SUPPLY AND USE TABLES AT TURKSTAT

Workshop on Supply and Use Tables in the Eastern Europe, Caucasus and Central Asia (EECCA) and South East European (SEE) countries
2-4 October 2018, Chisinau, Moldova

TurkStat
Sibel BAŞTÜRK TARHAN
National Accounts Department
Annual Accounts Group
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2. Special Issues
   - Balancing the benchmark year
   - Balancing the extrapolation years
The current state of affairs

SUTs & IOTs in TurkStat

• Previous tables by TurkStat
  – Published at current prices

• 2012 SUTs for the benchmark year
  – Published at current prices (published at 12/12/2016)

• Extrapolation SUTs for annual
  – Prepared at current prices
  – Not published yet

• Extrapolation SUT’s for quarters (2009Q1-2016Q4-...)
  – (2009Q1-2016Q4-...-2017Q4-..)
  – Prepared at current prices & previous years’ prices
  – Not published yet
The current state of affairs

SUT 2012 (Benchmark year – Data sources)

- 2012 Supply and Use Tables Questionnaire (compiled from 20,274 enterprises)
- Structural Business Statistics (SBS)
- Revenue Administrations Records (RAR) from Ministry of Finance (MoF)
- Social Security Registry (SSR)
- Annual Industrial Products Survey (PRODCOM)
- Household Labor Force Survey (LFS)
- Household Budget Survey (HBS)
- Tourism Statistics
- Financial Intermediary Institution Statistics
- Foreign Trade Statistics
- Government Finance Statistics
- Balance of Payments Statistics
- Agriculture Statistics
- Radio and Television Broadcasting Institutions Statistics
- 2011 Population and Housing Census (PHC),
- Address Based Population Registration System (ABPRS)
Extrapolation SUTs

• Extrapolation SUTs were prepared for the estimation of Independent Annual Accounts for the years 2009, 2010, 2011, 2013, 2014, 2015, 2016, 2017, ...
## The current state of affairs

### Main Data Sources for the Extrapolation Years

<table>
<thead>
<tr>
<th>Institutional sector</th>
<th>Codes</th>
<th>Survey</th>
<th>Administrative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-financial corporations</td>
<td>S.11</td>
<td>SUT 2012&lt;br&gt;Structural Business Statistics (SBS)&lt;br&gt;Industrial Production Survey (IPS)&lt;br&gt;R&amp;D Survey&lt;br&gt;Tourism Statistics</td>
<td>Revenue Administration’s Register (RAR)&lt;br&gt;Foreign Trade Statistics (FTS)</td>
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<tr>
<td>Financial corporations</td>
<td>S.12</td>
<td>SUT 2012&lt;br&gt;Structural Business Statistics (SBS)&lt;br&gt;R&amp;D Survey</td>
<td>Revenue Administration’s Records (RAR)&lt;br&gt;Banking Regulation and Supervision Agency (BRSA)&lt;br&gt;Capital Markets Board (CMB)&lt;br&gt;Saving Deposit Insurance Fund (SDIF)&lt;br&gt;Central Bank (CBRT)&lt;br&gt;Undersecretariat of Treasury (UT)&lt;br&gt;General Directorate of Public Accounts (GDPA)&lt;br&gt;General Directorate of Foundations (GDF)</td>
</tr>
<tr>
<td>General government</td>
<td>S.13</td>
<td>SUT 2012&lt;br&gt;R&amp;D Survey</td>
<td>General Directorate of Public Accounts (GDPA) under Ministry of Finance</td>
</tr>
<tr>
<td>Households</td>
<td>S.14</td>
<td>SUT 2012&lt;br&gt;Labour Force Survey (LFS)&lt;br&gt;Census of Agriculture (CA)&lt;br&gt;Agricultural Holding Structure Statistics&lt;br&gt;Fishery Statistics&lt;br&gt;Crop Production Statistics&lt;br&gt;Livestock Statistics</td>
<td></td>
</tr>
<tr>
<td>Non-profit institutions serving households</td>
<td>S.15</td>
<td>SUT 2012</td>
<td>The Department of Associations of Ministry of Interior’s register system</td>
</tr>
</tbody>
</table>
The current state of affairs

SUTs are the core of the system

Independent Annual GDP by current year SUTs

Revise the quarters in current prices

Independent Annual GDP by sum of previous years

Works on Independent Annual GDP by previous years prices are on going under the IPA2015
The current state of affairs

Software

- **SAS and Excel** for the estimations
- **NA_Builder (Excel VBA)** for compiling SUTs
  - Developed in the context of USST III Programme “Improving annual supply and use tables and input-output tables” Project and improved in IPA-2012 by project experts
  - Usage areas for NA_Builder:
    - Generation of supply and use tables
    - Automatic balancing process
    - Transformation of SUT to Symmetric IOT
    - Extrapolation SUT
### The current state of affairs

Publication [www.turkstat.gov.tr](http://www.turkstat.gov.tr) in Turkey

<table>
<thead>
<tr>
<th>Press Releases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Statistics</td>
</tr>
<tr>
<td>Statistical Indicators</td>
</tr>
<tr>
<td>Statistics by Theme</td>
</tr>
<tr>
<td>Databases</td>
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<tr>
<td>Official Statistics Portal</td>
</tr>
<tr>
<td>National Data Release Calendar</td>
</tr>
<tr>
<td>MetaInfo</td>
</tr>
</tbody>
</table>

**Input-Output Tables**

- Input-Output Table for Domestic Output, 2012 (at Basic Prices) [at Current Prices]
- Input-Output Table for Imports (2012) at (Basic Prices) [at Current Prices]
- Input-Output Table, 2012 (at Basic Prices) [at Current Prices]

- Supply Table, 2012 (at Basic Prices, including a Transformation Into Purchasers Prices) [at Current Prices]
- Use table, 2012 (at Purchasers Prices) [at Current Prices]
- Use Table, 2012 (at basic prices) [at current prices]
- Domestic Use Table, 2012 (at Basic Prices) [at Current Prices]
- Imports Use Table, 2012 (cif) [at Current Prices]
- Trade and Transportation Margins, 2012 (at Current Prices)
- Taxes Less Subsidies on Products, 2012 (at Current Prices)
Balancing the benchmark year

The compilation

- Balancing process is based on product balance.
- Balancing was performed at the detail of 262 product groups of CPA-2008.
- To make the process more simple, the data was added to the system at 5-digit and 3-digit CPA level even compiled at more detailed level.
- Tables were aggregated and balanced at 3-digit level of CPA-2008.
Hierarchical order of SUT matrices according to the acceptable reliability level of the data

**PRODUCTION MATRICE**
- Data 1 Matrice
- Nace 3-Digit
- CPA 5-Digit
  - Agricultural Activities (A)
  - Mining & quarrying and manufacturing industry (B&C)
  - Financial and insurance activities (K64,K65)

**IMPORTS**
- Data M.
- CPA 5-Digit
  - Goods
  - BOP
  - Tourism

**MARGINS**
- Data M.
- CPA 5-Digit
  - Trade
  - Transport

**TAXES**
- Data M.
- CPA 5-Digit
  - + Taxes
  - - Subsidies

**1 SUB TOTAL SUPPLY**
- Aggregation M.
- Nace 3-Digit
- CPA 5-Digit
- first total

(A) Agricultural statistics (10 Digit to CPA 6 Digit)

(B) and (C) SUT Survey, SBS and PRODCOM Survey


K64 and K65 (detailed balance sheets and income statements)

K66 (SUT Survey of Financial Intermediary Institutions)

Goods: Foreign Trade Stat. GTIP to CPA

BOP - CPA Bridges

Tourism Statistics

MoF Data
CPA Distribution by SUT Survey and GFS definitions.
Hierarchical order of SUT matrices according to the acceptable reliability level of the data

**PRODUCTION MATRICE**
- Data 2 Matrice
- Nace 3-Digit
- CPA 3-Digit

  - General Government
    (36;37;38;39;58;60;72;84;85;86;87;88;91;93;94)
  - SUT Survey data which cannot be compiled in more detailed level for (D, E, F, G, H, I, J, L, M, N, P, Q, R, S)
  - Own Account Software (OAS)

**2 SUB TOTAL SUPPLY**
- Aggregation Matrice
- Nace 3-Digit
- CPA 3-Digit

  second total

**1 SUB TOTAL SUPPLY**
- Aggregation Matrice
- Nace 3-Digit
- CPA 3-Digit

  first total

**TOTAL SUPPLY**
- Calculation Matrice
- Nace 3-Digit
- CPA 3-Digit

  TOTAL SUPPLY
Hierarchical order of SUT matrices according to the acceptable reliability level of the data

**INPUT MATRICE**
- Data 1 Matrice
- Nace 3-Digit
- CPA 5-Digit
  - Agricultural Activities (A)
  - Financial and insurance activities (K64,K65,66)

**Final Consumption**
- Data M.
- CPA 5-Digit
  - HH + NPISH Government

**GFCF**
- Data M.
- CPA 5-Digit
  - SBS Government
  - Financial Other

**Change in Inv.**
- Data M.
- CPA 5-Digit
  - IC Goods
  - Goods
  - Trd Goods

**EXPORTS**
- Data M.
- CPA 5-Digit
  - Goods
  - BOP
  - Tourism

**1 SUB TOTAL USE**
- Aggregation M.
- Nace 3-Digit
- CPA 5-Digit
  - first total

For A agricultural surveys
K64 and K65 coded from detailed balance sheets and income statements

Goods: Foreign Trade Stat. GTIP to CPA
BOP - CPA Bridges
Tourism Statistics
Hierarchical order of SUT matrices according to the acceptable reliability level of the data

INPUT MATRICE
- Data 1 Matrice
- Nace 3-Digit
- CPA 3-Digit

Final Consumption
- Data M.
- CPA 3-Digit
  - HH + NPISH
  - Government

GFCF
- Data M.
- CPA 3-Digit
  - SBS
  - Government
  - Financial
  - Other

Change in Inv.
- Data M.
- CPA 3-Digit

EXPORTS
- Data M.
- CPA 3-Digit

2 SUB TOTAL USE
- Aggregation M.
- Nace 3-Digit
- CPA 3-Digit

SUT Survey:
Some data were at 3-digit level and if we could not get more detail, we add them to the system in three digit level.
Hierarchical order of SUT matrices according to the acceptable reliability level of the data
The Unbalanced SUT

TOTAL SUPPLY
Calculation Matrice
Nace 3-Digit
CPA 3-Digit

TOTAL USE
Calculation Matrice
Nace 3-Digit
CPA 3-Digit
### The Validation

**Estimating the indicators**
- The level of P1, P2, B1g
- CPA P2 / Total P2 for each NACE
- CPA P1 / Total P1 for each NACE

**Comparing the indicators**
- Compare with the previous years SUTs (2002 SUTs)
- Compare with the EU countries indicators (percentage, mean deviation etc.)

### Balancing the benchmark year

<table>
<thead>
<tr>
<th>NACE</th>
<th>YIL</th>
<th>CPA</th>
<th>Belgium</th>
<th>Bulgaria</th>
<th>Czech Republic</th>
<th>Denmark</th>
<th>il 1990 former territories</th>
<th>Estonia</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>A01</td>
<td>CPA_A01</td>
<td>0.146</td>
<td>0.405</td>
<td>0.123</td>
<td>0.157</td>
<td>0.000</td>
<td>0.341</td>
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<td>2</td>
<td>2010</td>
<td>CPA_A02</td>
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<td>0.005</td>
<td>0.000</td>
<td>0.010</td>
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<td>0.001</td>
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<tr>
<td>4</td>
<td></td>
<td>CPA_B</td>
<td>0.001</td>
<td>0.006</td>
<td>0.001</td>
<td>0.007</td>
<td>0.000</td>
<td>0.013</td>
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<tr>
<td>5</td>
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<td>0.325</td>
<td>0.203</td>
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<td>0.04</td>
<td>0.04</td>
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<td>0.06</td>
</tr>
</tbody>
</table>
Balancing the benchmark year

The Validation

Analyzing the discrepancy

- Checking the raw data.
- Checking the NOE adjustments
- Checking the KAU transformation
- Checking the CFM coefficients
- Checking the margins
- Review reports (reports of sectors from public utilities and private institutions)

If there is a data that will cause a major revision

- Checking the other sources: (Ex: Construction)
  
  - Statistical analysis:
    - Correlation analysis
    - Econometric models

  (the turnover of the enterprises which has the activity code of NACE Rev.2 - 23.63 (Manufacture of ready-mixed concrete; volume on real estate loans, interest rate on real estate loans, employment of construction in LFS and in Social Security Ins. Registers Etc.)
Ending the manual balancing

- The validation process continued until the difference between supply and use is below %1 at product level.

- Manual balancing was predominantly applied at the benchmark year.

- Small differences were done at RAS

- After RAS procedure the validation procedure re-started again.
Balancing the extrapolation years

Extrapolation of SUTs

- Extrapolation method is applied
  - by using coefficients of SUT 2012
  - by double deflation

- Balancing process for Extrapolation SUTs
  - Manual balancing
  - Mechanical balancing (RAS)
Balancing the extrapolation years

**Before RAS:** Check the time series of the differences, then start CPA rows one by one.

<table>
<thead>
<tr>
<th>TOTAL SUPPLY</th>
<th>CPA</th>
<th>FINAL CONSUMPTION</th>
<th>GFCF</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>HH</td>
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<tr>
<td>250</td>
<td>01.1</td>
<td>100</td>
<td>50</td>
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<tr>
<td>225</td>
<td>01.2</td>
<td>120</td>
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<td>150</td>
<td>01.3</td>
<td>100</td>
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<td>125</td>
<td>01.4</td>
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<td>60</td>
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<tr>
<td>1.250</td>
<td>...others</td>
<td>700</td>
<td>100</td>
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<tr>
<td>2.000</td>
<td>Total</td>
<td>1040</td>
<td>220</td>
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<tr>
<td>2.000</td>
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</table>

- Try to make smaller
- The total should be Zero before RAS

Check the time series
Check the deflators
Check the CFM
Check other reports
Balancing the extrapolation years

After RAS

- The validation process should be done.
  - Check the time series of SUTs

<table>
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<th>NACE 10</th>
<th></th>
<th></th>
<th>P2</th>
<th></th>
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<td>2016</td>
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<td>09.9</td>
<td>0,00</td>
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<td>0,00</td>
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<td>0,076</td>
<td>0,077</td>
<td>0,071</td>
<td>0,073</td>
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</tr>
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<td>10.8</td>
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<td>0,05</td>
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<td>0,05</td>
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</tr>
<tr>
<td>10.9</td>
<td>0,01</td>
<td>0,01</td>
<td>0,01</td>
<td>0,01</td>
<td>0,01</td>
<td>0,01</td>
<td>0,01</td>
<td></td>
</tr>
</tbody>
</table>

| P1 | 2012| 2013| 2014| 2015| 2016| 2017|  |
| CPA |  |  |  |  |  |  |  |
| 07.1 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 07.2 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 08.1 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 08.9 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 09.1 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 09.9 | 0,00| 0,00| 0,00| 0,00| 0,00| 0,00| 0,00|
| 10.1 | 0,21| 0,21| 0,21| 0,21| 0,20| 0,22| 0,22|
| 10.2 | 0,01| 0,01| 0,01| 0,01| 0,01| 0,01| 0,01|
| 10.3 | 0,14| 0,14| 0,17| 0,17| 0,17| 0,13| 0,13|
| 10.4 | 0,10| 0,09| 0,08| 0,09| 0,10| 0,10| 0,10|
| 10.5 | 0,10| 0,10| 0,10| 0,10| 0,09| 0,10| 0,10|
| 10.6 | 0,10| 0,10| 0,10| 0,10| 0,10| 0,10| 0,10|
| 10.7 | 0,12| 0,12| 0,11| 0,11| 0,11| 0,11| 0,11|
| 10.8 | 0,15| 0,15| 0,14| 0,15| 0,15| 0,15| 0,15|
| 10.9 | 0,05| 0,06| 0,05| 0,05| 0,05| 0,05| 0,05|

*The figures are improvisation.
Balancing the extrapolation years

Check the indicators in time series format

<table>
<thead>
<tr>
<th>INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Production</td>
</tr>
<tr>
<td>• Production deflators</td>
</tr>
<tr>
<td>• Intermediate consumption</td>
</tr>
<tr>
<td>• Gross value added deflators</td>
</tr>
<tr>
<td>• Gross value added</td>
</tr>
<tr>
<td>• Intermediate consumption deflators</td>
</tr>
<tr>
<td>• I/O Ratios</td>
</tr>
<tr>
<td>• Production per employee</td>
</tr>
<tr>
<td>• Paid Employee</td>
</tr>
<tr>
<td>• Gross value added per employee</td>
</tr>
<tr>
<td>• Registered paid Employee</td>
</tr>
<tr>
<td>• CoE per Employee</td>
</tr>
<tr>
<td>• Employment</td>
</tr>
<tr>
<td>• The share of paid employee in total employment</td>
</tr>
<tr>
<td>• The share of gross value added in total gross value added</td>
</tr>
</tbody>
</table>

If find something inconsistent re-start the process
Thank you for your attention
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