TWINNING CONTRACT

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Strengthening the capabilities of the Department of Statistics in Jordan

MISSION REPORT

on

Activity 1.11: Fixed price calculation

Mission carried out by
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List of Abbreviations

CPI	Consumer Price Index
DoS	Department of Statistics of Jordan
ESA/10	European System of National Account 2010
ISTAT	Italian National Institute of Statistics
IPI	Investment Price Index
PPI	Producer Price Index
SNA08	United Nation System of National Account 2008
ToR	Terms of Reference
WPI	Wholesale Price Index

1. General comments

This was the first Activity devoted to "Fixed price calculation" within Component 1: National Account.

The purposes of the mission were:

- Methodologies as well as compilation techniques for fixed price calculations
- Special focus on the methodology for change of base year.
- Discussions on when to use single deflators
- Discussions on when to use double deflators
- Special focus on changes needed in the current system in order to comply with the ESA10/SNA08
- To introduce the DoS staff to requirements regarding fixed prices in the ESA 2010 /SNA2008

The consultants would like to express their thanks to all officials and individuals met for the kind support and valuable information received during the stay in Jordan which highly facilitated their work.

This views and observations stated in this report are those of the consultants and do not necessarily correspond to the views of EU, DoS or Istat.

2. Assessment and results

The main activities carried out were:

1. Brief introduction on the general concepts and methodologies suggested by Eurostat to deflate the resource and accounts flows (e.g. fixed prices vs chain index, distinction between price, volume, quantity, etc.)
2. Focus on resources components (training and application to the Jordan case)
   - 2.1 Data sources (current figures and prices);
   - 2.2 Methodologies and compilations techniques;
   - 2.3 Specific critical issues;
   - 2.4 Single vs double deflators;
3. Focus on uses components (training and application to the Jordan case)
   - 3.1 Data sources (current figures and prices);
   - 3.2 Methodologies and compilations techniques;
   - 3.3 Specific critical issues;
4. Focus on methodology for changes of the base year;
5. Special focus on main changes needed on the current system in order to comply with ESA10/SNA08;
6. Lining up of work programme for the next activity (1.8, 4th- 8th May 2014).

During the action a training has been done on these specific aspects:

- General concept and definition on Nation Account at constant price;
- Methodology to deflate resources;

- Methodology to deflate uses;
- Double deflation and single indicator methods;
- Methodology used to change base year.

The training has been based mainly on the guidelines stated in the Eurostat manual on constant price.

Furthermore the following specific item have been analysed in detail.

Agriculture (3.6% in GDP)

Crops

Output calculated p x q; q disaggregated by more than 200 products; p weighted on the base year 2010. Output in volume is calculated using the same quantity index used to calculate the output at current price,

Intermediate consumption calculated in value in the base year (disaggregated by 33 products on the basis of 1994 structure?). The value of base year is updated using a volume index based on "cultivated area" and a price index derived from various data sources. The volume index of IC using the same quantity index used to calculate the IC at current price (cultivate area at time t/cultivated area at 2010).

Main problems

IC at constant price:

a) Iq is too aggregate (total amount);
b) Iq does not take adequately in account the change in technology;

Iq does not take adequately in account the cyclical fluctuations

Livestock

Output in value is derived from a specific survey. Output in volume calculated using as quantity index the number of livestock disaggregated by 19 categories.

The output and the IC are calculated separately by: unorganized (30% of the total) and organized farm.

The IC in volume are calculate updating the base year using the rate of change of output in volume.

Main problems

IC at constant price:

a) Iq is too aggregate (total amount);

Internal trade (about 6-7% in GDP)

To deflate output Wholesale (WPI) and Consumer price (CPI) are used, the former for the wholesale sector and the latter for the retail sector.

Main problems

WPI and CPI do not represent the price of output of internal trade, since they register the change in the total price of goods and not only the component related to trade margin.

Non market activity (about 13% in GDP)

The supply aggregates (output, intermediate consumption, value added) of non market activity at current price is calculated all together, without distinguish by branch of activity (general government, health, education, etc.).

Output at current price is calculated by sum of cost (compensation of employees, intermediate consumption and depreciation of fixed capital).
Output is deflated component by component:
compensation of employees, extrapolation using the number of employees;
intermediate consumption, price index using WPI and CPI.
depreciation of fixed capital, PPI for equipment and transport; construction cost index for buildings.

Main problems

The main drawback is represented by the use of input method applied to the whole of non market activity.

3. Conclusions and recommendations

On the basis of the training delivered during the mission and taking into account the methodologies adopted by DoS, the following general recommendations have been proposed:

1. distinction between domestic output and output devoted to export (at the present the deflator of output reflect only the internal market);
2. distinction between domestic input and imported input (at the present the deflator of output reflect only the internal market);
3. deflation of taxes and subsides by branches by extrapolating the base year using the index of volume of value added[1] (at the present they deflate the items at aggregate level using the implicit deflator of value added).

Recommendations in 1 and 2 will be useful also to construct the supply and use table.
Furthermore the adoption of the double deflation has been recommended.
In practice, double indicator methods can create problems when intermediate consumption is a large share of output and the reliability of the price or volume data is not very high. In such cases, the estimate for the volume of value added can become erratic (even negative value added[2]). In order to control the erratic result of the double deflation the methodology shown in Annex 3 could be applied.

The questionnaire used by Statistics Jordan to gather information on the supply of manufacturing data has been analyzed. The questionnaire was found very adequate for calculating the weights necessary to carry out the double deflation.

The adoption of a system of constant price based on chain indices is suggested as best recommandation. As second best we suggest to maintain a fixed base system updating the base year at 2010.
In any case, it is necessary that the DoS plans and design a transition to a system of chain indices in the near future

[1] Given "i" the branch of economic activity and "j" the different kind of taxes and subsidies; the value at constant price of tax ($TAXco_t$) or subsidies ($SBSco_t$) at time "t" is given by the following formula

$$TAX_b \text{ or } SBS_b = \sum_{ij} TAX_b \text{ or } SBS_b * OUTco_t/OUTc_b$$

where b is the base year and OUT is the National Account figure referred to tax or subsidies.

[2] A negative value added at constant prices is conceptually possible. Whilst these situations may be theoretically conceivable, it can be assumed that this will not happen very often in practice.

Agriculture

Crops

IC at constant price: it is necessary to split the Iq used in order to better describe the structure of cost of different kind of production. We strongly recommend a disaggregation by type of product, base on the data derived to the survey on the intermediate cost of agriculture farm. As second best a disaggregation by kind of farms (e.g. small, medium, large) or geographical area could be adopted. The best solution would be a cross classification of the previous 3 items (product, kind of firm and geographical area).

Livestock

IC at constant price: for the organized farm we suggest to try the deflation using a price index, calculate using the weight derived from the specific survey.

Internal trade

Value Index of trade margins

$$Iv = S - P + \Delta In$$

where: S are the value of goods purchased for resale; P are the value of purchases of goods for resale and ΔIn are the change in inventories of goods for resale.
At the base year, "o", we have a rate of trade margins as:

$$(So - Po + \Delta Ino)/(Po + \Delta Ino)$$

Applying the rate of trade margin to the flow of purchase of each year, "t", we can obtain a volume index, Iq. In formal term:

$$Iq = [(So - Po + \Delta Ino)/(Po + \Delta Ino)] *(Pt + \Delta Int)$$

Iq can be used to deflate both wholesale and retail trade. It is strongly recommended to calculate the rate of trade margin at the most level of detail available.

Non market activity

It is strongly recommended to deflate separately general government activity, health and education.
For the general government activity the current methodology can be confirmed.
For Health and education it is necessary to move to a method based of volume index of output.
According to the Eurostat Handbook on constant prices this is the preferred approach. For individual goods and services it is in principle possible to define the output, since an actual delivery of that output takes place from the producer to the consumer(s). For example, for education, the output is the amount of teaching consumed by a pupil. For hospital services, the output is the amount of care received by a patient. For cultural services, the output is the number of theatre plays consumed.

Change base year

To implement the change the base year, DoS needs to address the following two problems:

1. To change the base year of the price indices (PPI, IPI, CPI 2006; WPI 1998);
2. To change the classification of price indices (ISIC rev 3) into the classification adopted in National Account (ISIC rev 4)

To solve the first problem DoS must work with elementary price indices, i.e. an index that includes a single product. If this is not possible to, the highest level of detail should be used. At elementary level a simple shifting base year is enough. It is obtained by dividing all the components of the time series in base “b” by the value of the new base year “b+n”.
Regarding problem 2, DoS has arranged a transition matrix between the two classification on the basis of the national account figures. In order to transform the price index from ISIC rev 3 to ISIC rev 4 the methodology showed in Annex 4 can be applied.

4. Next mission

In order to prepare for the next mission on "Methodologies used for measuring the informal sector. Special focus on changes needed in order to comply with the ESA10/SNA08" we need to receive the following documents by the DoS:

- the results of previous estimated, performed by DoS or other Institutions or researchers, on informal sector in Jordan, even if daft;
- brief report on the main characteristics of the Labour Force survey;
- classification of the methods used to estimate the output of each branch in national account, distinguishing: price time quantity, based on survey on enterprise, based on demand data, others;
- description of other data sources available to estimate the informal sector (e.g. fiscal audit).

The documents must be delivered no later than April 20.

Annex 1. Terms of Reference

Component 1: National Accounts

Activity 1.11: Fixed price calculation

0. Mandatory results and benchmarks for the component

- The national accounts system in Jordan updated to SNA 2008 (Apr 2015)
- The national accounts system in Jordan will cover the informal sector (Apr 2015)
- Assessment report on current situation (Jan 2014)
- Review of the GDP methodology (Apr 2014)
- Plan for how to change base year in the fixed price calculations (Jan 2015)
- Plan for how to improve the current accounts (Jan 2015)
- Present and discuss the concept of different types of agricultural accounts (Jan 2015)
- Data sources, compilation methods, and balancing in relation to supply and use tables reviewed and updated towards SNA08 principles (Apr 2015)
- Provide recommendations on how to update input-output tables (Apr 2015)
- Update the methodology for calculation the informal sector (Apr 2015)

1. Purpose of the activity

- Methodologies as well as compilation techniques for fixed price calculations
- Special focus on the methodology for change of base year.
- Discussions on when to use single deflaters
- Discussions on when to use double deflators
- Special focus on changes needed in the current system in order to comply with the ESA10/SNA08
- To introduce the DoS staff to requirements regarding fixed prices in the ESA 2010 /SNA2008

2. Expected output of the activity

- DoS staff trained in methodologies as well as compilation techniques for fixed price calculations
- DoS staff trained in methodology for change of base year in fixed price calculations
- DoS staff trained in when to use single or double deflators
- DoS staff introduced to the most recent updates regarding fixed prices in the ESA10/SNA08
- A lining up of work programme for the next activity (1.8, scheduled to 4th - 8th May 2014)

Programme for the mission

Time		Place	Event	Purpose / detail
Sunday, morning	08.30 – 10.00	Hotel /DoS	Meeting with RTA	To discuss the programme of the week
Sunday, morning	10.00 – 12.00	DoS	Meeting with BC Component Leader and BC Experts	Presentation by DoS on available price indices and the methods behind them, e.g. PPI, CPI. Availability of information and current methods to deflate agriculture, contruction, internal trade, external trade, non-market

				activities, taxes and subsidies.
	12.00 – 01.00		Break / Preparations / Report writing	Break / Preparations / Report writing
Sunday, afternoon	01.00 – 03.30	DoS	Meeting with BC Component Leader and BC Experts	Brief introduction on the general concepts and methodologies suggested by Eurostat to deflate the resource and accounts flows (e.g. fixed prices vs chain index, distinction between price, volume, quantity, ect.)
	03.30 – 04.00		Preparations / Report writing	Preparations / Report writing
Monday, morning	08.30 – 09.30	DoS	Preparations / Report writing	Preparations / Report writing
	09.30 – 12.00		Meeting with BC Component Leader and BC Experts	Focus on resources components (training and application to the Jordan case) -Data sources (current figures and prices); -Methodologies and compilations techniques; -Specific critical issues; -Single vs double deflaters
	12.00 – 01.00		Break / Preparations / Report writing	Break / Preparations / Report writing
Monday, afternoon	01.00 – 03.30	DoS	Meeting with BC Component Leader and BC Experts	Focus on resources components (training and application to the Jordan case) -Data sources (current figures and prices); -Methodologies and compilations techniques; -Specific critical issues; -Single vs double deflaters
	03.30 – 04.00		Preparations / Report writing	Preparations / Report writing
Tuesday, morning	08.30 – 09.30	DoS	Preparations / Report writing	Preparations / Report writing
	09.30 – 12.00		Meeting with BC Component Leader and BC Experts	Focus on uses components (training and application to the Jordan case) -Data sources (current figures and prices); -Methodologies and compilations techniques; -Specific critical issues;

				Break / Preparations / Report writing
	12.00 – 01.00		Break / Preparations / Report writing	
Tuesday, afternoon	01.00 – 03.30	DoS	Meeting with BC Component Leader and BC Experts	Focus on uses components (training and application to the Jordan case) -Data sources (current figures and prices); -Methodologies and compilations techniques; -Specific critical issues;
	03.30 – 04.00		Preparations / Report writing	Preparations / Report writing
Wednesday, morning	08.30 – 09.30	DoS	Preparations / Report writing	Preparations / Report writing
	09.30 – 12.00		Meeting with BC Component Leader and BC Experts	Focus on methodology for changes of the base year;
	12.00 – 01.00		Break / Preparations / Report writing	Break / Preparations / Report writing
Wednesday, afternoon	01.00 – 03.30	DoS	Meeting with BC Component Leader and BC Experts	Special focus on main changes needed on the current system in order to comply with ESA10/SNA08
	03.30 – 04.00		Preparations / Report writing	Preparations / Report writing
Thursday, morning	08.30 – 09.30	DoS	Preparations / Report writing	Preparations / Report writing
	09.30 – 11.30		Meeting with BC Component Leader and BC Experts	A lining up of work programme for the next activity (1.8, 4th- 8th May 2014).
			Ad-hoc meetings	Final clarifications with BC Experts, preparation of report and presentation for BC Project Leader
Thursday, morning	11.30 – 12.30	DoS	Meeting with BC Component Leader	Presentation for BC Project Leader
Thursday, noon	12.30 – 01.00	DoS	Debriefing with BC Project Leader	Conclusions and decisions and their consequences for the next activity and the implied work programme for BC Experts

Annex 2. Persons met

DoS:
Mr Moawiah Alzghoul Director of National Accounts Directorate, and component leader

Annual national accounts
Amal Abu Afeefeh - Head of the Annual Accounts Division
Khairallah Almarzoug
Farhan Mohammad
Loay Alrawashdeh
Ali Zaitoun
Ayman Nasir

Input-output division
Murad Bani-Hamad
Murad Omari

Quarterly accounts division
Walid Battah - Head of the Quarterly Accounts Division
Jaber Alfazza
Walaa Gharram

Other stakeholders taking part in the activity

Mr. Mohammad Abed Alrazzag, Head of Prices Division

Annex 3. Method for controlling the erratic result obtained applying the double deflation

The output (Y_t) and the intermediate cost (C_t) can be decomposed in the following way

$$Y_t = IPY_t * Qo_t \ ; C_t = IPC_t * Qi_t$$

where: Qo_t and Qi_t are the unobserved quantities of output and intermediate cost; IPY_t and IPC_t are the price of output and intermediate cost.
We focus our attention on the ratio

$$C_t / Y_t = (IPC_t * Qi_t)/ (IPY_t * Qo_t)$$

The dynamic of the ratio is

$$(C_t / C_{t-1})/(Y_t / Y_{t-1}) = (IPC_t * Qi_t)/(IPC_{t-1} * Qi_{t-1}) / (IPY_t * Qo_t)/(IPY_{t-1} * Qo_{t-1})$$

Hyp: the "unobserved" Qi can not undergo sharp fluctuations in the short term as it depends on the production technology. We can, therefore, impose the condition

$$-n\sigma \leq \frac{IPC_t / IPC_{t-1}}{IPY_t / IPY_{t-1}} / \frac{C_t / C_{t-1}}{Y_t / Y_{t-1}} \leq n\sigma \quad [1]$$

Where σ is a standard deviation calculated on time series or cross section data and n is a subjective parameter.
If the condition [1] is not verified we correct IPC so as to place the difference [1] corresponding to the extreme of the range considered (± nσ). The correction is performed on the IPC as it is not directly observed.

Annex 4. Transition matrix between ISIC rev 3 and ISIC rev 4

Hyp: 4 products classified according to ISIC rev 3 and 4 products classified according to ISIC rev 4. In the following the transition matrix of the NA output classified both in ISIC rev. 3 and ISIC rev. 4.

		ISIC rev 4				
		1	2	3	4	Total
ISIC rev 3	1	70		100		170
	2		100			100
	3	30	200	900	300	1430
	4				500	500
	Total	100	300	1000	800	2200

Give PPI for the for products classified ISIC rev 3:

$PPI_1 = 1.05$
$PPI_2 = 1.06$
$PPI_3 = 1.00$
$PPI_4 = 1.08$

We can transform the PPI from ISIC rev 3 to ISIC rev 4 (PPI*) by adopting the formulas:

$PPI^*_1 = (70/100*1.05 + 30/100*1.00)$
$PPI^*_2 = (100/300*1.06 + 200/300*1.00)$
$PPI^*_3 = (100/1000*1.05 + 900/1000*1.00)$
$PPI^*_4 = (300/800*1.00 + 500/800*1.08)$