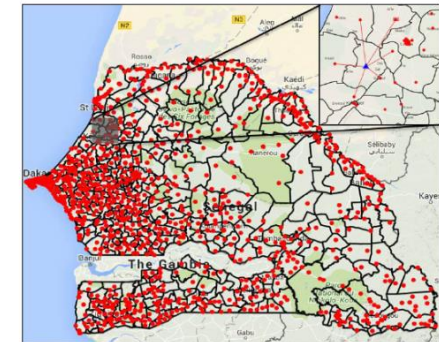
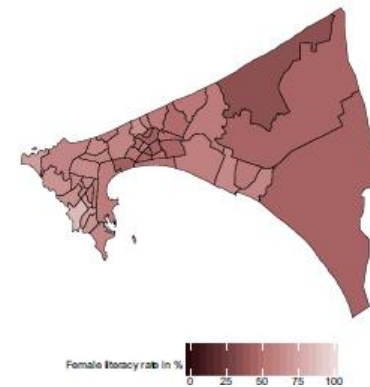
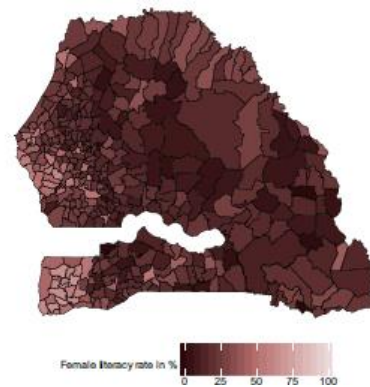


Fig. 3. Location of mobile phone towers in Senegal

Solution: Fay-Herriot Model (aggregated level)



Literature

Schmid, T., F. Bruckschen, N. Salvati and T. Zbiranski (2017). Constructing socio demographic indicators for National Statistical Institutes using mobile phone data: estimating literacy rates in Senegal. Journal of the Royal Statistical Society: Series A (Statistics in Social Sciences). doi:10.1111/rssa.12305

THANK YOU FOR YOUR ATTENTION!

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