METHODOLOGIES AND TECHNIQUES FOR GEO-SPATIAL STATISTICS

Project 8

Title: Use of GIS and WebGIS tools in statistical production, analysis and diffusion processes.

Description: The aim of the traineeship is to deepen the theoretical and practical aspects of integrating geographical and statistical information. The aim is to

create use cases oriented towards data analysis. The Geographic Information System for Statistics (Gistat) infrastructure will be supported through Istat technicians and researchers. Particular interest will be placed in the georeferencing of statistical data down to the municipal level (and where possible also to a lower level).

The tutor is available to carry out the tutoring activity in English.

Project 60

Title: Transformations of socio-economic systems in the pandemic era by Covid19: comparisons through statistical indicators between Italian and European regions.

Description: Analysis of official statistical data at the level of Italy (with focus on the region) and Europe useful for to measure the changes induced by the Covid19 pandemic in the territories, both in the demosocial and economic spheres. Due to its characteristics and the commitment required in terms of hours, the internship is preferably addressed to students who will carry out the course with a view to writing their dissertation. The tutors are available to carry out the tutoring activity in English. The project can be carried out also by small groups of students.

ECONOMIC STATISTICS AND NATIONAL ACCOUNTS

Project 9

Title: Pilot study to identify and analyse the economic profiles of private companies (concessionaires and subcontractors) involved in Public Private Partnership (PPP) contracts.

Description: The pilot study will be carried out on a company-by-company basis. The analysis will initially be aimed at studying the profile of the dealerships, and will subsequently focus on the identification and profiling of companies indirectly involved in PPP contracts.

The tutors will be available to carry out the tutoring activity in English.

Project 10

Title: Study on the impact of policies supporting research and development.

Description: The objective of the study is to measure the impact of policies to support business for investments in research and development on total expenditure.

The analysis also aims to identify the distribution of R&D expenditure by

economic activity and region. The study will be carried out on the basis of currently available administrative and statistical sources.

The tutor is available for tutoring in English.

Project 11

Title: Analysis of additional information available in the basic data to support estimates of flows with foreign countries.

Description: The analysis will focus on some information available in the basic data (data on deposits, triangulations, freight and transport services components) that are currently not used for the purpose of estimating the external flows of the national accounts. The study will assess, also by means of a regulatory study on the basic data models, both the possibility of using this information to complement current estimates and the information potential in the light of possible definitional changes in the National Accounts manuals (SNA/SEC).

The tutor is available for tutoring in English.

Project 15

Title: Development of indicators on illegal economy.

Description: Update of information and estimation methodologies on aggregates contributing to GDP estimation and related to illegal activities according to the National Accounts Regulation.

Tutors are available to carry out the tutoring in English.

Project 26

Title: Foreign productions in the context of company income statements and balance sheets.

Description: The main purpose of this work is to identify information in financial statements for different economic sectors and types of enterprises, useful for the identification of the production and value added analysis of enterprises with foreign permanent establishments as required by the European System of Accounts ESA 2010. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 29

Title: Analysis of the impact of the Covid-19 pandemic crisis and recovery on the behaviour and performance of Italian companies.

Description: The main objective is to develop tools to assess the impact of the interruption and resumption of production on the financial (and possibly economic) solidity of companies in the pre- and post-pandemic phases and the possible impact of the NRP. The analysis will use business databases from structural and economic surveys, statistical registers and balance sheet data archives. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 38

Title: Longitudinal studies on the income register.

Description: The trainee will have at his or her disposal a complex database, consisting of a collection of data on a large sample of individuals (around 250,000) specially selected for the placement.

For each individual information on income between 2013 and 2019 will be available. The trainee is required to become familiar with and manage the complexity of the database, and to choose a specific scope of analysis, cross-sectional or longitudinal, possibly devoted to a limited subset of the variables of interest, possibly following and comparing tried and tested approaches.

The tutor is available to carry out the tutoring activity in English.

ECONOMETRICS AND TIME SERIES ANALYSIS

Progetto 16

Title: Analysis of the seasonally adjusted quarterly time series of the general government profit and loss account.

Description: Study of the statistical properties of seasonal adjustment models for the aggregates of the general government profit and loss account and analysis of the quality of the seasonally adjusted series.

The tutor is available for tutoring in English.

Progetto 36

Title: Methods for estimating structural breaks in time series and robustness of parameter estimates within the macroeconomic model.

Description: The objective of the course is to deepen the econometric methodologies to be used to determine structural changes in the relationships estimated by the macroeconomic model adopted by Istat (MEMO-IT). Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 37

Title: Sustainability, welfare and economic models.

Description: Study the developments of macro-econometric models to extend their use to sustainability and well-being. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 54

Title: An analysis on the resilience of Italian households.

Description: The trainee (through the analysis of the historical series of microdata for public use of the ISTAT household surveys of the last 20 years) will study the spending and saving behaviour of households in particular in periods of crisis (such as the one induced by the Covid-19 pandemic) and according to the nature of income and the sector to which the main income earner belongs. By integrating data from other sources, it will also be able to assess the impact of welfare

and income support measures, both national and regional, on the share of the population considered at risk of poverty. With the help of multidimensional data analysis techniques, it will identify the variables (territorial and demographic) that have the greatest impact on household behaviour, and assess the population's ability to adapt to negative shocks in order to construct an ad hoc indicator of household resilience. The tutor is available to carry out the tutoring activity in English.

Project 63

Title: Impact of Multinationals on the Economy of Local Employment Systems.

Description: This work proposes a detailed analysis of the presence of Multinationals in Local Employment Systems and of the synergies created at a territorial level.

An econometric verification of the impact of the presence of Multinationals on local productive activities will be carried out. The tutor is available to carry out the tutoring activity in English.

DEMOGRAPHY

Project 22

Title: Presence and integration of asylum seekers and recognised refugees in Italy.

Description: From a technical point of view, the aim of the training is first of all to analyse the residence permits

issued to non-EU citizens, in particular those for reasons of international protection (asylum, asylum application, subsidiary protection), trying to

harmonise the information coming from different

archives of the Ministry of the Interior. Afterwards, indicators will be built to monitor the presence of non-EU citizens over time and on the territory. The tutor is available to carry out the tutoring activity in English.

Project 70

Title: Regional demographic forecasts.

Description: Preparation of a report on regional population dynamics over the next 40 years. The tutor is available to carry out the tutoring activity in English.

METHODS AND TECHNIQUES FOR STATISTICAL SURVEYS

Project 19

Title: Fertility techniques and analysis.

Description: The traineeship includes collaboration on the elaboration of the new survey questionnaire on fertility. It will include an analysis of the existing literature and a comparison with questionnaires that have already investigated this topic. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 33

Title: Constructing a questionnaire: methodological foundations in research practice

Description: The aim is to provide the theoretical basis of questionnaire construction, using examples taken from ISTAT surveys, then moving on to practical exercises, followed by discussion of the results.

Project 34

Title: Futures studies in Italy: little known but very important.

Description: The aim of the course is to introduce students to a subject area, the one of Futures Studies, which today has very important effects in the context of official research (BES and SDGs indicators in particular).

The internship aims at providing students with the epistemic foundations necessary to face with a more complete knowledge the theme of forecasting (social and otherwise), which is currently the focus of international debate and scientific research. Together with the theoretical foundations, some of the main techniques used in the field will also be illustrated.

The tutor is available to carry out the tutoring activity in English.

Project 49

Title: Goal 4: Quality education for all. The performance of the Italian education system.

Description: The aim of the project is to analyse the criticalities of the Italian education system (with reference to the European context) that emerge through the monitoring of indicators of participation in education and school results. The trainee will also be supported in the drafting of a document (paper, thesis, etc.) from an editorial point of view. The tutor is available to carry out the tutoring activity in English.

Project 59

Title: The Permanent Census of Population and Housing: an analysis of the first results.

Description: Spatial analysis of the phenomena detected by the Permanent Census. The objective is to

describe and characterise territories, e.g. in terms of their vulnerability, resilience and attractiveness. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

METHODS OF MULTIDIMENSIONAL DATA ANALYSIS

Project 20

Title: Analysis of the phenomenon of trafficking of human beings.

Description: In agreement with the United Nations Office on Drugs and Crime - UNODC and with the support of the ISTAT Methodology Sector, we want to estimate the Sustainable Development Goals - SDG 16 on the topic of

trafficking in human beings in the 2030 Agenda.

The training is aimed at learning/refining techniques for measuring complex phenomena on the basis of multiple sources.

The tutor is available to carry out the tutoring activity in English.

Project 39

Title: Composite indices for measuring multidimensional socio-economic phenomena.

Description: The training aims to build a rigorous paradigm for measuring

complex and multidimensional socio-economic-environmental phenomena. The measurement tool covers all data transformation and synthesis techniques, known as composite indices. The traineeship work plan includes the identification of a multidimensional phenomenon (chosen by the candidate, with the help of the trainer), the selection of the elementary indicators, the choice of the normalisation method, the choice of the aggregation method of the normalised indicators, the way of representing the results obtained.

The tutor is available to carry out the tutoring activity in English.

Project 41

Title: Multilevel models for forecasting, estimating and interpreting demo-social phenomena.

Description: The aim of the training is to familiarise oneself with and apply multilevel models. These models allow the variability of the phenomenon to be considered jointly at different levels and to capture the interactions between the micro and macro characteristics of the statistical units under study.

The tutor is available to carry out the tutoring activity in English.+

Project 50

Title: Mental models, disruption and repair.

Description: When people lack information, they build mental models reflecting interdependencies among variables that are not always correctly specified or shared, see Martignoni et al. (2016). The ESR will simulate models (i.e., convenient cognitive simplification of complex conditions) in the

presence of under- or over-specification and assess the practical and managerial implications of the "errors" in the model. The investigation is then extended to allow for multiple agents who routinely interact, exchanging information and beliefs, but these exchanges seldom lead to complete agreement.

The tutoring, if required, will be in English.

Project 57

Title: Work and life-time balance: a gender approach to measuring inequalities.

Description: Among EU countries, Italy ranks 14th in the gender equality index, scoring lowest in the labour domain and making little progress in the time domain. The analysis of gender inequalities, with particular regard to inequalities at work and difficulties in reconciling work and family life, provides a contribution

to the promotion of equal opportunities policies.

The tutor is available to carry out the tutoring activity in English.

Project 58

Title: Sustainable well-being at territorial level

Description: The traineeship includes a territorial data analysis aimed at:

1. Selection of methods and models for the analysis of spatial divergences (spatial analysis and

of variability, etc.);

2. Study on the completeness and quality assessment of indicators in the different BES domains; 2.

3. Use of well-being measures for the evaluation of territorial policies.

Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

Project 64

Title: Evolution of agriculture and resilience of the sector. Assessing the effects of the Common Agricultural Policy – CAP

Description: The trainee will analyse changes in the sector using descriptive analysis techniques; in particular, through inferential statistical techniques, they will identify the strengths of those companies that have survived 20 years of economic history. Finally, the influence of the Common Agricultural Policy - CAP in the evolution of the sector will be analyzed. The tutor is available to carry out the tutoring activity in English.

Project 68

Title: Health conditions and use of health services in Italian and European regions.

Description: The trainee, through the analysis of public microdata (related to the last two editions of the European Health Interview Survey - EHIS) and the application of multivariate statistical techniques, will be able to draw up a picture of the most common diseases by gender, age group and geographical area, as well as the incidence of different lifestyles. They can also detect the

the presence of social inequalities determining the various reasons for recourse to/renouncement of health services and in particular

to prevention visits, focusing the analysis on the behaviour of

population groups (e.g. elderly, immigrants). The tutor is available to carry out the tutoring activity in English.

SOCIAL RESEARCH METHODOLOGIES AND TECHNIQUES

Project 42

Title: Assessment of the quality of data from administrative sources of assets confiscated from the mafia.

Description: The aim of the traineeship is the design of information bases for the monitoring of policies for the re-use of assets confiscated from the mafia and assigned to local authorities, public or non-public institutions. In addition to the subject matter of the training, students will be trained in the procedures of

classification, collection and storage of administrative data for statistical purposes. The tutor is available to carry out the tutoring activity in English.

MACHINE LARNING

Project 35

Title: Sentiment analysis to be applied to data extracted from big data sources.

Description: Identification of techniques for mining big data sources and development of sentiment analysis. Due to its characteristics and the commitment required in terms of hours, this traineeship is preferably intended for students who will carry out the course with a view to writing their dissertation.

The tutor is available to carry out the tutoring activity in English.

STATIC IT SYSTEMS

Project 43

Title: The use of the Statistical Data and Metadata eXchange - SDMX standard in the industrialisation of statistical processes.

Description: As part of the training the student will learn both the modelling of multidimensional statistical tables (defining appropriate metadata) and the creation of a dissemination database(from the metadata to the publication of the datasets on the Public Statistics Hub). The tutor is available to carry out the tutoring activity in English.

Project 73

Title: Generative Models for the creation of Synthetic Datasets.

Description:In this project it is proposed to design and implement generative Deep Learning models and

combinations of them to produce synthetic data for different use cases of the National Institute of

Statistics. Through the course you will acquire methodological skills on deep learning models for generating data distributions (gan, pixel cnn, transformer, variational ae, etc.),

programming in python and various machine learning (scikit-learn) and deep learning libraries (keras, tensorflow, etc.).

(keras, tensorflow, pytorch, etc.).

The tutor is available to carry out the tutoring activity in English.

Porject 74

Title: Extraction of data from satellite maps.

Description: In this course we propose to work on the segmentation and classification of satellite images of urban or suburban areas for the extraction of simple automatic statistics: land

cover, i.e. percentage of soil occupied by civil/military constructions, percentage of plantations, trees, etc. In line with the trainee's interests, the possibility of extracting more complex statistics can also be envisaged.

This project will provide methodological expertise on

deep learning models for image classification (wide residual networks, inception resnet, etc.), segmentation (u- net, etc.) and technical skills in computer vision (open cv), python programming and various machine learning (scikit-left) and deep learning libraries (keras, tensorflow, etc.).

The tutor is available to carry out the tutoring activity in English.

Project 75

Title: Graph Neural Networks.

Description: In this project, particular operations are to be implemented on layers of neural networks of the type

GNNs, called graph convolutions, and "attentional" layers. Subsequently, they will be applied to tasks

interesting for Istat that require node-level, edge-level and graph-level operations. In this project the treinee will acquire advanced methodological skills in data classification with

state of art deep learning models (convolutional neural networks, recurrent convolutional neural networks, recurrent neural tensors) and technical skills in Python programming and various machine learning (scikit-learn) and deep learning libraries (keras, tensorflow, etc.).

The tutor is available to carry out the tutoring activity in English.

Project 76

Title: Mobile Machine Learning.

Description: In this project, it is required to explore all possibilities of data analysis and model training on mobile devices and exchange with a GPU backend. In addition, it is required to contemplate microservice architectures. You will acquire methodological expertise on deep learning models for classification on mobile devices, programming in Python and various machine learning (scikit-learn) and deep learning libraries (keras, tensorflow, etc.). The tutor is available to carry out the tutoring activity in English.

Project 77

Title: Text analysis with Deep Learning techniques.

Description: This internship project requires the classification of tweets of an economic nature according to topics. In addition, a Sentiment Analysis of the tweets through Deep Learning techniques is required.

It is very important to carry out a study of the learning of both unsupervised and supervised models. This implies, on the unsupervised side the application of methods such as FastText for the generation of an embeddings space of the tweets and on the other, the use of classification models based on recurrent neural networks such as Recurrent Convolutional Neural Networks, Transformers, etc…

The tutor is available to carry out the tutoring activity in English.

CROSS-SECTORAL PROJECTS

Project 6

Title: Statistics for sustainability.

Description: The project includes the analysis of statistics for measuring sustainability and the consideration of interlinked issues. The tutor is available to carry out the tutoring activity in English.

Project 7

Title: Statistics for climate change, extreme events and disasters.

Description: The project includes the analysis and development of recommendations related to statistics for climate change, extreme events and disasters. The tutor is available to carry out the tutoring activity in English.

Project 30

Title: Analysis of inequalities in the domains of fair and sustainable well-being.

Description: After a preliminary phase in which the framework used in Italy for the analysis of sustainable and fair and sustainable wellbeing (which pays particular attention to the distributional aspects of wellbeing) will be analyzed, an attempt will be made to extend the analysis of BES indicators on the basis of what has been defined at an international level (Oecd, 2017; Oecd, 2018; Oecd, 2020) and on the basis of the PNNR, with the objective of monitor inequalities in the various aspects that make up well-being in Italy and in other European countries. The tutor is available to carry out the tutoring activity in English.

Project 32

Title: Multidimensional analysis of sustainability.

Description: The aim of the training is the analysis of sustainability with a multidimensional approach.

From a theoretical point of view, the various dimensions of sustainability (economic, social and environmental) and how the concept has been applied in international frameworks will be analysed.

The empirical aspect will be based on the analysis of sustainability indicators in different fields.

Participants will learn about different national and international data sources, about the connections between indicators and will learn about casual links by

using microdata.

The tutor is available to carry out the tutoring activity in English.

IMPLEMENTATION OF IT SYSTEMS

Project 88

Title: Platforms for modelling and synthesis of massive data processing.

Description: The trainee's course includes an introduction to the specialised design platforms available at the National Institute of Statistics, followed by a guided synthesis of transformations of statistical interest, starting from the data sources available at Istat for the trainee's exercise in a "safe" data processing perspective.

The tutor is available to carry out the tutoring activity in English.