SUT EQUALIZER
THE NEW GENERATION TOOL FOR THE PRODUCTION OF SUT AND IOT

Chisinau, 2-4 October 2018
CONTENTS

1. The methodology
2. The IT architecture of the tool
3. The implementation of the solution

CONCLUSIONS
We compile Supply-Use tables, split to domestic production and imports — at basic prices and — at current and previous year prices?

CLEAR STEPS FOR A SECURE RESULT
MOTIVATIONS: WHY the SUT-Equalizer?

- The SUT is a synthetic tool for convergence between expenditures and production (and income) approaches, either in values and in volume

- As reminded in session 2 – Presentation 1 of the workshop

In order to make GDP calculations more reliable, statisticians use three different methods: production, income and expenditure

- GDP by production: GDP = Output – Intermediate consumption + Taxes/subsidies on products
- GDP by income: GDP = Compensation of employees + Gross operating surplus (incl. mixed income) + Taxes/subsidies on production
- GDP by expenditures: GDP = Final consumption expenditure + Gross capital formation + Exports - Imports

[Overview of Supply and Use Tables and their statistical production process - Michael Smedes (UNSD)]
**MOTIVATIONS: WHY the SUT-Equalizer?**

- The **disaggregation** becomes a **necessity** now-a-days (in the ESS, the NSOs are reporting 250 to 300 products in the CPA nomenclature)

- Disaggregation is often synonym of lack of quality. A mechanism should be invented to help going through it (sources, corrections, balancing)

- The **IOT** in current prices is an analytic tool for economic studies, often a 5 years basis, but uneasy to solve or not accurate enough once the NA computation is finished.

The SUT compilation is challenging enough to require a tool towards sufficient productivity
REMINDER: WHAT is a SUT and/or an IOT?

▪ Read horizontally by product the expenditures approach

▪ Read vertically by industry the production and income approaches

Legend:
- TTM  Trade and Transport Margins
- TLS  Taxes Less Subsidies on products
- IC   Intermediate consumption
- GFCF Gross Fixed Capital Formation

Make Matrix + Imports + TTM + TLS = IC Matrix + Industry i + Final Consumption + GFCF + Change in inventories + Exports

Generation of income (Sharing of value added)
- Employment
- GFCF (production factors)

at basic prices

value adjustment

Uses

at purchasers' prices
REMINDER: Dynamic of the system

Values and volumes are solved simultaneously:

- Taking the values at year Y-1 as initial values,
- Deriving the values at year Y and solving the SUT in value homogeneously.
- Deriving the volumes at year Y and solving the SUT in volume

<table>
<thead>
<tr>
<th>Val_{Y-1}</th>
<th>I-in-Vol</th>
<th>Vol_Y</th>
<th>I-in-Prices</th>
<th>Val_Y</th>
<th>I-in-Val</th>
</tr>
</thead>
<tbody>
<tr>
<td>Val_{Y-1}</td>
<td>Vol_Y / Val_{Y-1} * 100</td>
<td>Val_Y *100 / IPR</td>
<td>IPR</td>
<td>Val_Y</td>
<td>Val_Y / Val_{Y-1} *100</td>
</tr>
<tr>
<td>EXO</td>
<td>Formula</td>
<td>Formula</td>
<td>EXO</td>
<td>Formula or EXO</td>
<td>Formula or EXO</td>
</tr>
</tbody>
</table>
**THE CORE:** Exogenous data in cycles

- Production approach / sector accounts provide exogenous data. The **upper side** of the cycle transmits this information to expenditures approach by products. The **lower side** brings back information for the production approach / sector accounts (prod., GFCF, stocks, IC, VA...).
KEY TARGET: Guaranteeing the accuracy

For this reason, SUT-Equalizer is

- **INTEGRATED**: expenditures approach v.s. production and income approaches are in the same solving process.

- **ITERATIVE**: each product is capturing updated information, then each IS / operation ... Loop after loop the values are converging to the consistency.

- **SIMULTANEOUS**: Current and previous year prices are solved within the same framework at every step ($Val_{n-1}$ if necessary, the $VAL_n$, then $VOL_n$).

- **STRUCTURAL**: The commodity flows are compiled « decentralized » (spread in the team), while IS and operations are « centralized » (by the coordinator or few persons).
MANY CONCEPTS for the exhaustiveness

The SUT-Equalizer is hosting:

- Decentralised objects
  - The Commodity Flow (as many as in your products nomenclature)

- Centralized objects
  - The MAKE matrix describing the output [Product x Industry]
  - The IC matrix describing the intermediate consumption [Product x Industry], distinguishing DEDuctible and Non-DEDuctible
  - Both in a Process Tables scheme, offering the users, multiple transition stages from the ‘source’ to a given set of ‘final’ (acceptable) values.
A model is a set of variables, some provided (EXOGENOUS) others calculated (ENDOGENOUS) interconnected by relationships (EQUATIONS).

➤ The target is to calculate all ENDOGENOUS

➤ And sometimes the data configuration offers

✓ Perfect match
✓ Over-representation (conflict of values)
✓ Under-representation (needs more exogenous)
Translated in the SUT-Equalizer paradigm, there are:

- **Automated models**: all variables are calculated straight; there is no discrepancy;
- **Semi-automated models**, i.e. as many patterns of equations which are focussing on the properties of a product and on the reliability of the exogenous.

For example, a focus may be on the trade margins, whether PPI or XMPI exist, if the FC or the IC is the main use, etc.
Which IT solution?

✓ A comprehensive information system
✓ A user-friendly interface
✓ The tracking of all changes

SUT-Equalizer has its own IT environment
ABOUT THE CHOICE OF FRAMEWORK:
Ms-Excel or a dedicated environment?

- The SUT equalizer may be in Excel.
  - Flexibility, easy communication with data providers and stakeholders, no learning curve, ...
  - But important limitations appear
  - Risk in formulas with large amount of cells, of sheets, of files
  - Difficulties to handle the changes in the dimensioning.

Ms-Excel alone is not the sustainable solution
ABOUT THE CHOICE OF FRAMEWORK:
Ms-Excel or a dedicated environment?

- There are needs Ms-Excel cannot afford efficiently
  - Data storage in an Information System
    → Solves data integrity / security and versioning
  - Multi-user and multi-profile environment
    → Administrator, Coordinator, Accountants

SUT-Equalizer and Ms-Excel is efficient
THE USER FUNCTIONAL PATHWAY (1/2)

Two embedded cycles

1. End-user cycle on CFs
   - Import a set of exogenous
   - Assemble and check all together
   - Reach equilibrium of CF one by one

2. Coordinator cycle
   - Once satisfactory
   - Publish: IOTs, extract according to stakeholder, go to SDMX
The User Functional Pathway (2/2)

Dynamic of the system
ARCHITECTURE: A central database

- A relational model and a database
  - Usage of standard database management system (Ms-SQL, Ms-Access, Oracle, Etc)
- A model of information compatible with the Data and Metadata concepts (SDMX)
- Many groups of fields and tables:
  - Data
  - Versions for complete tracking
  - Dimensions and codelists (SDMX compatible)
  - Formulas
  - Etc
The last generation of Ms-Windows objects

Plus comprehensive info. system functionalities

- A monitoring frame like a dashboard on the progress
- Mimic of Ms-Excel everywhere a sheet is manipulated,
- Workspace and dynamic toolbars,
- Docking station effects,

- Eight statuses reporting the convergence of commodity flows,
- Full access to the compilation of models
- Integration of the DISSEMINATION module
- Visualisation of the historical data at any time
FUNCTIONALITIES: A spreadsheet approach

▪ Mimic of Ms-Excel for a user-friendly environment
▪ Interaction with sheet in a workbook
▪ Full compatibility with Ms-Excel
  ⇒ Very fast learning phase regarding IT manipulations

▪ Flexibility in the manipulation of the sheets
  ✓ Formulas in Ms-Excel format and through variable names,
  ✓ Editable formulas
  ✓ Coloured and locked cells,
  ✓ Integrated balancing as a sheet in the workbook
▪ State of the balancing by layer of SUT
FUNCTIONALITIES: Others

- A toolbar for each profile (Coordinator vs National Accountants)
- Implicit guidance of the user in the compilation steps
- Mutual exclusion on forbidden actions
- Contextual menu (right click)
- Retrieval of the story of past adjustments through commenting areas
- Full autonomy to compile models - accepts changes in distribution of formulas and on dimensions to certain extend.
How comprehensive is the project?

- The tool
- The training
- The coaching
- The follow-up

Are in a single package

SUT-Equalizer is a capacity building project
THE TEAM: *Pluri-disiplinary and adequate*

From Hendyplan:

- **A Field Expert** as the scientific advisor
- **Assisted by:**
  - Statisticians
  - IT specialists to customize the SUT-Equalizer
- **Coordinated by a Project Manager**

Plus **the local team** at the NSO
THE PHASES: Standardized

- Kick-off meeting
- Analysis of existing materials, choice of initial year,
- Analysis of available indicators,
- Definition of the main dimensions and their code-lists,
- Identification of the standard models by product,
- Initialization of the tables, the tools, the models, …
  - The tool is available
- Implementation of the tool and first data at your premises,
- Agreement on a coaching agenda,
  - A 2-year period is a good compromise
And finally …

SUT-EQUALIZER is the substratum from where the SUT and IOT compilation becomes fast and accurate.
Conclusions

SUT-Equalizer

- Computes the SUT before the GDP is known
- Creates a dynamic in the National Accounts department through an organisation of statisticians (eventually from different departments) around a coordinator
- Forces accuracy in the knowledge of the National Accounts data
- Guides the users in the proper application of the methodology
- Implements a comprehensive information system guaranteeing the data consistency and keeping the track of the changes.

✓ SUT-Equalizer carries the knowledge over the years
Contact us ...

THANK YOU

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