



IT tools serving National Accounts in Istat

National Accounts and Business statistics Department

Amman, April 12, 2015



Meeting's Objective

- Shading light on:
 - Short presentation of ourselves
 - Italian experience in National Accounts Department
 - ❖ The Department organization
 - ❖ The main productive processes within the National Accounts Department
 - ❖ The input data
 - ❖ The software tools used by National Accounts at moment
 - ❖ The customize application
 - ❖ The current ICT initiatives



Elena Forconi

- Education
 - ❖ High Degree in "Statistical and actuarial sciences"
 - ❖ Professional license as actuary
 - ❖ Project Management Professional (PMP) Certified
 - ❖ ISIPM-Base Certified
 - ❖ ITIL Foundation v. 3 Certified
 - ❖ Several trading courses on information technology



Elena Forconi: work experience

Dates	Company	Position/Activities
2010	Istat	Head of the Unit "Support, monitoring and verification of the planning and design of software development" of the Department for the National Accounts and Business Statistics
2006 ÷ 2010	Data Management S.p.A	Project Technical Department Manager
1993 ÷ 2006	Finsiel S.p.A.	"Decision support Systems" Operating Unit Manager; Program Manager
1991 ÷ 1992	Presidency of the Council of Ministers	Statistical Data Processing Consultant
1980 ÷ 1991	Italsiel S.p.A.	Member of the "Forecasts and Decisions" group
1980	Gan Soleil	Application of Operational Research to insurances



Enrico Giannone

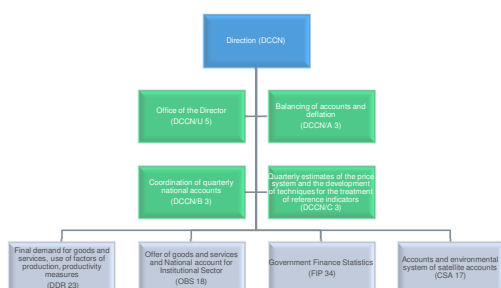
- Education
 - ❖ High Degree in "Political Science and International Relations"
 - ❖ Several trading courses on information technology and International Cooperation



Enrico Giannone: work experience

Dates	Company	Position/Activities
2011	Istat	Project Manager of the Technical Cooperation Unit within the General Directorate
2002 ÷ 2011	Istat	IT Expert of the Final Demand for Goods and Service Division within the National Accounts Directorate
1999 ÷ 2002	Bft Consulting	Webmaster and website administrator (Implementation of php web pages, javascript procedures and MySql database).

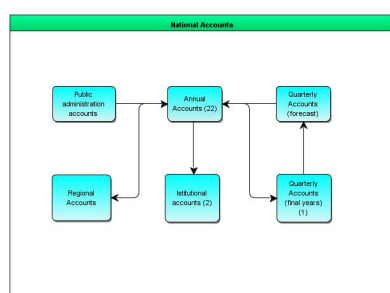
The Department Organization



National Accounts

- National Accounts is the reference model detailing a country's economic & monetary activity (in an accounting form), during a specific time stretch.
- The Italian National Accounts System is based on the European System of Accounts (ESA). National Accounts describe the economic activities that have been implemented on the territory by the operators who execute the due transactions.
- The Accounts System consists of the following typologies:
 - Annual accounts
 - Quarterly accounts
 - Institutional accounts
 - Regional accounts
 - Public administration accounts
 - Social and environmental accounts
 - Satellite accounts

National Accounts – Schematization



National accounts – Process mapping

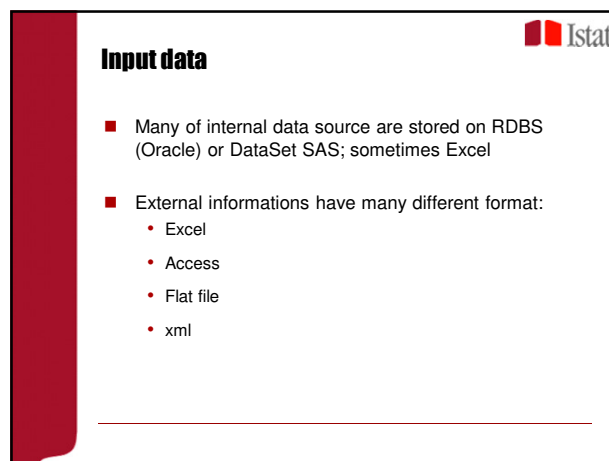
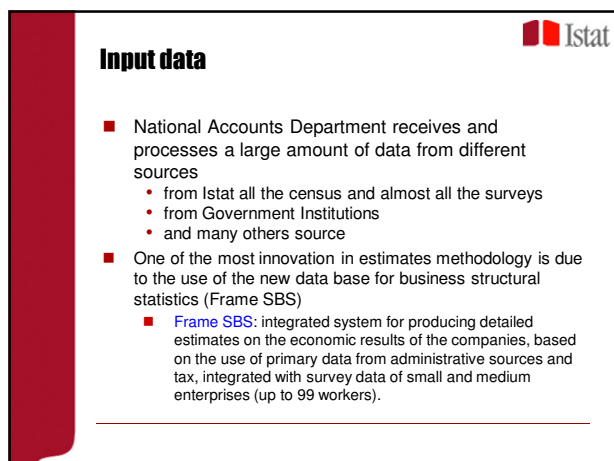
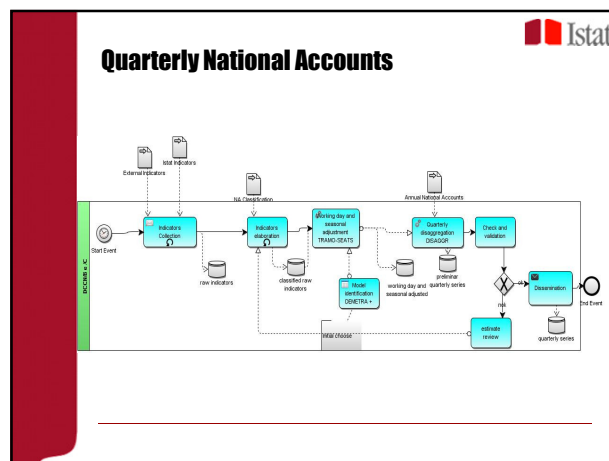
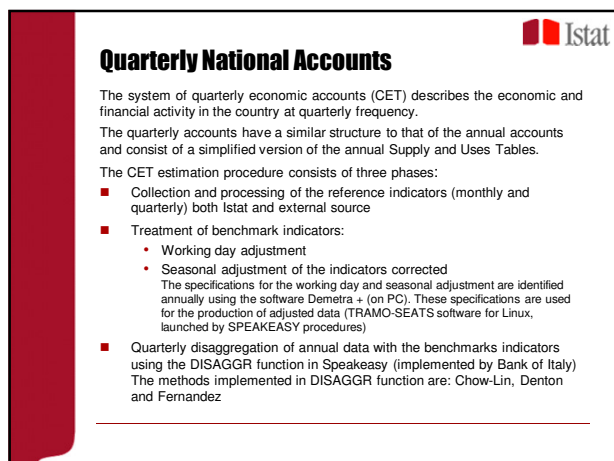
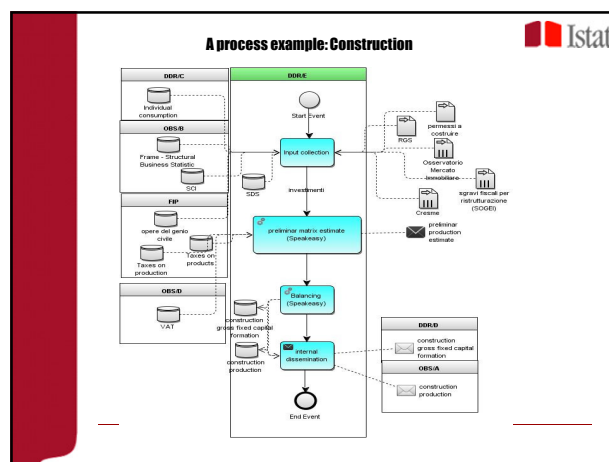
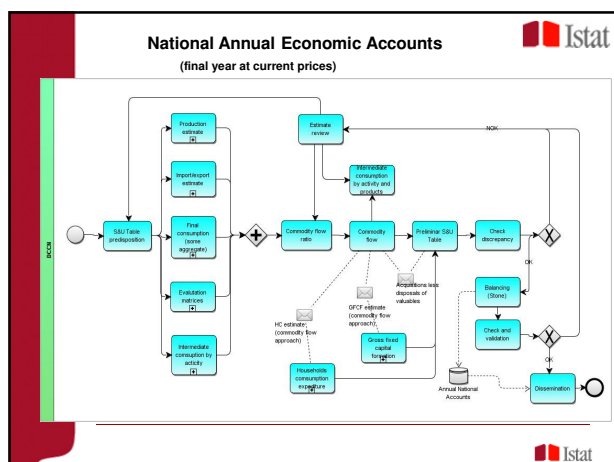
Macro Process	Level 1	Level 2	Level 3	Level 4
Annual (current prices estimation)	1	8	6	6
Quarterly	1			
Institutional	1	2		

Annual Economic Accounts (GDP estimation)

- National Accounts System depicts a country's economic & monetary activity where the temporal measurement unit is the year.
- National Accounts concerns 3-years-related estimations:
 - T-3 time estimation, named "final";
 - T-2 time estimation, named "semi-final";
 - T-1 time estimation, named "provisional".
- The Italian National Accounts System is based on the estimation of Supply and Use Tables (SUT).
- Those tables are organized by products and branches of economic activity providing a detailed summary about goods and services supply and goods and services use for the intermediate/final consumption.
- The estimation of supply and use aggregates is based on independent approaches founded on a system of administrative and statistical sources.

Annual National Accounts

- The aggregate data in the Supply Tables mainly are:
 - Production
 - Import
- The aggregate data in the Use Tables mainly are:
 - Intermediate uses (production costs)
 - Final uses (households consumption, PA & NPISH consumption, Gross fixed capital formation, Changes in inventories, Acquisitions less disposals of valuables, Export)
- Aggregates are estimated at the current prices and the previous year prices and are evaluated according to basic prices, purchasers' prices and factors costs.
- The transition from a kind of evaluation to one another is performed by evaluation matrices containing: taxes, duties and distributive margins (trade and transport).
- Tables undergo accounting constraints which determine the need apply refining operations to the estimations and, thus, to a balancing among supply and uses by means of the Stone, Champenowne, Meade method, (Speakeasy) .
- Within the estimation process, all the National Accounts divisions are involved in it.

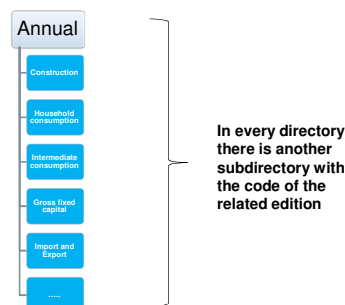


The intermediate results



- For Annual National Accounts the intermediate and final results are organized in matrix format e store on server in a system of directory designed in function of domains
- Everyone of national account employees can read, but only the domain's owners can write
- An accurated back-up system ensure the security and safety of data
- Data are always available as the are shared on the system server, that allows the access also from external location

The intermediate result



Software Systems currently in use



The software systems actually used for the estimations are:

- Speakeasy Linux
- SAS Windows
- Tramo-seats Linux
- Demetra+ Windows
- Excel Windows
- VBA Windows
- R Linux/Windows
- Kettle Windows

The data production is performed by means of these servers:

- BOSNIA It's a Windows Server where SAS is installed. This is mainly adopted for the elaboration of remarkable loads of data (survey, administrative, registers data)
- ALBANIA It is a Linux Server (redhat) where Speakeasy/Modeleasy is installed .

General rule



- As a general rule:
 - [SAS](#) is used primarily to process significant amounts of data (archives of survey, administrative records) as input to the estimation process
 - Once traced the information to the level of disaggregation necessary to estimate the aggregate own accounting, the estimation processes keep going on the [Speakeasy](#) Environment.
 - [Excel](#) has been basically adopted for the stage of control/validation, even though in some cases (i.e. in Public Finance) for the estimation process as well.

General role



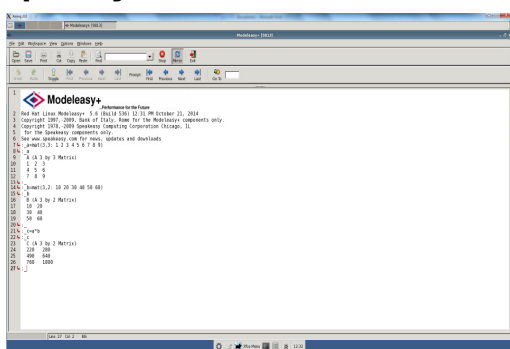
- [Demetra +](#) for the estimation of the model of working day adjustment and seasonal adjustment of indicators;
- [Tramo-Seats](#) for working day adjustment, seasonal adjustment and quarterly forecast;
- [Speakeasy](#) for quarterly disaggregation of annual data by making use of the DISAGGR function implemented «ad hoc» by the Bank of Italy.
- [Kettle](#) for the Extraction, Transformation and Load (ETL) and some other verification applications;
- [R](#) for some minor estimation processes

Speakeasy and related applications



- The Speakeasy Software is marked by EMCC (Econometric Modeling & Computing Corporation);
- The initial version of Speakeasy dates back to the early '60;
- The current release is 5.6 - 2009
- It 'an interactive environment for numerical computation, programmable (played), and extensible. The language is similar to that of SAS / IML. The data is stored in a proprietary format (.keep) or dif.
- The system is widely used in all the processes of elaboration of National Accounts.
- It is estimated that the number of programs used for the estimation of the final year annual economic accounts (at current prices) is about 110 modules.
- Basically the system is used directly by the researchers, to perform arithmetic operations on matrices and vectors.

Speakeasy session

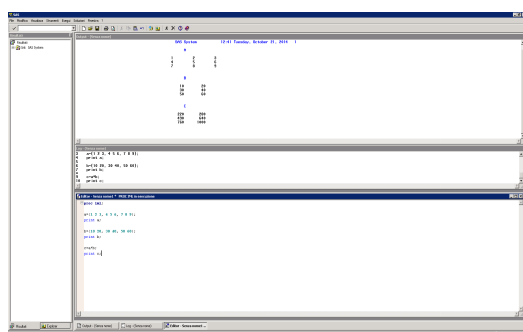


SAS and related applications



- SAS (Statistical Analysis System) is owned by Sas Institute
- Born in 1976
- It is an integrated suite that allows: advanced analytics, business intelligence, data management and predictive
- The currently used release is the 9.1
- The system is widely used in all the processes of elaboration of National Accounts
- Basically the system is used directly by the researchers to carry out estimation from heterogeneous databases often of high dimension

SAS session

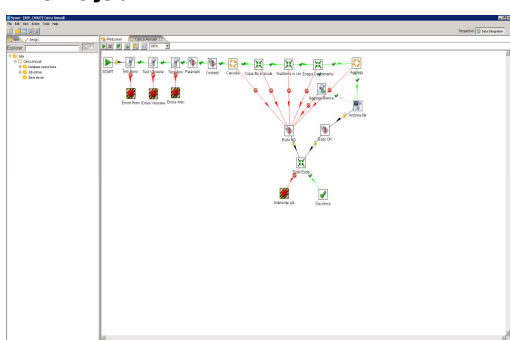


Other software

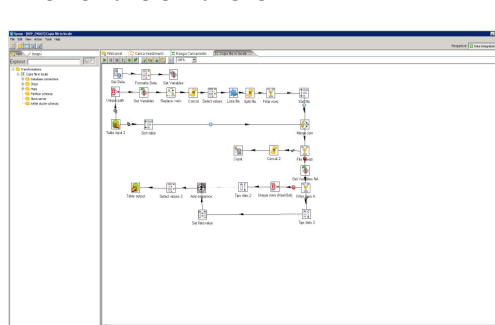


- DEMETRA+
 - Project managed by Eurostat
 - Produced by the Belgium National Bank's Department of Statistics
 - EUPL License (European Union Public License)
 - Free software license
- TRAMO-SEATS
 - Produced by the Spanish Central Bank
 - Recommended for the seasonal adjustment by the European Statistical System and by the ECB (European Central Bank)
 - Free software license
- R
 - Statistical Analysis Software
 - Free software license
- Kettle (Pentaho Data Integration)
 - ETL & Data Integration Software
 - Free software license

A Kettle job



A Kettle transformations



DCCN employees and Software Knowledge



- 72% Speakeasy (62% usage rate)
- 60% SAS (53% usage rate)
- 20% R (mainly entry level)
- 7% Matlab
- The DCCN employees (researchers) compile the code and update the programs by themselves (mainly using Speakeasy, SAS and Excel)
- Otherwise there are some customized applications used by everyone

Customized application



- **Balancing**
 - The balance is used in the context of the estimates of annual accounts to solve the problem of quadratures accounting
 - The technique used is based on the method Stone, Champenowne and Meade (1942) in the formulation and implementation in the environment "Modeleasy" due to Nicolardi ("Balance large accounting systems: an application to the 1992 Italian I-O Table" 2000)
 - The same procedure was implemented in SAS and R

Customized application



- **Archivio**
 - Output of procedure: retention of final information for vintage at different levels of aggregation, in order to provide a basis of reference certified and centralized :
 - ❖ Used for the estimates of the following year
 - ❖ Base for dissemination according to the usual distribution channels
 - ❖ single point of access for any additional processing or investigations
 - ❖ the information stored are in matrix format (product by branch) and in series starting from the year 1990 (the years in the column and branches or products in row)
 - Procedure implemented in "Speakeasy":
 - ❖ Check the coherence of the results
 - ❖ calculates derived information
 - ❖ Reduce information at different level of detail

Customized application



- **Archivio**
 - Procedure implemented in "Speakeasy" for update a centralized storage of annual estimates for vintage and at different levels of aggregation, in order to provide a basis of reference certified and centralized :
 - ❖ Used for the check of results
 - ❖ Used for the estimates of the following year
 - ❖ Used for dissemination according to the usual distribution channels
 - ❖ single point of access for any additional processing or investigations
 - the information are stored in matrix format (product by branch) and in time series starting from the year 1990

Customized application



- **DCCNWeb**
 - Intranet Web application implemented with:
 - ❖ Apache web server
 - ❖ Tomcat web server (to support BIRT)
 - ❖ Php and javascript
 - ❖ BIRT for reporting (open source)
 - ❖ Highcharts
 - ❖ RDBM Oracle
 - ❖ SAS (for ETL and some calculation)

Customized application



- **DCCNWeb**
 - Is used for Annual National Accounts, showing several reports and graphics:
 - ❖ to monitoring and evaluating the results of the elaboration before and after balancing procedure
 - ❖ to compare the different versions inside the same edition
 - ❖ to compare the difference between present and previous editions (every march and october)

Ongoing Projects



- On the side of the estimation procedure :
 - Identification of a Speakeasy alternative Software to prevent the risk of the discontinuity utilization, in addition to overcoming the technical limitations of the product
 - Progressive safety operation on data (input and intermediate) by means of Data Base storing (Oracle)
 - Porting SAS procedure to release 9.3

Ongoing Projects



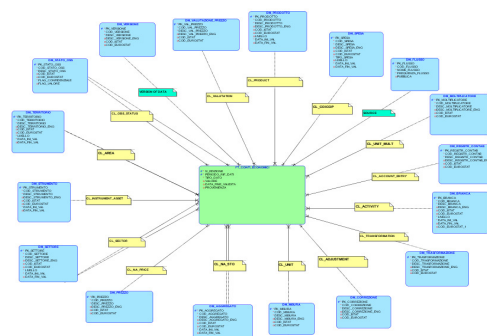
- On side of 'Input':
 - **SyncroRGS**: Kettle application created for the control, analysis and classification (on Oracle DB) of information from Department of Treasury related to the State Government Accounts, sent via high frequency rates by non-structured Excel files
 - ❖ The application:
 - intercepts and allows the treatment of changes in the structure of input (such as the insertion of an item not been censuses before)
 - Display the accounting differences between successive release of input
 - Record onto the DB (Oracle) each release's data

Ongoing Projects



- On side of the 'output':
 - **CopyEDP**: application for the semi-automatic compilation of Eurostat's Excel sheets for notifying the Excessive Deficit Procedures
 - ❖ Implemented by **Kettle**
 - **CNOOut** : realization of Data Warehouse (Oracle) for storing the validated results of the estimates, from which is produced the information for dissemination (SDMX Statistical Data and Metadata eXchange, I.Stat)
 - ❖ ETL part is mostly implemented by **Kettle**
 - ❖ Db design is according star schema (fact table, dimension, metadata)
 - ❖ Dimensions follow SDMX- code list

CNOOut: Example of star schema for economic account



Statistical Data and Metadata eXchange



- SDMX is an initiative to foster standards for the exchange of statistical information.
Sponsored by:
 - Bank for International Settlements (BIS)
 - European Central Bank (ECB)
 - Eurostat
 - International Monetary Fund (IMF)
 - Organisation for Economic Co-operation and Development (OECD)
 - United Nations (UN)
 - World Bank
- In 2013 SDMX was approved by ISO as an International Standard (ISO 17369:2013)