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Editors: Monica Pratesi and Cira Pena

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PLENARY SESSIONS

(A) E. Baldacci — Financial Crises and their Impacts: Data Gaps and Innovation in Statistical Production.

(B) D. Dunson — Probabilistic inference from big and complex data.

(C) S. Strozza — Foreign immigration in Italy: a forty-year-old history.

SPECIALIZED SESSION (SPE)

(SPE-01) Inference, sampling and survey design

P. Conti — Resampling from finite populations under complex designs: the pseudo-population approach. (Co-author(s): F. Andreis, D. Marella, F. Mecatti)

P. Righi — A joint use of model based and design based frameworks for defining optimal sampling designs. (Co-author(s): P. D. Falorsi)

A. Ruiz-Gazen — A unified approach for robustness in survey sampling. (Co-author(s): J. Beaumont, D. Haziza)

(SPE-02) Multivariate models for risk assessment

M. Billio — A Bayesian nonparametric approach to macroeconomic risk. (Co-author(s): R. Casarin, M. Costola, M Guindani)

P. Cerchiello — Bank risk contagion:an analysis through big data. (Co-author(s): P. Giudici, G. Nicola)

L. De Angelis — A Markov-switching regression model with non-Gaussian innovations for systemic risk measurement. (Co-author(s): C. Viroli)

(SPE-03) Bayesian nonparametrics

D. Durante — Bayesian Nonparametric Modeling of Dynamic International Relations. (Co-author(s): D. Dunson)

A. Guglielmi — Bayesian autoregressive semiparametric models for gap times of recurrent events. (Co-author(s): G. Paulon, M. De Iorio)

A. Rodriguez — Restricted Nonparametric Mixtures models for Disease Clustering. (Co-author(s): T. Xifara)

(SPE-04) Statistical methods for the analysis of gene-environment interaction in the study of complex pathologies

C. Angelini — An introduction to next generation sequencing for studying omic-environment interactions.

L. Calciano — Statistical approaches for the evaluation of genetic associations in complex diseases: the heterogeneity of asthma phenotypes. (Co-author(s): L. Portas, S. Accordini)

Y. Pankaj — Improved case-only approach to study genome-wide gene-environment interaction. (Co-author(s): S. Freitag-Wolf, A. Dempfle, W. Lieb, M. Krawczak)

(SPE-05) Nonlinear time series

M. Niglio — Probabilistic properties of Self Exciting Threshold Autoregressive processes. (Co-author(s): F. Giordano, C. D. Vitale)

T. Proietti — Optimal prediction of stochastic trends. (Co-author(s): A. Giovannelli)

H. Tong — On model selection from a finite family of possibly misspecified models. (Co-author(s): H. Hsu, C. Ing)

(SPE-06) Spatial analyses in demography

F. Heins — Measuring residential segregation with spatial indices: an appraisal and applications for the metropolitan area of Rome. (Co-author(s): F. Benassi, F. Lipizzi, E. Paluzzi)

A. Mazza — Immigrants' settlement patterns in the city of Naples. (Co-author(s): G. Gabrielli, S. Strozza)

L. Natale — Native Immigration and Pull Factor Evolution in Italy: a Spatial Approach. (Co-author(s): A. Santacroce, F. G. Truglia)

(SPE-07) Recent developments in Volatility modeling

R. Casarin — Dynamic Model Averaging for Quantile Regression. (Co-author(s): M. Bernardi, B. Maillet, L. Petrella)

A. Rahbek — Testing volatility: consistency of bootstrap testing for a parameter on the boundary of the parameter space.

E. Ruiz — Asymmetric Stochastic Volatility Models: Properties and Estimation. (Co-author(s): V. Czellar, X. Mao, H. Veiga)

(SPE-08) Advances in ordinal contingency table analysis

L. D'Ambra — Dimensionality reduction methods for contingency tables with ordinal variables. (Co-author(s): P. Amenta, A. D'Ambra)

R. Lombardo — Modelling Trends in Ordered Three-Way Non-Symmetrical Correspondence Analysis. (Co-author(s): P. Kroonenberg, E. Beh)

M. Riani — Using Collapsing and Multiple Comparisons to Detect Association in Two Way Contingency Tables. (Co-author(s): S. Arsenis)

(SPE-09) Statistical models for directional and circular data

C. Ley — The WeiSSVM: a tractable, parsimonious and flexible model for cylindrical data.

G. Mastrantonio — The multivariate projected-skew normal distribution: Bayesian estimation and a hidden Markov model application.

A. Panzera — Circular density estimation via matching local trigonometric moments. (Co-author(s): M. Di Marzio, S. Fensore, C. C. Taylor)

(SPE-10) The interplay between frequentist and bayesian inference

C. Grazian — Classical inference for intractable likelihoods.

J. Hannig — Fusion learning for Interlaboratory Comparison. (Co-author(s): Q. Feng, H. Iyer, C. Wang, X. Liu)

F. Pauli — p-value in science: a review of issues and proposed solutions.

(SPE-11) Société Française de Statistique

B.H. Avner — Stochastic Block Model for Multiplex network: an application to a multilevel network of researchers..

Y. Bennani — Nonnegative Matrix Factorization for Transfer Learning. (Co-author(s): I. Redko)

T. Laloe — Detection of dependence patterns with delay.

J. Poggi — Disaggregated Electricity Forecasting using Wavelet-Based Clustering of Individual Consumers. (Co-author(s): J. Cugliari, Y. Goude)

(SPE-12) National accounts

A. Coli — The European Welfare State in times of crisis according to macroeconomic official statistics. (Co-author(s): E. Micheletti, B. Pacini)

C. Martelli — National Account and Open Data: a new semantic approach.

G. Oneto — New information contents of the National Accounts for the monitoring of the economic situation.

(SPE-13) Statistical tools for monitoring the educational system and assessing students' performances

L. Grilli — Evaluation of university students' performance through a multidimensional finite mixture IRT model. (Co-author(s): S. Bacci, F. Bartolucci, C. Rampichini)

G. Leckie — Monitoring school performance using value-added and value-table models: Lessons from the UK.

P. Sarnacchiaro — A statistical model to assess teacher performance. (Co-author(s): I. Camminatiello, R. Palma)

(SPE-14) Robust inference by bounded estimating functions

A.C. Monti — M Estimation based Inference for Ordinal Response Model.

E. Ruli — Approximate Robust Bayesian Inference with an Application to Linear Mixed Models. (Co-author(s): N. Sartori, L. Ventura)

J. Valeinis — Some robust methods using empirical likelihood for two samples. (Co-author(s): M. Velina, E. Cers, G. Luta)

SOLICITED SESSION (SOL)

(SOL-01) Subjective wellbeing and demographic events over the life course

G. Fuochi — Cultural and institutional drivers of basic psychological needs satisfaction. (Co-author(s): P. Conzo, A. Aassve, L. Mencarini)

L. Mencarini — Five reasons to be happy about childbearing. (Co-author(s): A. Aassve, F. Luppi)

B. Nowok — Migration motivations and migrants' satisfaction in the life course: A sequence analysis of geographical mobility trajectories in the United Kingdom.

A. Pirralha — Does becoming a parent change the meaning of happiness and life satisfaction? Evidence from the European Social Survey. (Co-author(s): H. Dobewall)

(SOL-02) Statistics for equitable and sustainable development

E. di Bella — Wellbeing and sustainable development: a multi-indicator approach to evaluate urban waste management systems. (Co-author(s): B. Cavalletti, M. Corsi)

C. Giusti — Small Area Estimation for Local Welfare Indicators in Italy. (Co-author(s): S. Marchetti, L. Faustini, L. Porciani)

T. Laureti — Does socio-economic variables influence the Italians' adherence towards a sustainable diet?. (Co-author(s): L. Secondi)

F. Riccardini — Sustainability of wellbeing: an analysis of resilience and vulnerability through subjective indicators. (Co-author(s): M. Bachelet, F. Maggino)

(SOL-03) New approaches to treat undercoverage and nonresponse

F. Andreis — Methodological perspectives for surveying rare and clustered population: towards a sequentially adaptive approach.

E. Furfaro — Dealing with under-coverage bias via Dual/Multiple Frame designs: a simulation study for telephone surveys.

D. Haziza — Weight adjustment procedures for the treatment of unit nonresponse in surveys. (Co-author(s): É. Lesage)

E. Kabzinska — Empirical likelihood multiplicity adjusted estimator for multiple frame surveys. (Co-author(s): Y. G. Berger)

(SOL-04) Statistical models and methods for network data

M. Cugmas — Measuring stability of co-authorship structures in time. (Co-author(s): A. Ferligoj)

J. Koskinen — A dynamic discrete-choice model for movement flows. (Co-author(s): T. Mueller, T. Grund)

G. Ragozini — Prototyping and Comparing Networks through Archetypal Analysis. (Co-author(s): D. De Stefano, M.R. D'Esposito)

S. Zaccarin — Modeling network dynamics: evidence from policy-driven innovation networks. (Co-author(s): A. Caloffi, D. De Stefano, F. Rossi, M. Russo)

(SOL-05) Recent developments in computational statistics

R. Argiento — A conditional algorithm for Bayesian finite mixture models via normalized point process.

S. Favaro — Thompson sampling for species discovery. (Co-author(s): M. Battiston, Y. Teh)

A. Mira — An application of Reinforced Urn Process to advice network data. (Co-author(s): S. Peluso, P. Muliere, F. Pallotti, A. Loni)

N. Sartori — Bootstrap prepivoting in the presence of many nuisance parameters. (Co-author(s): R. Bellio, I. Kosmidis, A. Salvan)

(SOL-06) Statisticians meet naturalists: issues on ecological and environmental statistics

F. Ferretti — Estimating the abundance of wildlife ungulate populations in Mediterranean areas: methods, problems and findings. (Co-author(s): A. Sforzi)

M. Ferretti — The monitoring of forests in Europe: methods, problems and proposals.

D. Rocchini — The power of generalized entropy for biodiversity assessment by remote sensing: an open source approach. (Co-author(s): L. Delucchi, G. Bacaro)

(SOL-07) From survey data to new data sources and big data in official statistics

G. Barcaroli — Machine learning and statistical inference: the case of Istat survey on ICT. (Co-author(s): G. Bianchi, R. Bruni, A. Nurra, S. Salamone, M. Scarnò)

S. Falorsi — Forecasting Italian Youth Unemployment Rate Using Online Search Data. (Co-author(s): S. Loriga, A. Naccarato, A. Pierini)

B. Liseo — Bayesian nonparametric methods for record linkage. (Co-author(s): A. Tancredi)

T. Tuoto — Exploring solutions for linking Big Data in Official Statistics. (Co-author(s): L. Di Consiglio, D. Fusco)

(SOL-08) Symbolic data analysis methods and applications

E. Diday — Explanatory and discriminatory power of variables in Symbolic Data Analysis.

M.B. Ferraro — Fuzzy and possibilistic approach to clustering of imprecise data. (Co-author(s): P. Giordani)

L. Grassini — Symbolic data analysis approach for monitoring the stability of monuments.. (Co-author(s): B. Bertaccini, G. Biagi, A. Giusti)

M. Ichino — Similarity and Dissimilarity Measures for Mixed Feature-type Symbolic Data. (Co-author(s): K. Umbleja)

(SOL-09) Compositional analysis

L. Crosato — Forecasting CPI weights through compositional VARIMA: an application to Italian data.. (Co-author(s): F. Lovisolo, B. Zavanella)

J. A. Martín-Fernández — Understanding association rules from a compositional data approach. (Co-author(s): M. Vives-Mestres, R. Kenett)

A. Menafoglio — Object Oriented Geostatistical Simulation of Functional Compositions via Dimensionality Reduction in Bayes spaces. (Co-author(s): A. Guadagnini, P. Secchi)

V. Simonacci — Fitting CANDECOMP-PARAFAC model for compositional data: a combined SWATLD-ALS algorithm. (Co-author(s): M. Di Palma, V. Todorov)

(SOL-10) Sustainable development: theory, measures and applications

F. Riccardini — Measuring sustainable development goals from now to 2030.

F. Riccardini — How the nexus of food/water/energy can be seen with the perspective on well-being of people and the Italian BES framework. (Co-author(s): D. De Rosa)

T. Rondinella — An innovative methodology for the analysis of sustainability, inclusion and smartness of growth through Europe2020 indicators.. (Co-author(s): E. Grimaccia)

P. Ungaro — The Italian population behaviours toward environmental sustainability: a study from Istat surveys. (Co-author(s): I. Mingo, V. Talucci)

(SOL-11) Detecting heterogeneity in ordinal data surveys

E. Di Nardo — CUB models: a preliminary Fuzzy approach to heterogeneity. (Co-author(s): R. Simone)

S. Giordano — Modelling uncertainty in bivariate models for ordinal responses. (Co-author(s): R. Colombi, A. Gottard, M. Iannario)

M. Manisera — Treatment of "don't know" responses in rating data: effects on the heterogeneity of the CUB distribution. (Co-author(s): P. Zuccolotto)

F. Pennoni — Modelling a multivariate hidden Markov process on survey data.

(SOL-12) Active ageing: age management and lifelong learning strategies

P. E. Cardone — Age management in Italian companies. Findings of two Isfol surveys. (Co-author(s): M. Aversa, L. D'Agostino)

A. Lorenti — Working after Retirement in Europe.

C. Polli — Older low-skilled workers and economic crisis in Italy. (Co-author(s): R. Angotti)

G. Rivellini — Population ageing and human resources management. A chance for Applied Demography. (Co-author(s): F. Marcaletti, F. Racioppi)

(SOL-13) Statistical models for evaluating policy impact

M. Bia — Evaluation of Training Programs by exploiting secondary outcomes in Principal Stratification frameworks: the case of Luxembourg. (Co-author(s): F. Li, A. Mercatanti)

G. Cerulli — Testing Stability of Regression Discontinuity Models. (Co-author(s): Y. Dongz, A. Lewbel, A. Poulsen)

R. P. Mamede — Counterfactual Impact Evaluation of Vocational Education in Portugal. (Co-author(s): D. Cruz, T. Fernandes)

G. Pellegrini — Italian public guarantees to SME: the impact on regional growth. (Co-author(s): M. De Castris)

(SOL-14) Usage of geocoded micro data in the economic analysis

M. Dickson — Spatial sampling methods with locational errors. (Co-author(s): D. Filipponi)

D. Giuliani — Spatial Micro-Econometrics Models with Locational Errors. (Co-author(s): S. Cozzi, G. Espa)

F. Santi — Three-Year Survival Probability of Italian Start-up Businesses in Healthcare Industry: an Empirical Investigation through Logistic Multilevel Modelling. (Co-author(s): M. M. Dickson, D. Giuliani, D. Piacentino)

(SOL-15) Statistical models in functional data analysis

G. Adelfio — Space-time FPCA Algorithm for clustering ofmultidimensional curves. (Co-author(s): F. Di Salvo, M. Chiodi)

C. Miller — Functional data analysis approaches for satellite remote sensing applications. (Co-author(s): R. O'Donnell, M. Gong, M. Scott)

E. Romano — Order statistics for spatially dependent functional data. (Co-author(s): A. Balzanella, R. Verde)

L. M. Sangalli — A penalized regression model for functional data with spatial dependence. (Co-author(s): M. S. Bernardi, G. Mazza, J. O. Ramsay)

(SOL-16) Forecasting economic and financial time series

G. Goracci — Asymptotics and power of entropy based tests of dependence for categorical data. (Co-author(s): S. Giannerini)

M. M. Pelagatti — Forecasting electricity load and price: a comparison of different approaches. (Co-author(s): F. Lisi)

G. Storti — Flexible Realized GARCH Models. (Co-author(s): R. Gerlach)

(SOL-17) Immigrations and integration in Italy

O. Casacchia — Minorities internal migration in Italy: an analysis based on gravity models. (Co-author(s): C. Reynaud, S. Strozza, E. Tucci)

C. Conti — Growing generations and new models of integration.

N. Tedesco — Measurement of segregation in the labour market. An alternative approach. (Co-author(s): L. Salaris)

L. Terzera — Family behaviours among first generation migrants. (Co-author(s): E. Barbiano di Belgiojoso)

(SOL-18) Open data, linked data and big data in public administration and official statistics

G. Di Bella — Linked Administrative Data in Official Statistics: a Positive Feedback for the Quality?. (Co-author(s): G. Garofalo)

C. Martelli — Generating high quality administrative data: new technologies in a national statistical reuse perspective. (Co-author(s): M. Calzaroni, A. Samaritani)

V. Santarcangelo — An innovative approach about the analysis of quality and efficiency in Italian law. (Co-author(s): A. Buondonno, A. Romano, M. Giacalone, C. Cusatelli)

B. Squittieri — Prato municipality experience towards a high integration between administrative and statistical data.

(SOL-19) Evaluation of prognostic biomarkers

F. Ambrogi — Combining Clinical and Omics data: hope or illusion?. (Co-author(s): P. Boracchi)

L. Antolini — Graphical representations and summary indicators to assess the performance of risk predictors. (Co-author(s): D. Bernasconi)

P. Chiodini — Multivariable prognostic model: external validation and model recalibration with application to non-metastatic renal cell carcinoma. (Co-author(s): L. Cindolo)

(SOL-20) Models for studying the mobility of students

S. Balia — Modelling inter-regional patient mobility: evidence from the Italian NHS. (Co-author(s): R. Brau, E. Marrocu)

A. D'Agostino — University mobility at enrollment: geographical disparities in Italy. (Co-author(s): G. Ghellini, S. Longobardi)

M. Enea — From South to North? Mobility of Southern Italian students at the transition from the first to the second level university degree.

F. Giambona — Measuring territory student-attractiveness in Italy. Longitudinal evidence.

CONTRIBUTED SESSION (CON)

(CON-01) Bayesian statistics (1)

F. Giummolè — Reference priors based on composite likelihoods. (Co-author(s): V. Mameli, L. Ventura)

B. Nipoti — On Bayesian nonparametric inference for discovery probabilites. (Co-author(s): J. Arbel, S. Favaro, Y. W. Teh)

R. Pappadà — Relabelling in Bayesian mixture models by pivotal units. (Co-author(s): L. Egidi, F. Pauli, N. Torelli)

C. Scricciolo — On Deconvolution of Dirichlet-Laplace Mixtures.

(CON-02) Statistical modeling

P. Faroughi — A New Bivariate Regression Model for Count Data with Excess Zeros. (Co-author(s): N. Ismail)

B. Francis — Dynamic latent class profiles in cross-sectional surveys: some preliminary results. (Co-author(s): V. Hoti)

P. M. Kroonenberg — The use of deviance plots for non-nested model selection in loglinear models, structural equations, three-mode analysis.

A. Lucadamo — Variable selection through Multinomial LASSO for PCMR. (Co-author(s): L. Greco)

O. Paccagnella — Integrating CUB Models and Vignette Approaches. (Co-author(s): S. Pavan, M. Iannario)

(CON-03) Demographics and social statistics (1)

D. Bellani — Gender egalitarianism, education and life-long singlehood: A multilevel analysis. (Co-author(s): G. Esping-Andersen, L. Nedoluzhko)

L. Colangelo — Fear of Crime and Victimization among Sexual Harassed Women: Evidence from Italy. (Co-author(s): P. Mancini)

S. De Cantis — A survival approach for the analysis of cruise passengers' behavior at the destination. (Co-author(s): M. Ferrante, A. Parroco, N. Shoval)

A. Di Pino — Retirement of the Male Partner and the Housework Division in the Italian Couples: Estimation of the Causal Effects. (Co-author(s): M. Campolo)

F. Lariccia — Many women start, but few continue: determinants of breastfeeding in Italy. (Co-author(s): A. Pinnelli)

(CON-04) Environmental statistics

F. Bono — Measuring sustainable economic development through a multidimensional Gini index. (Co-author(s): M. Giacomarra, R. Giaimo)

C. Calculli — Modeling multi-site individual corals growth. (Co-author(s): B. Cafarelli, D. Cocchi, E. Pignotti)

F. Di Salvo — GAMs and functional kriging for air quality data. (Co-author(s): A. Plaia, M. Ruggieri)

F. Durante — The Kendall distribution and multivariate risks.

(CON-05) Health statistics

E. di Bella — Dental care systems across Europe: the case of Switzerland. (Co-author(s): L. Leporatti, I. Krejci, S. Ardu)

F. Gasperoni — Multi-state models for hospitalizations of heart failure patients in Trieste. (Co-author(s): F. Ieva, G. Barbati)

F. Grossetti — Multi-state Approach to Administrative Data on Patients affected by Chronic Heart Failure. (Co-author(s): F. Ieva, S. Scalvini, A. M. Paganoni)

G. Montanari — Evaluation of health care services through a latent Markov model with covariates. (Co-author(s): S. Pandolfi)

(CON-06) Labor market statistics

A. Bianchi — Multifactor Partitioning: an analysis of employment and firm size. (Co-author(s): S. Biffignandi)

G. Busetta — Ugly Betty looks for a job. Will she ever find it in Italy?. (Co-author(s): F. Fiorillo)

G. Busetta — No country for foreigners: an analysis of hiring process in Italian labor market. (Co-author(s): M. Campolo, D. Panarello)

F. Crippa — Know your audience. Towards a partnership between employers and university. (Co-author(s): M. Zenga)

I. Vannini — Online Job Vacancies: a big data analysis. (Co-author(s): D . Rotolone, C. Di Stefano, A. P. Paliotta, D. F. Iezzi)

(CON-07) Robust statistics

F. Greselin — Robust estimation of mixtures of skew-normal distributions. (Co-author(s): L. García-Escudero, A. Mayo-Iscar, G. McLachlan)

M. Musio — Renyi's Scoring Rules. (Co-author(s): A. F. Dawid)

A. Paganoni — Robust classification of multivariate functional data. (Co-author(s): F. Ieva)

G. C. Porzio — A robust estimator for the mean direction of the von Mises-Fisher distribution. (Co-author(s): T. Kirschstein, S. Liebscher, G. Pandolfo, G. Ragozini)

F. Palumbo — Robust Partial Possibilistic Regression Path Modeling. (Co-author(s): R. Romano)

(CON-08) Sampling methods

A. Ghiglietti — Adaptive Randomly Reinforced Urn design and its asymptotic properties.

D. Marella — PC algorithm from complex sample data. (Co-author(s): P. Vicard)

S. Missiroli — Optimal Adaptive Group Sequential Procedure for Finite Populations in the Presence of a Cost Function. (Co-author(s): E. Carfagna)

E. Pelle — The Rao regression-type estimator in ranked set sampling. (Co-author(s): P. Perri)

M. Ruggiero — Modelling stationary varying-size populations via Polya sampling. (Co-author(s): P. De Blasi, S. Walker)

(CON-09) Economic data analysis

M. Brunetti — Getting older and riskier: the effect of Medicare on household portfolio choices. (Co-author(s): M. Angrisani, V. Atella)

E. Ciavolino — Modelling the Public Opinion on the European Economy with the HO-MIMIC Model. (Co-author(s): M. Carpita)

G. D'Epifanio — Indexing the Worthiness of Social Agents. To norm index on conventional specifications.

G. Guagnano — An econometric model for undeclared work. (Co-author(s): M. Arezzo)

M. Mussini — A spatial shift-share decomposition of energy consumption variation. (Co-author(s): L. Grossi)

(CON-10) Quantile methods

M. Bernardi — Bayesian inference for L_p–quantile regression models. (Co-author(s): V. Bignozzi, L. Petrella)

V. Bignozzi — On the L_p-quantiles and the Student t distribution. (Co-author(s): M. Bernardi, L. Petrella)

M. Marino — M-quantile regression for multivariate longitudinal data. (Co-author(s): M. Alfò, M. Ranalli, N. Salvati)

D. Vistocco Comparing Prediction Intervals in Quantile and OLS Regression. (Co-author(s): C. Davino)

(CON-11) Statistical algorithms

N. Loperfido An Algorithm for Finding Projections with Extreme Kurtosis. (Co-author(s): C. Franceschini)

L. Scrucca Poisson change-point models estimated by Genetic Algorithms.

A. Stamm Maximum Likelihood Estimators of Brain White Matter Microstructure. (Co-author(s): O. Commowick, S. Vantini, S. K. Warfield)

(CON-12) Statistics for medicine

G. Barbati Competing risks between mortality and heart failure hospital re-admissions: a community-based investigation from the Trieste area. (Co-author(s): F. Ieva, A. Scagnetto, G. Sinagra, A. Di Lenarda)

C. Brombin Evaluating association between emotion recognition and Heart Rate Variability indices. (Co-author(s): F. Cugnata, R. M. Martoni, M. Ferrario, C. Di Serio)

M. Ferrante Socio-economic deprivation, territorial inequalities and mortality for cardiovascular diseases in Sicily. (Co-author(s): A. Milito, A. Parroco)

M. Giacalone The use of Permutation Tests on Large-Sized Datasets. (Co-author(s): A. Alibrandi, A. Zirilli)

(CON-13) Statistics for the education system

G. Boscaino Further considerations on a new indicator for higher education student performance. (Co-author(s): G. Adelfio, V. Capursi)

C. Masci Analysis of pupils' INVALSI achievements by means of bivariate multilevel models. (Co-author(s): A. Paganoni, F. Ieva, T. Agasisti)

A. Valentini Promoting statistical literacy to university students: a new approach adopted by Istat. (Co-author(s): G. De Candia, M . Carbonara)

(CON-14) Testing procedures

E. Cascini A Reliability Problem: Censored Tests.

G. De Santis Testing the Gamma-Gompertz-Makeham model. (Co-author(s): G. Salinari)

M. M. Pelagatti A nonparametric test of independence.

A. Pini Functional Data Analysis of Tongue Profiles. (Co-author(s): L. Spreafico, S. Vantini, A. Vietti)

A. Vagheggini On the asymptotic power of the statistical test under Response-Adaptive randomization. (Co-author(s): A. Baldi Antognini, M. Zagoraiou)

(CON-15) Time series analysis

C. Cappelli Robust Atheoretical Regression Tree to detect structural breaks in financial time series. (Co-author(s): P. D'Urso, F. Di Iorio)

P. Chirico Prediction intervals for heteroscedastic series by Holt-Winters methods.

M. Costa Inequality decomposition for financial variables evaluation.

G. De Luca Three-stage estimation for a copula-based VAR model. (Co-author(s): G. Rivieccio)

(CON-16) Forecasting methods

M. Andreano Forecasting with Mixed Data Sampling Models (MIDAS) and Google trends data: the case of car sales in Italy. (Co-author(s): R. Benedetti, P. Postiglione)

V. Candila Probability forecasts in the market of tennis betting: the CaSco normalization. (Co-author(s): A. Scognamillo)

S. Vantini Daily Prediction of Demand and Supply Curves. (Co-author(s): A. Canale)

(CON-17) Bayesian statistics (2)

G. Marchese Bayesian hierarchical models for analyzing and forecasting football results. (Co-author(s): P. Brutti, S. Gubbiotti)

L. Paci Bayesian modeling of spatio-temporal point patterns in residential property sales. (Co-author(s): A. E. Gelfand, M. Beamonte, P. Gargallo, M. Salvador)

V. Vitale Non-parametric Bayesian Networks for Managing an Energy Market. (Co-author(s): V. Guizzi, F. Musella, P. Vicard)

(CON-18) Business statistics

E. Bartoloni How do firms perceive their competitiveness? Measurement and determinants.

C. Bocci An evaluation of export promotion programmes with repeated multiple treatments. (Co-author(s): M. Mariani)

A. Righi The inter-enterprise relations in Italy. (Co-author(s): A. Nuccitelli, G. Barbieri)

(CON-19) Clustering and classification

C. Drago Dendrograms Stability Analysis of Sub-periods Time Series Clustering. (Co-author(s): R. Ricciuti)

G. Menardi Stability-based model selection in nonparametric clustering.

T. Padellini Topological signatures for classification. (Co-author(s): P. Brutti)

(CON-20) Demographics and social statistics (2)

M. Antonicelli — Ecolabels: informin or confusing customers? Evidences form the agrifood sector. (Co-author(s): D. Calace, D. Morrone, A. Russo, V. Vastola)

B. Arpino — What makes you feeling old? An analysis of the factors influencing perceptions of ageing. (Co-author(s): V. Bordone, A. Rosina)

G. De Santis — A (partial) solution to the intractability of APC models. (Co-author(s): M. Mucciardi)

G. Gabrielli — Partner reunification of first generation immigrants in Lombardy. (Co-author(s): A. Paterno, L. Terzera)

(CON-21) Statistical inference

E. Kenne Pagui — Median bias reduction of maximum likelihood estimates in binary regression models. (Co-author(s): A. Salvan, N. Sartori)

N. Lunardon — On penalized likelihood and bias reduction. (Co-author(s): G. Adimari)

A. Maruotti — Population size estimation and heterogeneity in capture-recapture count data. (Co-author(s): O. Anan, D. Böhning)

(CON-22) Survey methods

A. Pinto — Italian consumers' food risks perception: an approach based on the correspondence analysis. (Co-author(s): E. Ruli, S. Crovato, L. Ventura, L. Ravarotto)

R. Salvatore — Spatial-temporal multivariate small area estimation. (Co-author(s): F. Cappuccio)

D. Toninelli — Is the Smartphone Participation Affecting the Web Survey Experience?. (Co-author(s): M. Revilla)

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M. Bernardi — Non-conjugate Variational Bayes Approximation. (Co-author(s): E. Ruli)

M. Bernardi — The Multivariate Fuzzy Skew Student–t distribution.

M. Bini — Quality of Educational Services, Institutional Image, Students' Satisfaction and Loyalty in Higher Education. (Co-author(s): L. Masserini, M. Pratesi)

L. Bisaglia — Estimation of INAR(p) models using bootstrap. (Co-author(s): M. Gerolimetto)

D. Bossoli — Effect of internet-based cognitive therapy on children anxiety disorders: results from a marginal logistic quantile regression.

C. Calì Some mathematical properties of the ROC curve. (Co-author(s): M. Longobardi)

M. Cannas Machine learning for the estimation of the propensity score: a simulation study. (Co-author(s): B. Arpino)

M. Cannas An R package for propensity score matching with clustered data. (Co-author(s): B. Arpino, C. Conversano)

A. Coli Mapping local social protection data in Italy. (Co-author(s): B. Pacini, A. Valentini, S. Venturi)

A. Cosma Indirect inference for nonlinear panel data.

I. L. Danesi Cluster Analysis of Transactional Data in the Frequency Domain. (Co-author(s): F. M. Pons, C. Rea)

L. Gabrielli Using purchase market behavior to estimate collective well-being. (Co-author(s): G. Riccardi, L. Pappalardo)

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A. Lepore A Bayesian short-term strategy for site specific wind potential assessment. (Co-author(s): P. Erto, B. Palumbo, M. Lepore)

A. Magrini Distributed-Lag Structural Equation Modelling: An Application to Impact Assessment of Research Activity on European Agriculture. (Co-author(s): F. Bartolini, A. Coli, B. Pacini)

G. Mastrantonio A multivariate circular-linear hidden Markov model for site-specific assessment of wind predictions by an atmospheric simulation system. (Co-author(s): A. Pollice, F. Fedele)

F. Musella Bayesian networks for supporting the digitization process in Italian schools. (Co-author(s): S. Capogna, M.C. De Angelis)

B. Palumbo Statistical approach in aerospace industry innovation. (Co-author(s): P. Erto, F. Tagliaferri, G. De Chiara, R. Marrone, C. Leone, S. Genna)

B. Palumbo Ship fuel consumption control and engineering approach to fault-detection. (Co-author(s): P. Erto, A. Lepore, L. Vitiello, C. Capezza, D. Bocchetti, A. D'Ambra, B. Antonelli)

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E. Ruli	Optimal B-robust posterior distributions for operational risk. (Co-author(s): I. Danesi, F. Piacenza, L. Ventura)
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Is the Smartphone Participation Affecting the Web Survey Experience?

L'utilizzo di smartphone ha impatto sulla partecipazione ad indagini via web?

Daniele Toninelli and Melanie Revilla [1]

Abstract The last years' worldwide spread of mobile devices (smartphones and tablets) considerably encouraged the mobile participation to web surveys. These devices are different from PCs, e.g. in terms of screen size and portability. In particular, we expect that the higher portability makes respondents more likely to participate from public spaces and/or in the presence of other people. This could affect the survey answers, mostly when sensitive topics are asked. This paper focuses on the comparison of PCs and smartphones and is based on a two-wave experiment that involved 1,800 panellists for Spain of the Netquest opt-in panel. We studied to what extent the locations for the PC and the mobile participation are different and how this factor can affect how respondents felt about the participation itself.

Abstract *La diffusione degli ultimi anni di dispositivi mobili (smartphone e tablet) ha incoraggiato il loro utilizzo per partecipare ad indagini via web. Le caratteristiche di tali dispositivi sono diverse da quelle dei PC (ad es. le dimensioni dello schermo). Inoltre, la più elevata portabilità aumenta la probabilità di partecipazione da luoghi pubblici o in presenza di terzi. Ciò può influenzare le risposte fornite, soprattutto per argomenti sensibili. Questo lavoro confronta PC e smartphone ed è basato su un esperimento che ha coinvolto 1.800 panelisti di Netquest (Spagna). L'obiettivo è capire se ed in quale grado il contesto della partecipazione via dispositivi mobili sia diverso da quello via PC e come questo fattore impatti su come i rispondenti percepiscono la partecipazione all'indagine.*

Key words: mobile web surveys, smartphones, survey participation, survey methodology, survey context.

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1 Introduction

The use of mobile devices for the survey participation became, in the last years, a more and more spreading phenomenon and a leading research topic (de Bruijne and Wijnant, (2013, 2014), Toninelli et al., (2015)). One of the causes of this phenomenon is the quick spread of mobile devices in most countries: the mobile Internet usage increased from 8.5% (September 2012) to 41.0% (September 2015; source: StatCounter Global Stats, (2015)). At the same time, the PCs (desktops and laptops) web accesses showed a drop from 91.5% to 59.0%. A lot of studies started focusing on the "unintended mobile participation" (Peterson, (2012)), that is observed when respondents attempt to participate in web surveys using a mobile device, even if surveys are not adapted for this type of participation.

From the methodological point of view, the use of mobile devices could affect the quality/comparability of collected data and the response process (Peytchev and Hill, (2010)). This is because mobile devices have different characteristics, if compared to PCs. For example, the screen size is smaller and their portability allows the participation from a wider range of places and makes the presence of bystanders more probable. This work aims at comparing the PC and the mobile web survey participation in terms of their contexts.

The next section introduces the main literature findings and our research objectives. Section 3 gives details about the data collection methodology. Section 4 shows the main results, which are discussed in the conclusions section.

2 Literature review and goal of the paper

Previous studies focused on the comparison of the PC and the mobile participation. Some of them referred to the characteristics of respondents (e.g., Antoun, (2015) and Revilla et al., (2015)) or to the coverage error (e.g., Mohorko et al., (2013)).

Mobile participation does not affect the evaluation of questionnaire difficulty and the interest and the enjoyment of respondents (de Bruijne and Wijnant, (2013)). Nevertheless, completion times are usually longer for mobile devices than for PCs (Mavletova, (2013), Andreadis, (2015)), even if the gap is reduced if a mobile-friendly version of the questionnaire is provided (Toepoel and Lugtig, (2014)). Break-off rates are higher for mobile web (Buskirk and Andrus, (2014)) but a questionnaire optimized for the mobile participation helps in reducing this issue (Stapleton, (2013)). Other studies focused on how the mobile web participation can influence survey responses (Newell et al., (2015)). The device effect is expected to be higher when dealing with sensitive questions. In particular, using mobile devices, the social desirability bias can affect the respondents' willingness in reporting sensitive information or the perceived privacy (Mavletova and Couper (2013)); moreover the presence of bystanders' effect can vary according to the questions' topic.

Our goal is twofold: on the one hand, we aim at studying if and how the context of the mobile web participation is different from the PC context (public rather than domestic places, higher probability of having bystanders); on the other hand, we want to evaluate the potential impact of the survey context on how the respondents evaluate the survey experience (in terms of perceived privacy and confidentiality).

3 Data and methods

This project was conceived as a replication of the Mavletova and Couper (2013) experiment. Thus, whenever possible, we used the same questions and very similar settings. Our data were collected by means of a two-wave experiment. The same group of panellists answered twice the same questionnaire, but each time they were randomly assigned to a specific device (smartphone or PC). We focus on the smartphone participation because this is the most common mobile device within the Netquest panel (Revilla et al., (2015)) and because it is more different from PC than tablet.

The full questionnaires, by survey condition, are available at the following links: http://goo.gl/g9gAE4 (PC); http://goo.gl/4c9d1C (smartphones, not optimized for mobile participation); http://goo.gl/5jF2vr (smartphones, optimized version). In this work the two last categories (optimized/not optimized) are collapsed into one category only: we assume that the optimization did not affect the survey context, seen that the device (smartphone) is the same. The survey was developed by Netquest (www.netquest.com), an opt-in online panel, using the panel for Spain. The data collection took place between February 23rd and March 2nd, 2015 (first wave) and from March 9th and March 18th of the same year (second wave).

4 Results

In order to study the survey context, we consider two factors: the place of participation and the presence of bystanders. Table 1 provides the percentages for both waves and the chi-square tests obtained crossing these variables with the used device.

Contrary to our expectation, the participation at home is higher for smartphones (79.4%) than for PCs (76.1%). Mavletova and Couper (2013) found an outside-home completion rate higher for mobile devices (45%) than for PCs (29%). The difference between these two results may be due to the different contexts of the two studies (Spain, in our case, and Russia for the previous study) or to the spreading trends of mobile devices (our data were collected some years later). Nevertheless, our results are confirmed by other research that found “home” is the preferred

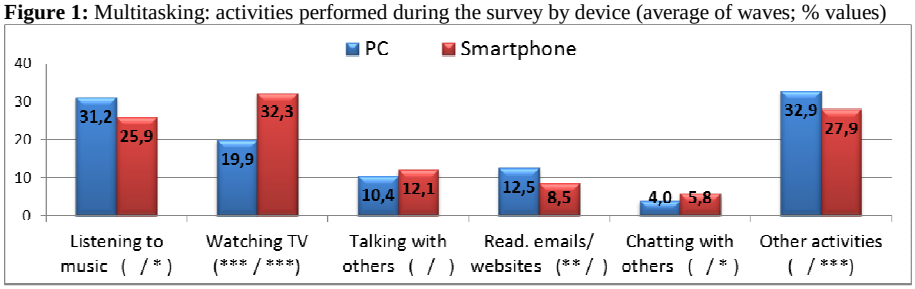
participation place, even if smartphones are used (Revilla et al., (2016) and de Bruijne and Wijnant, (2013)).

Table 1: Percentages (average of two waves) and chi-square tests (context vs survey settings)

Context variables	***Categories***	***Device*** *(% values)*		χ^2 **tests** *(p-values)*	
		PC	***Smart.***	***Wave 1***	***Wave 2***
Place of participation	Home	76.1	79.4	.077	.186
Presence of bystanders	Yes	18.3	28.2	.001	.000
Multitasking (at least one)	Yes	71.2	75.0	.052	.156

The last column of Table 1 shows the *p*-values for the two waves of the chi-square tests crossing the context variables and the used device. The null hypothesis of independence between place ("outside home"/ "home") and device ("PC"/"smartphone") is accepted for both waves (wave 1: p=.077; wave 2: p=.186). Thus, the preference for filling the questionnaire at home is independent from the used device. Focusing on the "presence of bystanders" we notice a higher percentage observed for smartphones (28.2% vs 18.3% of PCs) and the chi-square test confirms the rejection of the null hypothesis of independence for both waves ($p \leq .001$).

Figure 1: Multitasking: activities performed during the survey by device (average of waves; % values)



Note: chi-square tests in parenthesis (wave 1/wave 2): * p ≤ .05; ** p ≤.01; *** p ≤ .001.

Our data also allow us to evaluate multitasking during the survey (e.g. listening to music, watching TV, talking with others, checking emails). For both waves (see Table 1) the hypothesis of independence between the multitasking participation and the used device is accepted (p≥.052). Nevertheless, the conclusions change if we analyse by kind of activity (see Figure 1). For example, smartphone respondents watch TV significantly more than PC respondents (32.3% vs 19.9%). On the contrary, they read less emails (significant in wave 1). Thus, overall the PC and the smartphone participation are linked to different specific tasks. This could affect the quality of the collected data, mostly in terms of their comparability.

Thus, even if the survey participation is still mostly performed in a domestic context, does the significantly higher presence of third parties, when smartphones are used, affect how respondents felt during the survey? Or does the different context affect how the respondents feel the survey experience? To answer to these questions we analyse the perceived confidentiality of the survey, the perceived sensitivity of

the questions and how much the respondent felt uncomfortable answering to sensitive items (Table 2).

Table 2: Survey experience variables (average of waves) and chi-square tests (vs survey settings)

Survey experience variables	***Categories***	***Device*** *(% values)*		χ^2 **tests** *(p-values)*	
		PC	***Smart.***	***Wave 1***	***Wave 2***
Trust in confidentiality	Trust	99.0	98.4	.129	.428
Questions sensitivity	Sensitive	93.3	94.3	.368	.426
Feeling uneasy	Felt uneasy	29.1	27.6	.625	.079

Most respondents trusted in the confidentiality of the survey using both PCs (99%) and smartphones (98.4%). In both waves the hypothesis of independence can be accepted ($p \geq .077$). A similar situation is observed for the "perceived questions sensitivity": the hypothesis of independence is accepted ($p \geq .368$), so there is no link between the two variables. The independence between the variables "feeling uneasy during the survey" and "used device" is also confirmed ($p \geq .079$).

5 Conclusions

In this paper our scope was mainly to compare the participation to web survey through PCs and through smartphones.

First, we analysed the context of participation. Summarizing our results, we noticed that the high portability of smartphones is not really affecting the place of participation as expected, since the most recurrent place of participation is "home", even if a smartphone is used. These finding may be affected, at least partially, by respondents that received the survey invitation on PCs, at home, and were asked to participate by smartphones. Nevertheless, we observed a significantly higher percentage presence of bystanders, when respondents participate by means of smartphones. This setting can affect the quality of collected data, mostly when sensitive topics are asked. Indeed, the social desirability bias can cause an even higher misreporting of sensitive information, when third parties are present.

We also tested if, during the survey participation, mobile respondents show a higher multitasking (e.g., reading emails, talking with other persons, chatting online). At the aggregated level (all activities together) we found no significant link between the used device and such kind of activities. However, when looking at the different activities separately, we saw that there are significant differences in the kind of activities performed by PCs and smartphones respondents. We observe a different kind of multitasking for the two devices.

Then, we evaluated if the use of smartphones rather than PCs also affects how respondents feel about the survey experience. We found no significant device effect for these three factors: the perceived confidentiality of the survey, the perceived sensitivity level of the questions and the feeling uncomfortable during the survey.

Our results can be read combining them with the Mavletova and Couper's (2013) ones. Some of the findings of these authors are confirmed (e.g. the higher presence of third parties with smartphones), whereas some of the differences (e.g. about the perceived trust in data confidentiality) can be probably attributed to the two different countries studied or to the quick evolution of mobile web participation (the preference of "home" to participate in web surveys also by means of smartphones).

In order to further test the robustness of our results, we suggest developing further research on probability based panels, involving more countries, including in the study other types of devices (tablets), or focusing on other survey topics.

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