



# **Bilateral Conference on Statistical Methods for Service Evaluation**

## **IES2016**

**ies.ase.ro**

**Bucharest University of Economic Studies**

**17<sup>th</sup> of June, 2016**

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## PROGRAM

### IES2016 Conference activities will be held on the **Ion N Angelescu Building**

Bucharest University of Economic Studies (BUES)

2-10 Caderea Bastiliei St. corner to 6 Piata Romana St., 1 st District , Bucharest

**Friday, 17th of June, 2016**

Time	Event	Location
8:45-9:30	<b>Registration</b>	Ground Floor, Entry Hall near Virgil Madgearu Room
9:30-10:00	<b>Opening ceremony</b> <b>Prof. Mihai Daniel Roman</b> , Head of Doctoral School, Vice-Chancellor, BUES, Romania <b>HE Diego Brasioli</b> , Ambassador of Italy in Bucharest, Romania <b>Prof. Marian Dârdală</b> , Dean of the Faculty of Economic Cybernetics, Statistics and Informatics, BUES <b>Prof. Luigi D'Ambra</b> , University of Naples, Italy	Virgil Madgearu Room, Ground Floor
10:00-11:20	<b>Plenary lectures</b> <b>Prof. Maurizio Carpita</b> , University of Brescia, Italy <i>Measuring and Modelling the Quality of Work in the Italian Social Services Sector Combining the Rasch and the Latent Variables Approaches</i> <b>Prof. Zoltán Néda</b> , Babeş Bolyai University, Cluj Napoca, Romania <i>Non-Pearson type auto-correlations in stock indices</i> <u>Authors:</u> Bulcsú Sándor, Ingve Simonsen, Bálint Zsolt Nagy and Zoltán Néda	Virgil Madgearu Room, Ground Floor
11:20-11:40	<b>Coffee Break</b>	Ground Floor, Entry Hall near Virgil Madgearu Room
11:40-13:00	<b>Plenary lectures</b> <b>Prof. Corrado Crocetta</b> , University of Bari, Italy <i>Evaluation of University Websites</i> <u>Authors:</u> Corrado Crocetta and Francesco D'Ovidio <b>Prof. Leonardo Grilli</b> and <b>Prof. Carla Rampichini</b> , University of Florence, Italy <i>Predicting university student career: modelling gained credits using mixture models and quantile regression</i>	Virgil Madgearu Room, Ground Floor
13:00-14:30	<b>Lunch</b>	Cafeteria, 3 <sup>rd</sup> floor within the same building

Time	Event	Location
	<b>Parallel sessions</b>	
14:30-16:10	<p><b>Session 1 - Chair: Prof. Biagio Simonetti</b>  <b>Marco Marozzi and Mario Bolzan</b>  <i>Measuring household accessibility to services of public utility</i></p> <p><b>Antonello D'Ambra, Anna Crisci and Luigi D'Ambra</b>  <i>Weighted Log- Ratio Analysis on the rates to evaluate the Passenger Satisfaction of a Public Transport Service</i></p> <p><b>Ileana Niculescu-Aron, Constanța Mihăescu, Laura Asandului and Raluca Căplescu</b>  <i>Aspects of social mobility for Romanian 1957-1976 cohorts based on recent survey data</i></p> <p><b>Mihai Daniel Roman</b>  <i>Labour market dynamics and NAIRU in Romania</i></p> <p><b>Adriana AnaMaria Davidescu</b>  <i>Evaluating the Romanian labour market performances</i></p>	Virgil Madgearu Room, Ground Floor
14:30-16:10	<p><b>Session 2 - Chair: Prof. Victor Dragotă</b>  <b>Sergio Scippacecola and Massimiliano Giacalone</b>  <i>Big data for learning and education management</i></p> <p><b>Ion Ivan, Mihai Liviu Despa and Eduard Budacu</b>  <i>Statistical processing on very large comprehensive data sets</i></p> <p><b>Gurjeet Dhesi and Muhammad Bilal Shakeel</b>  <i>Modified Brownian Motion Model: a way for predictions when analysing stock markets</i></p> <p><b>Sebastian Ion Ceptureanu</b>  <i>Financial behavior of Romanian SMEs. A comprehensive survey</i></p>	Oval Meeting Room, 1 <sup>st</sup> floor within the same building
14:30-16:10	<p><b>Session 3 - Chair: Prof. Marcel Ausloos</b>  <b>Claudiu Herteliu, Marcel Ausloos, Bogdan Vasile Ileanu, Giulia Rotundo and Tudorel Andrei</b>  <i>How to identify coercive or glorifying citations? A case study</i></p> <p><b>Raffaella Palma and Enrica Sepe</b>  <i>Teachers' performance in Italian schools through the structural equation model</i></p> <p><b>Pasquale Sarnacchiaro, Ida Camminatiello and Raffaella Palma</b>  <i>Some remarks on teacher performance evaluation: a statistical model</i></p> <p><b>Sergio Scippacecola and Enrica Sepe</b>  <i>Technical efficiency: a critical overview of the methods</i></p>	0129 Room, 1 <sup>st</sup> floor within the same building

Time	Event	Location
14:30-16:10	<p><b>Session 4 - Chair: Prof. Vasile Strat</b>  <b>Simone Di Zio</b>  <i>Georeferenced IRT models for service evaluation: an approach with the use of vector primitives</i>  <b>Marian Dârdală, Mihai Gheorghe, Felix Furtună, Adriana Reveiu</b>  <i>Generating spatial data by aggregation</i>  <b>Monica Roman and Liliana Goțiu</b>  <i>Non-parametric methods applied in the efficiency analysis of structural funding</i>  <b>Eduard Gabriel Ceptureanu</b>  <i>Knowledge transfer in Romanian innovative ITC SMEs</i>  <b>Bogdan Vasile Ileanu, Adrian Pană, Tudorel Andrei and Claudiu Herțeliu</b>  <i>The impact of socio-economic determinants on the infant mortality death. The case of small geographical areas from Romania</i></p>	Robert Schuman Room, 2 <sup>nd</sup> floor within the same building
16:10-16:30	<b>Coffee Break</b>	Ground Floor, Entry Hall near Virgil Madgearu Room
16:30-17:30	<p><b>Round Table on "Service evaluation and contribution of statistics"</b>  <b>Chair: Prof. Mario Bolzan, University of Padua, Italy</b>  <b>Ilie Dumitrescu</b>, National Institute of Statistics, Bucharest, Romania  <b>Prof. Daniel Traian Pele</b>, Bucharest University of Economic Studies, Romania  <b>Simona Stăiculescu</b>, ESRI, Bucharest, Romania</p>	Virgil Madgearu Room, Ground Floor
17:30-17:45	<b>Conference Closing</b>	Virgil Madgearu Room, Ground Floor
19:00-23:00	<b>Social Dinner</b>	Marshal Garden Hotel, 6 <sup>th</sup> floor, Ametist Saloon

## Plenary lectures

### Measuring and Modelling the Quality of Work in the Italian Social Services Sector Combining the Rasch and the Latent Variables Approaches

#### Maurizio Carpita<sup>1</sup>

Professor, Department of Economics and Management,  
University of Brescia, Italy

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#### Abstract:

*The Quality of work has become a major subject of study and discussion in labour economy. In the particular context of the social services sector, its quantification is a challenging task, because it implies the translation of various subjective perceptions into some statistical measures (composite indicators). In this talk two approaches are considered: (1) the Rasch approach (RSM: Rating Scale Model), used to construct some measures of the quality of work with data of the Survey on the Italian Social Cooperatives; (2) the latent variables approach (SEM: Structural Equation Model), with parameter estimated using the Generalized Maximum Entropy (GME) estimator. The final aim is to show how to combine the RSM measures of the approach (1) to evaluate the relationships between latent factors of the quality of work described by the SEM of the approach (2).*

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<sup>1</sup> Maurizio Carpita received his M.S. degree in Political Economics at the University of Trento in 1988 and his PhD degree in Methodological Statistics at this University in 1993. From 2005 is Full Professor of Statistics at the Department of Economics and Management and Scientific Director of the DMS StatLab at the University of Brescia. At present he is a member of the Teachers Committee of the PhD in “Analytics for Economics and Business” at the University of Bergamo. His studies are about the statistical methods for evaluating efficiency and effectiveness of the welfare services, the measurement of subjective work quality, and the socio-economic impact of cooperatives, nonprofit organizations and social enterprises. He is member of the Permanent Group of the Italian Statistical Society (SIS) “Statistics for the evaluation and the quality of services”, fellow of the Italian Association for Applied Statistics (ASA) and senior researcher of the European Research Institute on Cooperative and Social Enterprises (EURICSE).

# Non-Pearson type auto-correlations in stock indices

## Bulcsú Sándor

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## Ingve Simonsen

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## Bálint Zsolt Nagy

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## Zoltán Néda<sup>1</sup>

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## Abstract:

*The origin of the gain-loss asymmetry, observed in the inverse statistics of stock indices, is investigated. This intriguing asymmetry is present for logarithmic return levels that are over 2%, and they are the result of the non-Pearson type auto-correlations in the index. These non-Pearson type correlations can be viewed also as functionally dependent daily volatilities extending for a finite time interval. A generalized time-window shuffling method is used to show the existence of such auto-correlations and their characteristic time-scale is also estimated. Connections with the leverage effect are established.*

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<sup>1</sup> Zoltan Neda holds a PhD in theoretical physics and momentarily he is a professor of theoretical and computational physics at the Babes-Bolyai University of Cluj. His research field is statistical physics with interdisciplinary applications. The main topics he is interested in are: collective behavior in complex systems, nonlinear dynamics, spatial and/or temporal pattern formation, complex networks, emergent and stochastic phenomena. He published more than 100 research papers in top journals in these fields, and had several media appearances with scientific popularization works. He is an elected external member of the Hungarian Academy of Sciences. He was a long-term visiting professor in USA and Hungary, and visiting researcher in Norway, France, Taiwan, Germany, Italy and Portugal. He keeps a close contact with all the former groups and students he collaborated with.

# Evaluation of University Websites

## Corrado Crocetta<sup>1</sup>

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## Francesco D'Ovidio

University of Bari, Italy



### Abstract:

*In order to measure the user satisfaction we propose a composite indicator considering 7 different dimensions. The research covers 3 Universities that have been compared according the same CAWI questionnaire.*

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<sup>1</sup> Corrado Crocetta is Full Professor of Statistics at Faculty of Economics – University of Foggia, Italy. At the Faculty of Economics, he is chair of Statistics and Business statistics courses. He holds a degree in Economics and a PhD in Statistics. He is member elected of ISI, SIS and SIEDS associations. He has been consultant for the Ministry of Education, in charge of some projects regarding the university reform impact evaluation.

At present, he is pursuing his academic interests in evaluation of efficiency of Universities and Judicial systems. Is author of several book and many articles.



# Predicting university student career: modelling gained credits using mixture models and quantile regression

## Leonardo Grilli<sup>1</sup>

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## Carla Rampichini<sup>2</sup>

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## Abstract:

*The talk will consider two recent papers by Grilli, Rampichini and Varriale about modelling credits obtained by university freshmen during the first year, in order to investigate whether the pre-enrolment assessment test is an effective tool to predict student performance. Looking at data from the School of Economics of the University of Florence, it appears that gained credits is a count variable with an irregular distribution and a peak in zero. This pattern represents a challenge in statistical modelling, which is tackled using two distinct approaches: (i) a concomitant variable binomial mixture model, and (ii) a two-part model with a logit specification for the zeros, while positive values are analysed by quantile regression for counts. The two approaches are applied to the same dataset, discussing issues of estimation and interpretation.*

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<sup>1</sup> Leonardo Grilli is Associate Professor of Statistics at the University of Florence. He graduated in Economics in 1996 and earned a Ph.D. in Applied Statistics from the University of Florence in 2000. The teaching activity focuses on introductory statistics and statistical modelling, including generalized linear models and multilevel models. The research activity concerns a variety of statistical methods including random effects models for multilevel analysis, causal inference in the potential outcomes framework, IRT models, latent growth curve models, mixture models, and quantile regression. The methodological work is typically driven by applications on real data in different fields mainly in the social sciences, but also in demography and medicine.

<sup>2</sup> Carla Rampichini is full professor of Statistics at the University of Florence, where she teaches Statistics, and Statistical models. She is a member of the Assessment Unit and of the PhD in Economics of the University of Florence. Her research interests relate to random effects models for multilevel analysis, program evaluation and causal inference. Her methodological work is joined with applications on real data, often concerning the effectiveness of universities, but she also made applications on demographic and socio-economic data. She presented papers at many Italian and international conferences and workshops and some relevant results of her research work on multilevel models have been published on international journals, such as Statistical Modelling, Structural Equation Modeling, and Journal of Educational and Behavioral Statistics.

## Session 1: Virgil Madgearu Room, Ground Floor

**Chair:**

**Prof. Biagio Simonetti, University of Sannio, Italy**



### Measuring household accessibility to services of public utility

**Marco Marozzi**

University of Venice, Italy

**Mario Bolzan**

University of Padua, Italy



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#### **Abstract:**

*How families have access to services of public utility is a matter of considerable importance. It is within the household that needs are created, developed, defined and first expressed and then transmitted to the services system in order to receive the proper response. "Family difficulty" is part of a three-dimensional environment: 1) the main functions of the household; 2) resources available to the household to achieve their aims; 3) the system of institutions in which household policies and interventions operate (Marozzi and Bolzan, 2006). Thus, family difficulty may be defined as an adverse condition, variously perceived by the household, which directly (e.g., the sudden onset of critical events) and/or indirectly (due to the household's structural state or the context of family life), prevents the normal performance of functions necessary for optimal achievement of the expected aims of quality of life (Marozzi and Bolzan, 2006).*

*Our aim is to evaluate access difficulty of Italian households to essential social and health services. The accessibility level of several services, collected by ISTAT (Italian Institute for Statistics) within the Multi-Purpose Survey on Households, is analyzed within the composite indicator framework (Marozzi 2014 and 2015). A composite indicator combines a set of indicators that assess partial aspects of a multidimensional issue that is difficult to, or cannot be, directly measured like active citizenship and rural development. The main steps to compute the composite indicator of accessibility are: (i) summary of individual data; (ii) normalization of summary data and computation of partial indicators; (iii) weighting and aggregation of the partial indicators.*

*The composite indicator measures the global difficulty in accessing services of public utility for households. It is shown that northern Italian regions have more accessible services than central, southern and island regions. A longitudinal comparison has been performed. The results are very worrying because show that policy makers have failed in reducing regional (and in particular north-south) accessibility disparities. The robustness of the results is assessed using uncertainty analysis as suggested by OECD (2008).*

# Weighted Log- Ratio Analysis on the rates to evaluate the Passenger Satisfaction of a Public Transport Service

## Antonello D'Ambra

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## Anna Crisci

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## Luigi D'Ambra

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## Abstract:

*In this talk we consider the  $RC(M)$  proposed by Goodman in the Weighted Log Ratio Analysis context. We combine these two methods we obtain different weighted Log Ratio Analysis that we can extend to analyze a matrix of rates, obtained by performing the ratio between two multidimensional contingency tables  $N$  and  $S$ , respectively. Our approach is demonstrated by an empirical study and the selection of the model to be analyzed through a factorial representation of the Weighted Log Ratio Analysis is carried out through the Poisson Regression.*

# Aspects of social mobility for Romanian 1957-1976 cohorts based on recent survey data

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## Raluca Căplescu

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## Abstract:

*One of the fundamental objectives of the Europe 2020 strategy refers to the social cohesion of its citizens through various programs and measures based on the principle of equality of opportunities. Their educational and socio-professionals' destinies are strongly related both to social background, but also to long-term structural developments in the economy, through transformations imposed by the division of labor. Knowing the trends of social mobility from one generation to another is crucial for the educational and employment' reproduction and, consequently, for smart, sustainable and inclusive growth in any society.*

*Studies on the topic of social mobility are few in Romania, mainly due to the lack of data sources to enable analysis of changes from one generation to another over long periods of time. Therefore, this paper proposes an analysis of educational and occupational mobility in Romania. The data are from a survey recently organized by specialists from the Centre for Surveys and Investigations of the Academy of Economic Studies in Bucharest. Data is analyzed using the mobility tables, log-linear hierarchical models and statistical tests of association and correlation.*

*The results show a coherent picture of educational homogamy of the parents' respondents and a strong tendency to move vertically and occupational education of children from parents. Respondents are generations in the range 1957-1976 and the period in which they could complete the studies at any level, was from 1967 to 2000. Vertical social mobility of these generations has many determinants related primarily to developments in the structure of the socialist planned economy, the effects of the policy of broad access to education and labor obligation imposed by the communist regime until 1989. Secondly, political changes, economic and social transition to a market economy in 1990, interfered with the emergence of private education at all levels, especially with the expansion of private higher education institutions. The inertia of traditional values regarding education level, the rise and social prestige that it entailed, caused a significant increase in the number of students in private education (where the access is much easier in terms of financial and academic performance compared to public education institutions).*

# Labour market dynamics and NAIRU in Romania

**Mihai Roman**

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## **Abstract:**

*Phillips curve usually describes the negative relationship between unemployment and inflation. Modern macroeconometrical models use always other version of Philips curve, where unemployment rate is replaced by aggregate demand gap, using the Okun law. Late 90's, when unemployment rate was under NAIRU estimates, the prices does not increases in most of economies. In this case potential GDP depends not only on labor (or unemployment) but also on capital increases or technological investments. In this paper I analyze the Romania labor market dynamics last decades and also the NAIRU level. The Romanian labor market register a cyclical evolution but the inflation rate decreased constantly. Using last decade quarterly data, in Romania the Phillips curve was not verified (due on various shocks generated by financial crisis) and the NAIRU level was estimate at 4.7%.*

# Evaluating the Romanian labour market performances

## **Adriana AnaMaria Davidescu**

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Bucharest University of Economic Studies, Romania

Senior researcher, National Research Institute for Labour and Social Protection, Bucharest, Romania



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## **Abstract:**

*The paper aims to evaluate the Romanian labour market performances at regional level using data covering the period 20002-2015 using principal component analysis and to highlight the regional poles from this perspective using cluster analysis. The empirical results revealed an improvement of Romanian labour market performances across the regions comparing in 2015 against 2000.*

## Session 2: Oval Meeting Room, 1<sup>st</sup> floor

**Chair:**

**Prof. Victor Dragotă, Bucharest University of Economic Studies, Romania**



### **Big data for learning and education management**

**Sergio Scippacercola**

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**Massimiliano Giacalone**

Department of Economics, Management and Institutions, University of Naples, Federico II, Italy



**Abstract:**

*The work recalls the fundamental concepts on Big Data, highlighting, in particular, applications of analytical techniques and supporting technologies in e-learning. The huge volumes of data available nowadays are becoming e-learning protagonists, for example, to effectively and efficiently identify the learning needs of students. The study compares the Big Data with Data Mining, e-learning techniques and learning-analytics. The principles of ethics and privacy are to be observed and are mentioned. The work shows the key benefits of the adoption of Big Data in the educational sector.*

# Statistical processing on very large comprehensive data

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## Abstract:

*Within the context of removing restrictions in terms of information storage and data acquisition, the topic of developing very large databases has become mainstream.*

*Nowadays there are databases that store information related to: - an entries' country population; - taxpayers' fiscal records; -students who graduate high school; - all students who take the graduation exam in the 8th grade; - weather conditions all over the world; - images captured in a particular traffic point.*

*It is particularly important to ensure the quality of data stored in a database which refers to an entire statistical population, aiming to at least ensure: - data completeness, meaning that for all of the elements within the population a record must exist in the database; - data accuracy, obtained by applying acquisition, measurement and storage procedures by all data operators; - data uniformity, which involves using the same measurement units and measurements instruments that were properly calibrated and certified beforehand.*

*For all statistical indicators the value of the information they provide is radically transformed, because by contrast to the situations in which work was performed using samples and raised the issue of extrapolating results at population level, now the entire populations' database is available thus facilitating the way for statistical indicators to be used directly and effectively to substantiate decisions. Calculating statistical indicators allows for: - determining the precise levels of required resources by establishing a comprehensive system of hypothesis; - performing a structural stability analysis of the statistical population by studying the transition from a subset to another; - the dynamics analysis of the input and output elements of the statistical population; - identification of distribution laws that allow behavior related simulations.*

*All statistical processing methods and techniques retain their validity in the context of the operation on complete statistical populations.*

*All risks, related to hypothesis systems which are built based on hypothesis that were accepted even though were false, are significantly diminished because it removes the extrapolation factor from the sample to statistical population process.*

*The new approach aims to change the entire contents of statistical processing, moving the effort to managing data quality. The role of the computerization process within integrated statistical systems no longer being to estimate but instead to rigorously calculate, thus decisions are no longer based on incomplete information.*



# Modified Brownian Motion Model: a way for predictions when analyzing stock markets

## Gurjeet Dhesi

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## Muhammad Bilal Shakeel

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## Abstract:

*This paper aims to focus on an innovative approach for prediction within stock markets. Based on Modified Brownian Motion Model the kurtosis of returns' distributions are estimated. Therefore important information may be obtained using this approach.*

# Financial behavior of Romanian SMEs. A comprehensive survey

**Sebastian Ion CEPTUREANU**

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## **Abstract:**

Entrepreneurship is recognized as a major source of innovation and economic change, and therefore stimulates sustainable development and promote competitiveness. Even though SMEs have an important socio-economic significance, their survivability and long-term growth is frequently compromised by systemic constraints such as access to finance. As such, financing is a major issue in the development, survivability and growth of SMEs.

Various studies point out that the factors that have impact on financial behavior of SMEs include business characteristics and entrepreneurial characteristics. We assume business characteristics as the key factors explaining SMEs financial behavior. Hence, this paper emphasize their impact on financial behavior of Romanian SMEs in terms of size, industry or legal form.

## Session 3: 0129 Room, 1<sup>st</sup> floor

### Chair:

**Prof. Marcel Ausloos, University of Leicester,  
United Kingdom**



## How to identify coercive or glorifying citations? A case study

### **Claudiu Herteliu**

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### **Tudorel Andrei**

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### **Abstract:**

*The paper addresses very hot topics in the line of several recent papers top journals, and debated within the highest ranked academic journals: we point to the peer review process and its weaknesses. Our approach follows a less often explored area: coercive citations resulting in the increase of the Hirsch h-index. All stakeholders involved in the peer review process should be (and are likely) aware of the existence of such situations.*

# Teachers' performance in Italian schools through the structural equation model

## Raffaella Palma

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## Abstract:

*The overall goal of this work is to examine a specific motivation, called Public Service Motivation (PSM) which may lead to an improvement in the quality of public service. Several authors noted that a high motivation to contribute to society, called Public Service Motivation (PSM), gives rise to higher individual performance. Based upon this perspective, this paper is aimed at verifying the existence of relationships between the PSM and the Individual Performance. Moreover, we attempt to analyze the connections of PSM with Job Satisfaction, Burnout, which is a cause of people leaving their jobs and Resigned Satisfaction, which in the long term leads to Burnout.*

*The analysis is based on a sample of 297 Italian teachers working in state primary and secondary schools. Starting from the Factorial Analysis, the collected data are analyzed to test the correlation between the variables under study.*

*Following this, the data set was estimated by applying structural equation modelling to establish the existence of significant relationships among the examined variables. In particular, the Partial Least Squares Path modelling has been utilized for this analysis, given the non-normal distribution of data. The non-normal distribution of sample has been confirmed by the descriptive statistics applied to mentioned variables. Finally, in addition to discussions and implications, suggestions for future research are made, based on the results.*

# Some remarks on teacher performance evaluation: a statistical model

**Pasquale Sarnacchiaro**

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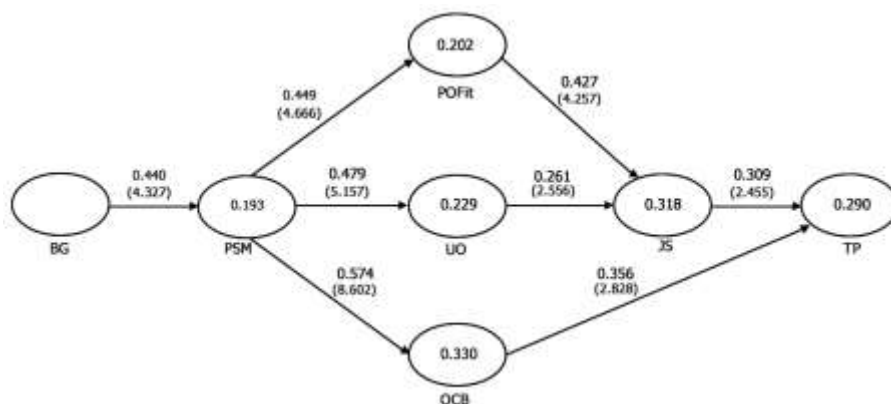
**Raffaella Palma**

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## Abstract:

The aim of this research is to construct a conceptual model that allows us to identify the factors influencing teacher performance. Starting from an overview of the literature, we identified six factors which could play an important role in determining performance: Public Service Motivation (PSM), Person-Organization Fit (POFit), Organizational Citizenship Behavior (OCB), Job Satisfaction (JS), User Orientation (UO) and Background (BG). In order to verify these Research Hypotheses, a Survey has been conducted and 507 public teachers have been interviewed over a period of a school year, precisely in four months, and the tool we used to gather data is a written questionnaires. In order to formalize a scheme for the interpretation of TP and detect the drivers, a SEM was elaborated. The results of the PLS estimations are presented in Figure 1.



**Figure 1:** Structural Equation Model. Coefficients, R<sup>2</sup> in the ovals and t-statistics in brackets

This model shows that the presence of PSM in a teacher might depend on the exposure to experiences mainly associated with religious activity, family socialization and youth volunteering. The results show that teachers who have high PSM are good teachers as happens for public employees [5], [8]. Nevertheless, in school context this relationship between PSM and performance does not travel in a straight direct way (as we proved unsuccessfully), but goes through three different routes along which PSM encounters some other variables so that its bearing on performance becomes significant and effective.

# Technical efficiency: a critical overview of the methods

## Sergio Scippacercola

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## Enrica Sepe

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## Abstract:

*The target of this study is to expose critical observations to give an opportunity to be more careful in choosing the most appropriate method for evaluating Technical Efficiency.*

*Technical Efficiency (TE) is a basic tool to determine the factors that slow down production. TE aims to evaluate and compare the operating performance of a set of production units, such as Companies, Offices, Hospitals, Banks, Schools, Transport Systems, etc. The literature on the measurement of Technical Efficiency provides a range of methodologies.*

*This paper presents an overview of the literature on the studies, comparing the main two approaches, namely Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA). DEA is the model most popular with many applications in various domains.*

*The purpose of this paper is to provide a significant critical overview on the main pros and cons of measuring technical efficiency because less effort has been directed toward a competing efficiency model such as SFA.*

## Session 4: Robert Schuman Room, 2<sup>nd</sup> floor

### Chair:

**Assoc. Prof. Vasile Alecsandru Strat, Bucharest University of Economic Studies, Romania**



## Georeferenced IRT models for service evaluation: an approach with the use of vector primitives

### Simone Di Zio

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### Abstract:

The models known as IRT (Item Response Theory) are used for the detection of latent variables. We propose here the adaptation of some IRT models in space, where spatial data (typically personal judgments) are collected by using specially designed questionnaires, called spatial questionnaires. The questionnaire can be administered to citizens, for the detection of needs or for the evaluation of public services. But, it can also be used for the evaluation of any other type of service which spreads on a territory. The basic hypothesis is that in such contexts the evaluation of a service depends on the geographic location where the service is offered.

The spatial judgments, collected through the spatial questionnaire, are stored in a GIS (Geographic Information System) database, by using vector data models, which are based on points, lines, or polygons. Therefore, according to the specific research problem, the spatial questionnaire can be designed for points, lines, or polygons.

Each vector object is considered as an item of a test for the measurement of a latent construct, so that the estimation of the latent variable can be realized in a spatial differentiated way. The georeferenced IRT models allows the estimation of an item parameter for each spatial location (i.e. vector object), and appropriate spatial covariates can be used in order to explain the different levels of the latent variable.

The resulting estimates of the item parameters can be easily represented on a GIS map, with obvious advantages in terms of interpretation and are directly usable as a Decision Support System (DSS).

We present two applications: one (based on a polygon vector data model) about the detection of the citizens' needs in a context of geomarketing, and another (based on a point vector data model) to attain geographically differentiated measures of tourist satisfaction. Models for line vector data are also discussed.

# Generating spatial data by aggregation

## Marian Dârdală

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## Mihai Gheorghe

Bucharest University of Economic Studies, Romania



## Felix Furtună

Bucharest University of Economic Studies, Romania



## Adriana Reveiu

Bucharest University of Economic Studies, Romania



## Abstract:

*The article aims to showcase a spatial data aggregation model which generates a new spatial data set. The necessity of this study is driven by the fact that in a Map Document different spatial entities can be visualized. For instance, the administrative representation can be illustrated on various levels: communes, counties, regions and macroregions. In this particular situation, data can originate from different sources and when inserted in the same Map Document, the perimeter of the county might not precisely correspond with the communes that form the border of that county. In order to prevent such scenarios, it is recommended that starting from the lowest representation level, the other entities to be formed through aggregation. The aggregation model is based on the relational description of data, i.e. a table in the database which defines a one-to-many relation, therefore the means to aggregate spatial entities to form a new higher level entity. The geoprocessing model was built to handle polygon spatial data and using the aggregation spatial operator, the outcome can be polygons or polylines in case the desired result is just the border. The model can be extended as well for non-spatial indicators tables so that their aggregation to lead to adequate values for the new entities. In this case, the aggregation entails defining the function the entities are grouped by, which can be: Sum, Average, Minimum, Maximum and so on, depending on the features of the software product. The new approach aims to change the entire contents of statistical processing, moving the effort to managing data quality. The role of the computerization process within integrated statistical systems no longer being to estimate but instead to rigorously calculate, thus decisions are no longer based on incomplete information.*



# Non-parametric methods applied in the efficiency analysis of structural funding

## Monica Roman

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## Liliana Gotiu

Bucharest University of Economic Studies, Romania



## Abstract:

*One of the most widely used methods in assessing the efficiency of public policies for a set of units is Data Envelopment Analysis (DEA). DEA is a non-parametric method which identifies an efficiency frontier on which only the efficient Decision Making Units (DMUs) are placed, by using linear programming techniques. By applying nonparametric techniques of frontier estimation, the efficiency of a DMU can be measured by comparing it with an identified frontier of efficiency. The aim of the paper is to analyze the regional differences existing between Romanian counties with respect to the efficiency of European structural funds (ESF) devoted to finance educational infrastructure. The regional dimension was enclosed in the model by considering 31 Romanian counties as decision making units (DMUs). The results confirm the deep disparities existing between Romanian counties concerning the efficiency of using ESF.*

# Knowledge transfer in Romanian innovative ITC SMEs

**Eduard Gabriel CEPTUREANU**

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## **Abstract:**

This paper examines knowledge transfers within innovative SME from ITC sector in Romania. Using the concepts of capabilities and knowledge management, we analyze changes in the performance (efficiency and efficacy) of involved companies in our research. We find that transfer of knowledge became increasingly stable when small and medium enterprises use a model of change and specific capabilities.

# The impact of socio-economic determinants on the infant mortality death. The case of small geographical areas from Romania

## **Bogdan Vasile Ileanu**

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## **Adrian Pană**

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## **Claudiu Herțeliu**

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## **Abstract:**

*Infant mortality in Romania had an exponential decrease from 20.5 deaths/1000 births in 1998 to 9.0 deaths/1000 births in 2012 but it is still three times higher than EU average. It is worth to analyze the variability and impact of socio-economic determinants on the infant mortality at lowest level of territorial administrative unit.*

*Quantitative analysis applied reveals a high heterogeneity between Romanian localities. Some important socio-economic indicators such as connection to water pipe or connection to sewage are found irrelevant but others like female education, share of Roma population, and access to family doctor are found as major determinants.*

## Round Table on “Service evaluation and contribution of statistics” Virgil Madgearu Room, Ground Floor

**Chair:**  
**Prof. Mario Bolzan, University of Padua, Italy**



### **Rational:**

#### Evaluation for decision-making

*Evaluation is a mental process of analysis and synthesis with a view to learning from experience, making good use of what one has learnt to improve on current activities and promote planning development through accurate selection amongst alternative options. Evaluation is essentially a major cultural approach to decision-making.*

*Considering evaluation as a decision-making tool and is essential to locating it in two different contexts: the operative-technical one and the really political-strategic one.*

*Evaluation may arise from several needs such as 1) lack of information necessary to planning and setting objectives; 2) lack of knowledge to manage an already implemented operating system; 3) medium-term need to review activities when work is in progress; 4) need to check once work is over.*

*When statisticians work with decision-makers, positive results can be achieved if they all put prejudices aside and co-operate with a view to striking an optimal balance between tools and designs”, so that decision makers can decide between alternative options concerning the competence “to discriminate between target or policies”*

#### Questions as an agenda for the round table:

- 1) *What information do we need in terms of statistical indicators (properties and level of accessibility for users), to ensure positive, user-friendly evaluation of services, for example in the Public Administration?*
- 2) *What is the role of statisticians as producers of information as per point 1 above)?*
- 3) *What are the more (and less) important skills and competencies for statisticians to meet requirements outlined under point 2?*
- 4) *What are the more (and less) important skills that allow statisticians and public managers to achieve optimal collaboration in evaluation services?*

### **Discussants:**

**Ilie Dumitrescu<sup>1</sup>**

National Institute of Statistics



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<sup>1</sup> Mr. Ilie Dumitrescu graduated the Institute of Economic and Statistics and since graduation, he offered more than 50 years of experience as a statistician working with official statistics. He has involved in practically all fields of economic and social statistics, having as areas of excellence: institutional structures related to statistics, legal framework, European Code of practice, quality management in statistics; EU legislation in agriculture statistics and other related fields, population and social statistics, international relations. He was involved in different projects of technical assistance in Ukraine, Rep. of Moldova, Armenia, Georgia, FYROM, etc due to his in depth knowledge of assessing third country legislation and institutional arrangements for compliance with EU standards. He was short term FAO expert assisting national institutes for statistics from different countries in reorganizing agriculture statistics and implementing statistical surveys in this field. For three years he was working in Vilnius, Lithuania for the Programme Coordination Unit in charge with observing the monitoring and reporting on the PHARE Statistical Cooperation Programme. He is member of the International Statistical Institute, he co-authored numerous published articles.

**Daniel Traian Pele<sup>1</sup>**

Department of Statistics and Econometrics, Bucharest University of Economic Studies, Romania



**Simona Stăiculescu<sup>2</sup>**

ESRI, Bucharest, Romania



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<sup>1</sup> Pele Daniel Traian, Ph.D., Bachelor's studies in mathematics, Ph.D. studies in statistics, post-doc. Academic staff at the Department of Statistics and Econometrics of the Bucharest University of Economic Studies, member in various research teams as expert in statistics/econometrics. Consultant at the World Bank for statistics and data analysis, expertise in applying statistical models to real-life problems.

<sup>2</sup> Simona Stăiculescu, Bachelor's studies in Mathematics and Computer Science, University of Bucharest, M.Sc. in Computerized Project Management, Bucharest University of Economic Studies, member in various projects as expert in GIS (Geographic Information Systems). Project Manager and Developer at Esri Romania, mainly responsible for education and geospatial technologies implementation in different industries, with expertise in spatial data analysis for decision making.