



# A New Framework for National Accounts

---

National Accounts Unit  
Economic Statistics Directorate

17 October 2014



## Contents

	Page
List of abbreviations	4
1.0 Introduction	5
2.0 Implementation in Malta	5
2.1 Effects of ESA 2010	8
2.2 Effects of methodological improvements	9
2.2.1 Main Statistical Projects	10
3.0 From constant prices to chain-linked prices	15
4.0 Future work on National Accounts	16
Annex 1	17
Annex 2	19

## Tables

1. GDP at current prices and impact of revisions: 2010-2013	6
2. Revision in national accounts: Results for 2010	8
3. Research and Development in millions of €	9

## Charts

1. Gross Domestic Product at current prices	6
2. Comparison of annual GDP growth rates	7
3. GVA by Economic Sector for ESA 1995 and ESA 2010 for 2013	12
4. Household Consumption	13
5. GFCF by Asset for 2013 in ESA 1995 and ESA 2010	14

## List of abbreviations

CBM	Central Bank of Malta
ESA	European System of Accounts
EU	European Union
FISIM	Financial Intermediation Services Indirectly Measured
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GNI	Gross National Income
GVA	Gross Value Added
IBIs	International Banking Institutions
MITA	Malta Information Technology Agency
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne/ Statistical Classification of Economic Activities in the European Community
NSO	National Statistics Office
R&D	Research and Development
SBS	Structural Business Statistics
SNA	System of National Accounts
SPEs	Special Purpose Entities

## 1.0 Introduction

As from September 2014, the new framework for national accounts statistics, the European System of Accounts (ESA) 2010 entered into force. It replaces the old framework of ESA 1995. The new system essentially modernises the previous standards contained in ESA 1995. Such changes are needed periodically in order to adapt the national accounts to the changing dynamics of economic activity, such as the advent of the knowledge economy. Updates are also needed in order to comply with international standards and preserve statistical comparability beyond the European Union (EU).

The changes in ESA 2010 are important but not radical. The biggest conceptual change is that Research and Development (R&D) spending is now being recorded as investment rather than as current expenditure. While this increases the level of Gross Domestic Product (GDP), it has a negligible impact on the growth rate of GDP from year to year. The new methodology also provides for more comprehensive and more comparable information on pension entitlements, starting in 2017, which is clearly important in the light of ageing societies. It also provides more precise principles for classifying units into or outside the government sector.

The changeover to ESA 2010 has been discussed and planned for several years, since the agreement on the underlying new international standard, the System of National Accounts 2008. The implementation of ESA 2010 coincides with normal periodic revisions of the national accounts produced by National Statistical Institutes. Grouping such changes is usually preferred to constant updates which can become confusing for users. The main changes other than those related to ESA 2010 are:

- Benchmark revisions, in which national methodologies and data sources are reviewed and updated. In some cases, benchmark revisions may generate a more significant revision to GDP than the changeover to ESA2010.
- The harmonisation of measurement of certain illegal activities, notably prostitution, the production and trafficking of drugs. While these were already included in the official definition of GDP under the old standard, implementation had varied from country to country. A common methodology for recording these activities is now being applied.

The successful implementation of these changes has been a Europe-wide project requiring a significant, co-ordinated effort from National Statistical Institutes and Eurostat. A more detailed assessment of the impact of the revisions on all the components of the national accounts can only be made after the full datasets are published by all Member States. A preliminary assessment is presented in Annex 1.

## 2.0 Implementation in Malta

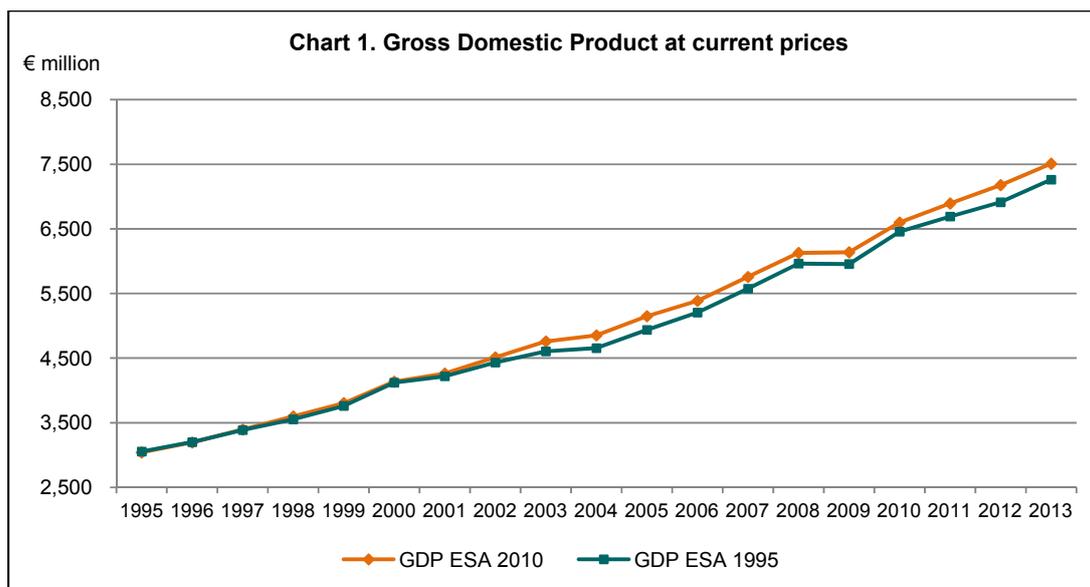
In the case of Malta, the new system meant that the entire time series from 1995 onwards was revised. The main statistical projects with respect to the benchmark revision relate to the insurance sub-sector and special purpose entities (SPEs), while for ESA 2010 they concern the capitalisation of R&D expenditure.

The National Statistics Office (NSO) has also introduced a major methodological improvement in the compilation of national accounts data in real terms. Under ESA 1995, the volume series of the quarterly national accounts were published in constant base-year prices (the base year was 2000). To meet EU requirements, the ESA 2010 series will henceforth be calculated at chain-linked prices. Users, however, should be cautioned that as a result of this change, levels of sub-components of GDP in real terms do not add up to the level shown by aggregate categories.

The NSO is publishing national accounts annual data from 1995 to 2013 at current market prices and from 2000 to 2013 in chain-linked volumes. Quarterly data is available on the online edition of News Release 195/2014.

## Results for gross domestic product and gross national income

The recalculation as part of the 2014 revision of national accounts has led to an increase in the nominal GDP by an average of 2.2 percentage points over the whole time series. The gross national income (GNI) series will be revised upwards by an average of 2.7 percentage points, compared to the news release published on 27 August 2014 (159/2014). Revisions in GDP range from -0.4 per cent in 1995 to 4.3 per cent in 2004. Revisions in GNI range from -1.0 per cent in 1995 to 6.0 per cent in 2012.



The main changes in the GDP and GNI levels between 2010 and 2013 may be broken down as follows:

- The introduction of ESA 2010 increased the GDP by an average of 0.4 percentage points and the GNI by an average of 0.6 percentage points;
- Methodological improvements increased the GDP by an average of 2.7 percentage points and GNI by an average of 4.6 percentage points.

**Table 1. GDP at current prices and impact of revisions: 2010-2013**

	2010	2011	2012	2013
ESA 2010 Revision on GDP	0.5%	0.4%	0.4%	0.5%
Benchmark Revision on GDP	1.7%	2.6%	3.4%	2.9%
Total impact of all revisions on GDP	2.2%	3.0%	3.8%	3.4%
Total impact of all revisions on GNI	4.8%	4.8%	6.0%	5.3%

The rates of change of the annual unadjusted figures at current prices differ by an average of 0.2 per cent in the whole time series between 1995 and 2013, and for the price-adjusted GDP the difference on average is of 0.3 per cent between 2000 and 2013. The new path of GDP confirms the economic cycle displayed by ESA 1995 national accounts data, as can be seen in Chart 2 below.

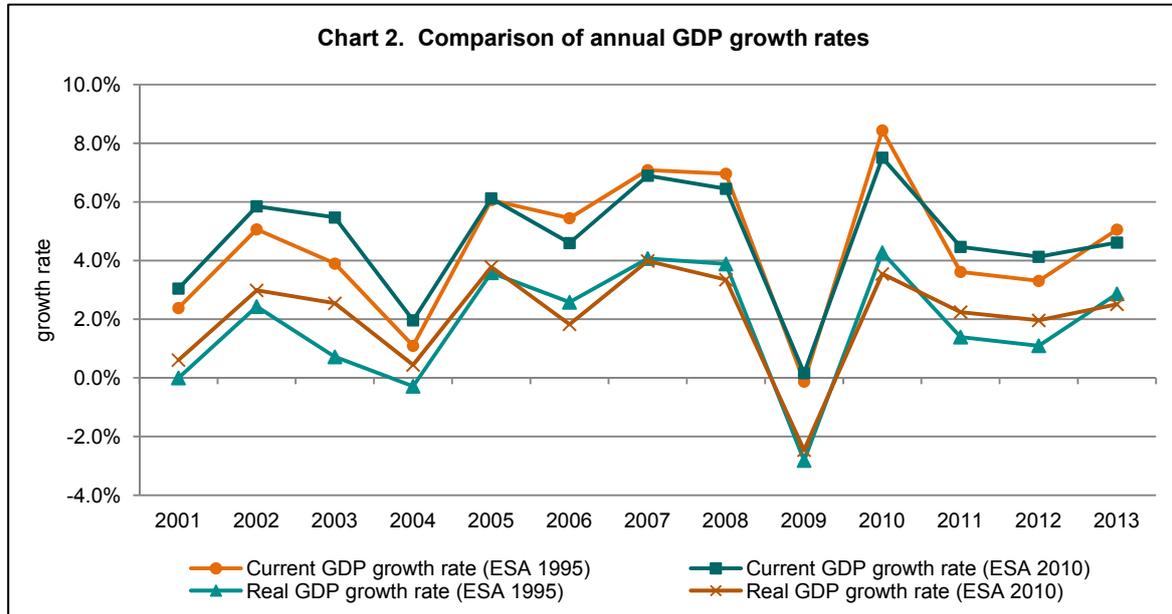


Table 2 illustrates the revision in some of the main variables of national accounts for benchmark year 2010. The most prominent revisions relate to imports, exports and property income received and paid from and to the rest of the world, mainly due to the integration of special purpose entities in national accounts. The GDP in nominal terms is used as a reference value for a number of ratios, so the increase in the GDP level and the increase in some of the main variables had an impact on such ratios.

**Table 2. Revision national accounts: Results for 2010**

Indicator	Revision*	New level	Origin of main revisions
Gross domestic product (GDP)	2.2%	€6,599.5 million	ESA 2010, SPEs, Insurance, Alignment with balance of payment statistics, Regular revisions, New sources, Illegal activities
Gross national income (GNI)	4.8%	€6,321.3 million	
GDP per capita	2.2%	€15,922	
Total exports	72.9%	€10,114.1 million	Integration of SPEs
Exports ratio (export as a % of GDP)	62.7%	153.3%	Integration of SPEs
Total imports	72.9%	€10,174.2 million	Integration of SPEs
Imports ratio (import as a % of GDP)	63.0%	154.2%	Integration of SPEs
Gross fixed capital formation (GFCF)	9.8%	€1,411.6 million	Expenditure on R&D and Transfer costs for Dwellings
Gross fixed capital formation ratio (GFCF as a % of GDP)	1.5%	21.4%	Expenditure on R&D and Transfer costs for Dwellings
Private household consumption expenditure	-0.8%	€3,717.9 million	Expenditure on food, culture, accommodation and financial services
Government consumption expenditure	-0.4%	€1,286.4 million	R&D expenditure is now recorded as capital formation
Compensation of employees	0.6%	€2,845.3 million	New data sources
Property income received from the rest of the world	309.0%	€6,571.1 million	Integration of SPEs
Property income paid to the rest of the world	237.2%	€6,853.2 million	Integration of SPEs

\*Compared to the GDP and its sub-components in ESA 1995 as published in news release 159/2014

## 2.1 Effects of ESA 2010

The main reason for the increase in the level of the GDP caused by ESA 2010 is the capitalisation of R&D expenditure. In 2013, 0.5 percentage points of the increase in the GDP level were due to this reclassification. Under ESA 2010, R&D expenditure is recorded as investment, and is included under gross fixed capital formation (GFCF) in the expenditure approach. In the case of market producers, the impact includes production for own use of R&D products and a reclassification of imported R&D previously included in intermediate consumption. This increase in the production approach is mirrored in operating surplus in the income approach, and in GFCF in the expenditure approach. For non-market producers, where output is valued using the sum-of-costs approach, the impact on GDP is equivalent to consumption of fixed capital of the new R&D assets. Other changes include reclassifications to purchased R&D no longer categorised as intermediate consumption but as GFCF, changes in non-market output in

the production output, which is mirrored in a downward revision in government final consumption expenditure, and an increase in GFCF in the expenditure approach.

**Table 3. Research and Development in million of €\***

	Market producer				Non-market producer			
	2010	2011	2012	2013	2010	2011	2012	2013
<b>Production approach</b>								
Output of goods and services (at basic prices)	25.2	21.1	21.1	22.1	7.8	8.6	9.6	10.7
Intermediate consumption (at purchasers' prices)	-1.2	-1.1	-1.2	-0.8	-0.5	-0.4	-0.4	-0.3
<b>Gross Value Added (at basic prices)</b>	<b>26.4</b>	<b>22.2</b>	<b>22.3</b>	<b>22.9</b>	<b>8.3</b>	<b>9.0</b>	<b>10.0</b>	<b>11.1</b>
<b>Expenditure approach</b>								
Total final consumption expenditure					-4.0	-4.8	-7.5	-5.2
General government final consumption expenditure					-4.0	-4.8	-7.5	-5.2
Gross capital formation	26.4	22.2	22.3	22.9	12.3	13.9	17.5	16.3
Gross fixed capital formation	26.4	22.2	22.3	22.9	12.3	13.9	17.5	16.3
<b>Income approach</b>								
Compensation of employees								
Gross operating surplus and mixed income	26.4	22.2	22.3	22.9	8.3	9.0	10.0	11.1
<b>Gross Domestic Product</b>	<b>26.4</b>	<b>22.2</b>	<b>22.3</b>	<b>22.9</b>	<b>8.3</b>	<b>9.0</b>	<b>10.0</b>	<b>11.1</b>
<b>Gross National Income</b>	<b>26.4</b>	<b>22.2</b>	<b>22.3</b>	<b>22.9</b>	<b>8.3</b>	<b>9.0</b>	<b>10.0</b>	<b>11.1</b>

\*Figures may not add up due to rounding

Other minor revisions included the reclassification in the General Government Sector of the Malta Freeport Corporation Ltd (from 1999 to 2011), and the Malta Information Technology Agency (MITA) from 1995 to date, and the reallocation of some output of the Central Bank of Malta (CBM) across sectors.

The introduction of ESA 2010 contributed 0.5 percentage points to the increase in GDP and 0.6 percentage points on GNI in 2013.

## 2.2 Effects of methodological improvements

The benchmark revision incorporated the work carried out over the past year, principally in relation to the financial sector. New estimates are now inclusive of special purpose entities and incorporate the results of a statistical project on the insurance sub-sector, where the compilation method was reviewed. Other enhancements include the identification of new data sources for holding companies and trusts. Reclassifications in the banking sector were also taken on board for the whole time series. The

benchmark revision also incorporates updates which resulted from the finalisation of supply and use tables. Some of the most important improvements relate to the methodological alignment in the compilation of the national accounts and balance of payments statistics. A number of pending methodological issues where Malta was not fully aligned with Eurostat methods were also dealt with. The revisions presented from 2011 onwards include other routine updates based on the latest Structural Business Statistics (SBS) survey and the availability of financial statements.

## **2.2.1 Main Statistical Projects**

### *2.2.1.1 Special purpose entities*

The inclusion of SPEs had an impact on the main variables shown in the production and expenditure approaches. A special purpose entity may be defined as a limited company or a limited partnership, created to fulfil narrow, specific or temporary objectives and to isolate a financial risk, a specific taxation or a regulatory risk. These entities have been classified in the financial sector as they are mainly involved in invoicing or act as holding companies. Consequently, figures for SPEs are compiled using the sum-of-costs approach, a method recommended by Eurostat. There was a level shift in output and intermediate consumption in the production approach, and in imports and exports in the expenditure approach. The level shifts amounted to €1.3 billion in 1995 and €4.7 billion in 2013. The impact on GDP was negligible up to 2004. Between 2005 and 2013 the contribution of SPEs increased from 0.1 percentage point to 0.4 percentage points in 2013. There was also a level shift in property income received and paid from and to the rest of the world. This is illustrated in the income approach below. The revision upwards ranged from €92.9 million in 1995 to €8.2 billion in 2013. GNI has been revised upwards by €4.0 million or 0.1 per cent in 1995, to €106.5 million or 1.6 per cent in 2013.

### *2.2.1.2 Insurance*

The insurance sub-sector was another main statistical project earmarked for this benchmark revision. A number of transactions disclosed in company accounts were causing large fluctuations in gross value added. These issues have now been addressed and the time series from 1995 to date has been revised accordingly. In the production approach, revisions are more pronounced in intermediate consumption, which has been revised downwards. The resulting upward revisions in gross value added (GVA) range from -€12.6 million in 1997 to €67 million in 2012.

The revisions in the compilation of national accounts data on insurance had a direct impact on household final consumption expenditure. The service charge consumed locally is equivalent to the output of resident insurance principals and net imports. Agents who represent non-resident principals import the insurance service charge, which is ultimately consumed by enterprises or households. Net imports (service charge) were obtained from balance of payments statistics and added to local production. As a result of this project, a fully balanced system is being compiled in national accounts, such that the total output (local and imported) is being allocated between intermediate consumption, consumer expenditure and exports.

Intermediate consumption at NACE division level has been adjusted to include the insurance service charge instead of insurance premiums. The revision in intermediate consumption led to an upward revision in GVA ranging from €10.3 million in 1995 to €17.9 million in 2013.

Property income attributed to holders of foreign insurance policies and income attributed to non-resident holders of domestic insurance policies were included in cross-border flows of property income. The overall impact on GDP amounted to 0.3 percentage points and 0.4 percentage points on GNI.

### 2.2.1.3 The production approach

#### a) *Alignment with balance of payments statistics*

Some methodological issues relating to inconsistencies between the compilation of national accounts and balance of payments statistics have been addressed. These were identified during the compilation of supply and use tables. The main revision related to companies classified in the financial sector. The national accounts statistics now reflect the methodology used in balance of payments statistics. The impact ranged from €0.9 million in 2005 to €50.2 million in 2013. Classification issues relating to residency had a negative impact on GDP of approximately €15 million annually across the time series.

#### b) *Regular revisions*

Annual and quarterly GDP data from 2011 onwards were routinely revised according to the latest available SBS survey and annual accounts and financial statements. As a result of these revisions, the GVA at current market prices increased by 1.8 percentage points in 2011, by 2.0 percentage points in 2012, and by 1.9 percentage points in 2013.

#### c) *New sources*

New data sources have been incorporated from 2003 onwards for holding companies and trusts, education and sports, amusement and recreation activities. Data was then extrapolated backwards to 1995 where applicable. Holding companies have been revised downwards by €6.0 million in 1995 and €36.3 million in 2013. Trusts were previously not included in the ESA 1995 series. The contribution to gross value added amounted to €1 million in 2003 and €11.6 million in 2013. Revisions in the education and sports sector were minor.

#### d) *Illegal activities*

Illegal activities relating to narcotics and prostitution, which were also an ESA 1995 requirement, were included in the whole time series. The inclusion of illegal activities in the case of Malta had an impact on GDP and GNI of approximately 0.3 percentage points. The increase in output shown in the production approach is mirrored by an equivalent increase in household final consumption expenditure and imports in the expenditure approach. In the income approach this had an impact on gross operating surplus.

#### e) *Others Changes*

The NSO has adopted a new classification for banks in line with that adopted by the Central Bank of Malta. A number of banks previously included as International Banking Institutions (IBIs) have now been classified as non-core banks. This had an impact on GDP given that IBIs are calculated in a different way. Moreover, these reclassified banks have more transactions with non-residents, consequently affecting significantly how the value of their services is allocated between intermediate consumption, exports and household expenditure. Other revisions related to the imputed calculations on banks' service charges, known as Financial Intermediation Services Indirectly Measured (FISIM)<sup>1</sup>.

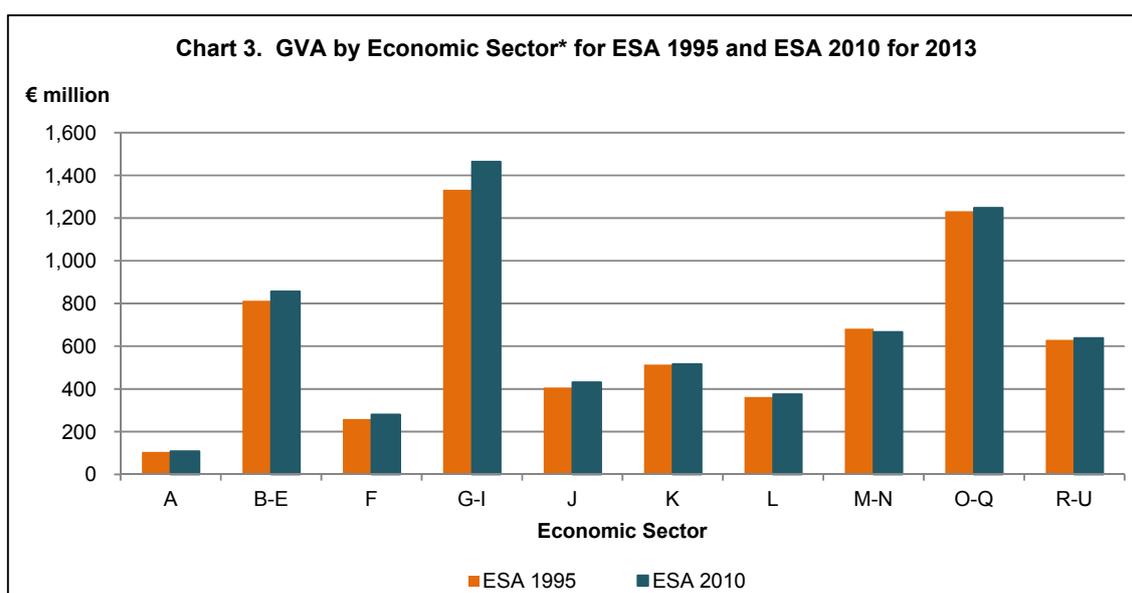
---

<sup>1</sup> FISIM is the term used to describe the services that banks provide to their customers but which are not invoiced. For bank depositors, these services generally include the management of current accounts, the sending out of bank statements and fund transfers between accounts. Instead of directly invoicing these services, the banks reduce the interest paid to depositors. This interest is in fact lower than the one customers could have obtained by lending their money directly to borrowers. For bank borrowers, these services include the monitoring of their credit worthiness, financial advice, the smoothing over time of repayments and the recording of these repayments for accounting purposes. The cost of these services is an inseparable part of the interest rate that the bank charges to these borrowers.

Revisions have also been carried out in relation to taxes relating to gaming duties for 2004 till 2008. These resulted from minor inconsistencies between national accounts and public finance statistics. The subsidy in relation to low fare airlines from 2006 onwards has been added to the output, and consequently on gross value added, of Warehousing and Support Activities for Transportation in order to derive output at basic prices.

The supply and use framework was used to introduce an exhaustivity adjustment for under reporting the construction sector for some years.

Chart 3 depicts the industry breakdown before and after the introduction of ESA 2010 and the other methodological changes documented above.



*\*(A) Agriculture, Forestry and Fisheries; (B-E) Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities; (F) Construction; (G-I) Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; (J) Information and communication; (K) Financial and insurance activities; (L) Real estate activities; (M-N) Professional, scientific and technical activities; administrative and support service activities; (O-Q) Public administration and defence; compulsory social security; education; human health and social work activities; (R-U) Arts, entertainment and recreation, repair of household goods and other services.*

#### 2.2.1.4 The expenditure approach

##### a) Household final consumption expenditure

Revisions in household final consumption expenditure differ over time. At product level, they mainly reflect the finalisation of supply and use tables. Downward revisions were made to estimates of the consumption of meat, milk, cheese and eggs, fruit, accommodation services and other cultural services. The latest available supply and use tables indicated that there was excess demand when comparing total supply (imports plus local production plus trade margins) with total demand for these products. Data from the SBS survey also indicated the need to increase the share of intermediate consumption of these products. This revision lowered household final consumption expenditure across all the time series by an

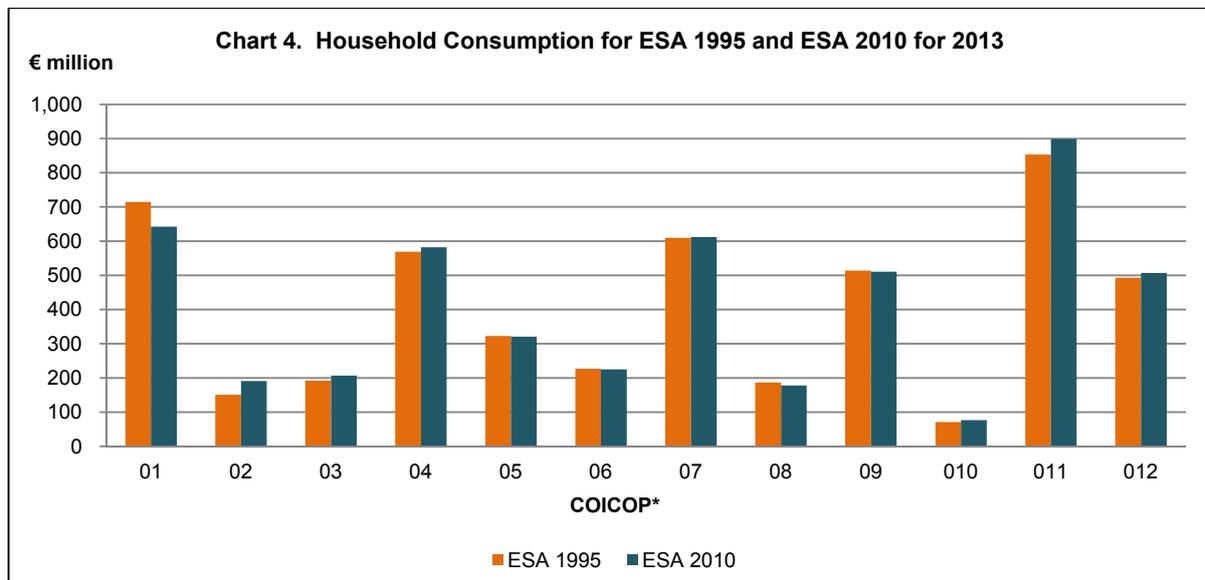
annual average of €106 million between 2000 and 2013. In addition, there was a change in the compilation of data for tobacco consumption. This had a positive impact of approximately €27.4 million annually between 2000 and 2013.

Household final consumption expenditure was revised upwards between 2001 and 2007 following the inclusion of data on the consumption of restaurant services located in hotels.

The project on insurance, the methodological changes made in the compilation of other financial services and the revision to FISIM had an impact which ranged from -€25.9 million in 2000 to €82.4 million in 2005.

Illegal activities, namely narcotics and prostitution were included in household consumption expenditure and the impact was of approximately €22 million.

A recent ad hoc survey on internet shopping carried out by NSO showed that an estimated €77 million were spent annually. This excludes expenditure relating to travel, for which the national accounts has other sources. Household consumption expenditure included of a conservative estimate which was topped up following the survey.



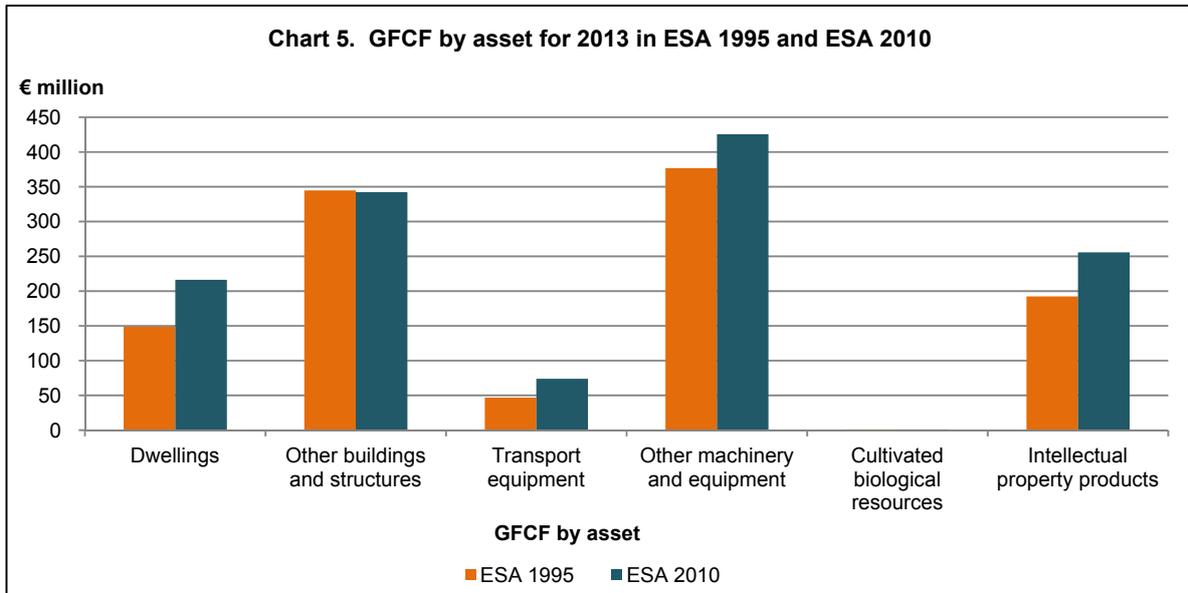
\* COICOP: Food and Non-Alcoholic Beverages (01), Alcoholic Beverages, Tobacco (02), Clothing and Footwear (03), Housing, Water, Electricity, Gas and other fuels (04), Furnishings, Household Equipment and Routine Household Maintenance (05), Health (06), Transport (07), Communication (08), Recreation and Culture (09), Accommodation (010), Restaurants and Hotels (011) and Miscellaneous Goods and Services (012).

**b) Gross fixed capital formation (GFCF)**

Apart from the inclusion of R&D expenditure, revisions to GFCF are due to updates for own-account production of dwellings by households (+€2 million), and transfer costs relating to dwellings which were previously only partly included in GFCF. Transfer costs amounted to €25.4 million in 1995 and €66.3 million in 2013.

Another important revision resulted from the incorporation of the latest available SBS survey and audited accounts. As a result of this new information, GFCF was revised upwards by approximately €77 million annually in 2011, 2012 and 2013. Other revisions were made to estimates of expenditure on software since 2010.

Following the above mentioned revisions the composition of GFCF changed slightly when compared to the ESA 1995 series.



### c) Imports and exports of goods and services

Revisions with respect to imports and exports are mainly due to the inclusion of changes in FISIM, internet shopping results, narcotics and SPEs. The upward level shift in both imports and exports is mainly due to the inclusion of SPEs. The level shift amounts to €1.2 billion, or 45.9 percentage points in 1995, and €4.8 billion, or 72.2 percentage points in 2013. Despite this level shift, the impact on balance of exports and imports generated by SPEs amounted to €1.4 million in 1995 and €30.3 million in 2013.

#### 2.2.1.5 The income approach

The income approach is a derived approach. Consequently any revisions reported in the production approach resulted in a revision in gross operating surplus and mixed income.

Revisions in compensation of employees which are directly measured through surveys and company accounts also have an impact on gross operating surplus and mixed income. As part of the regular revision, the annual and quarterly GDP data for 2011 were revised according to the latest available SBS survey and annual accounts and financial statements. In the income approach compensation of employees were revised by €58 million in 2011, and around €87 million annually in 2012 and 2013.

As already explained, there is a level shift in the property income received and paid from and to the rest of the world due to the inclusion of SPEs.

The overall impact of the changes discussed in the production and income approach determine the level of GNI which has been revised downwards in 1995 by -€31.5 million and upwards by €359.3 million in 2013.

### **3.0 From constant prices to chain-linked prices**

The volume series of the quarterly national accounts in ESA 1995 was published in constant base-year prices (the base year was 2000). To meet EU requirements, the series will henceforth be calculated at chain-linked prices.

There are different established techniques for chain-linking quarterly data. Malta has chosen the annual-overlap method, recommended by Eurostat and used by most EU Member States. The new method provides a better description of economic changes. It involves aggregating the GDP sub-components in volumes on the basis of the most recent price structure available, that is, the previous year. Chain-linking consists in choosing a reference year (essential for defining levels) and annually updating the structure of relative prices of sub-components. By constructing volume series at chain-linked prices, changes in the aggregates' relative prices over time may be incorporated.

However users should note that chain-linking gives rise to components of GDP not adding up to the aggregate real GDP series. This non-additivity, similar to that in other countries' national accounts, is due to mathematical reasons, and reflects the fact that chain-linked volumes are calculated by separately extrapolating both totals and their sub-components. Unlike historical series at constant prices, chain-linked prices do not preserve the classic identity between the sum of the economy's sources (GDP + imports) and the sum of final uses (final consumption + investment + exports + changes in inventories). The loss of additivity of volumes will be observed in all years except the reference year and the subsequent year. Non-additivity arises for purely mathematical reasons, whereas the discrepancies cannot be interpreted as indications of quality. One reason for non-additivity is that chain-linked volumes are calculated by separately extrapolating both aggregate numbers and its components. In addition, different weights are applied to the calculations of different periods (weights of fixed base year as against the previous year). The farther away from the reference year, the larger the discrepancies tend to be.

Chain-linking for variables with a potentially changing sign is aggravated and the results could prove to be erratic. For this reason, variables that are regularly susceptible to this are not required by Eurostat, at least not in absolute terms (e.g. acquisitions less disposals of valuables). In the case of Malta this issue may also have an impact on some components of GFCF when negative values result at current prices (e.g. Transport equipment in 2002).

#### *Selection of a new reference year*

In addition to the above-mentioned revisions, the reference year for the GDP calculated with the chain-linking method was moved from 2000 to 2010. The transition to the new reference year changed the chain-linked indices and the chain-linked values, but GDP growth rates remained unchanged. Eurostat will also publish Malta's data in chain-linked volumes in 2005 prices.

For more information on chain-linking refer to the Annex 2.

#### **4.0 Future work on National Accounts**

The work in relation to the implementation of ESA 2010 is by no means exhaustive. Malta, together with other Member States, obtained a number of derogations which expire on 1 January 2020. This means that the NSO will as from next year embark in a number of projects to address these derogations and to expand the national accounts statistics presently being compiled. Users should be informed that the GNI Inventory currently available on the NSO website describes the sources and methods of the ESA 1995 series. Following the implementation of ESA 2010 all EU Member States have been requested to update their GNI Inventory by September 2015.

More information on ESA 2010, including legal documents, manuals and guidelines are available on the web page [<http://www.nso.gov.mt/site/page.aspx?pageid=688>].

## Annex 1

Country	ESA 2010 revisions	Other benchmark revisions	Source
<b>Croatia</b>	The impact of GFCF amounted to 1.0% out of which 0.5% is due to R&D.	Other changes include illegal economic activities which are estimated to have an impact of 0.7% on GDP	<a href="http://www.dzs.hr/default_e.htm">http://www.dzs.hr/default_e.htm</a>
<b>Denmark</b>	Not enough information is given to distinguish between the impact of ESA 2010 and other benchmark revision on GDP		<a href="http://www.dst.dk/en/Statistik/dokumentation/hovedrevideret-nationalregnskab/hovedeffekter-af-revisionen.aspx">http://www.dst.dk/en/Statistik/dokumentation/hovedrevideret-nationalregnskab/hovedeffekter-af-revisionen.aspx</a>
<b>Estonia</b>	Introducing ESA 2010 increased the GDP 1.3% in 2010. On average the impact for 2010 to 2013 is of 1.4%.	Regular data accrual and revision increased GDP by 1.1%, in 2010. On average the impact for 2010 to 2013 is of 0.6%. On the other hand methodological improvements reduced the GDP by 0.1% in 2010. On average the impact for 2010 to 2013 fell by 0.4%.	<a href="http://www.stat.ee/79711?highlight=ESA,2010">http://www.stat.ee/79711?highlight=ESA,2010</a>
<b>Finland</b>	In 2010, revision was of 4.3 percentage points	In 2010, revision was of 0.3 percentage points	<a href="http://www.stat.fi/til/vtp/vtp_2014-07-11_uut_001_en.pdf">http://www.stat.fi/til/vtp/vtp_2014-07-11_uut_001_en.pdf</a>
<b>France</b>	The impact of ESA 2010 is of +2.4%	Revisions unrelated to ESA 2010 have resulted in an upward GDP revision of +0.8% in 2010	<a href="http://www.insee.fr/en/themes/comptes-nationaux/default.asp?page=base-2010.htm">http://www.insee.fr/en/themes/comptes-nationaux/default.asp?page=base-2010.htm</a>
<b>Germany</b>	Conceptual changes contribute 2.7 percentage points to the increase in the GDP level	Non-conceptual changes account for just 0.6 percentage points.	<a href="https://www.destatis.de/EN/Methods/NationalAccountRevision/Revision2014_BackgroundPaper.pdf?__blob=publicationFile">https://www.destatis.de/EN/Methods/NationalAccountRevision/Revision2014_BackgroundPaper.pdf?__blob=publicationFile</a>
<b>Ireland</b>	The greatest impact in Ireland's GDP due to ESA 2010 is R&D with an impact of an average of 4% between 2010 and 2013	Other changes include illegal economic activities which are estimated to have an impact of 0.71% on GDP	<a href="http://www.cso.ie/en/newsandevents/pressreleases/2014pressreleases/implementingnewinternationalstandardsfornationalaccountsandbalanceofpaymentsstatistics/">http://www.cso.ie/en/newsandevents/pressreleases/2014pressreleases/implementingnewinternationalstandardsfornationalaccountsandbalanceofpaymentsstatistics/</a>
<b>Italy</b>	Changes due to methodological innovations introduced by ESA 2010 contributed 1.6 percentage points (24.6 billion euros) to the revaluation of the nominal GDP in 2011; the main share (1.3 percentage points) is connected to the capitalisation of research and development expenditure.	Changes related to the overcoming of European reservations on the implementation of ESA 95 (including the inclusion of some illegal activities, which contributed 1.0 percentage points to the revaluation of the GDP), have determined an overall upward revision of 0.8 percentage points. The remaining share of the revaluation comes from the combination of several effects related to innovations in national sources and methodologies, which contributed 1.3 percentage points to the overall revision.	<a href="http://www.istat.it/en/archive/131989">http://www.istat.it/en/archive/131989</a>
<b>Latvia</b>	Impact of ESA changes amount to an average of 0.8% between 2005 and 2012	The impact of other changes on GDP amount to an average of 2.3% between 2005 and 2012	<a href="http://www.csb.gov.lv/node/40903">http://www.csb.gov.lv/node/40903</a>
<b>Lithuania</b>	The implementation of the ESA 2010 provisions conditioned an increase in GDP by, on average, 0.6 percentage points at current prices.	The use of new data sources and methods conditioned an increase in GDP in the most recent period (2007–2013) by, on average, 0.4 percentage points.	<a href="http://osp.stat.gov.lt/en/pranesimai-spaudai?articleId=2830626">http://osp.stat.gov.lt/en/pranesimai-spaudai?articleId=2830626</a>

<b>Country</b>	<b>ESA 2010 revisions</b>	<b>Other benchmark revisions</b>	<b>Source</b>
<b>Luxembourg</b>	On Average changes in ESA 10 is estimated +1.8%	On average other changes are estimated to increase GDP by 1.7%.	<a href="http://www.statistiques.public.lu/catalogue-publications/regards/2014/PDF-09-2014.pdf">http://www.statistiques.public.lu/catalogue-publications/regards/2014/PDF-09-2014.pdf</a>
<b>Netherlands</b>	Implementation of the new international guidelines accounts for 3.0 percentage points	Re-evaluation of new sources accounts for 4.6 percentage points.	<a href="http://www.cbs.nl/en-GB/menu/themas/macro-economie/publicaties/artikelen/archief/2014/2014-802-pb.htm">http://www.cbs.nl/en-GB/menu/themas/macro-economie/publicaties/artikelen/archief/2014/2014-802-pb.htm</a>
<b>United Kingdom (UK)</b>	Average revision 1997 to 2009 is +2.0%.	Average revision 1997 to 2009 is +1.6%.	<a href="http://www.google.com.mt/url?sa=t&amp;rct=j&amp;q=&amp;esrc=s&amp;frm=1&amp;source=web&amp;cd=2&amp;ved=0CCQQFjAB&amp;url=http%3A%2F%2Fwww.ons.gov.uk%2Fons%2Fguide-method%2Fmethod-quality%2Fspecific%2Feconomy%2Fnational-accounts%2Farticles%2F2011-present%2Fimpact-of-national-accounts-improvements--international-comparisons.pdf&amp;ei=unkzVJ_5LojbPeGCgMAE&amp;usq=AFQjCNGZus!TjCbKcLsnAkjbRfWJBX07g&amp;bvm=bv.76943099,d.ZWU">http://www.google.com.mt/url?sa=t&amp;rct=j&amp;q=&amp;esrc=s&amp;frm=1&amp;source=web&amp;cd=2&amp;ved=0CCQQFjAB&amp;url=http%3A%2F%2Fwww.ons.gov.uk%2Fons%2Fguide-method%2Fmethod-quality%2Fspecific%2Feconomy%2Fnational-accounts%2Farticles%2F2011-present%2Fimpact-of-national-accounts-improvements--international-comparisons.pdf&amp;ei=unkzVJ_5LojbPeGCgMAE&amp;usq=AFQjCNGZus!TjCbKcLsnAkjbRfWJBX07g&amp;bvm=bv.76943099,d.ZWU</a>

## **Annex 2: Frequently Asked Questions regarding the chain-linking method**

### **Why did Malta adopt the chain-linking method?**

The incorporation of the chain-linking method was undertaken in order to fulfil Regulation (EC) No 1392/2007 of the European Parliament and of the Council of 13 November 2007 amending Council Regulation (EC) No 2223/96 with respect to the transmission of national accounts data.

### **What are the benefits to integrating the chain-linking method?**

1. When compared to the previous method of constant prices, chain-linking allows the user to compute the real growth of GDP components using the most up-to-date base year possible (i.e. the preceding year). This means that growth rates reflect the economic changes and dynamics more accurately, even when considering data from a distant time-period when compared to the reference year.
2. The need for regular re-basing is eliminated, since through the chain-linking method the base year  $t$  is automatically changed to  $t-1$ . Furthermore, re-referencing does not affect growth rates and can be chosen arbitrarily.
3. Furthermore the rate of adoption within the international sphere means that all EU Member States and a majority of developed countries (e.g. USA, Canada, Japan, Norway, Switzerland) have incorporated chain-linking into their computations making international comparisons easier and more accurate.

### **What are the drawbacks to integrating the chain-linking method?**

1. Loss of additivity of volumes in all years except the reference year and the year following the reference year. Non-additivity arises purely out of mathematical reasons, whereas the discrepancies cannot be interpreted as indications of quality. The reason behind non-additivity is that chain-linked are calculated by separately extrapolating both aggregate numbers and its components. In addition, different weights are applied to the calculations of different periods.
2. Chain-linking for variables with a potentially changing sign is aggravated and the results could prove to be erratic, for this reason variables that are regularly susceptible to this are not requested by Eurostat, at least not in absolute terms (e.g. changes inventories and acquisitions less disposals of valuables). Specifically in cases such as this only the contribution to the GDP growth is computed.
3. Chain-linked indices are more complicated for the users to interpret, especially due them being non-additive.

**With the adoption of the chain-linking method, several new indices were calculated. These include: values at previous years prices, chain-linked volumes by reference year 2010, chained indices and contribution to GDP growth. What is the difference between these indices?**

1. Values at previous year prices: quarterly indices of accounting period (deflated) on the base of the average prices of previous year. Therefore year  $t$  can be described as having year  $t-1$  as both its base year and its reference year, meaning that one year cannot be compared to another.

2. Chained index: since values of the GDP components at previous year prices are not comparable to different years due to the changing base years, special indices are calculated for chain-linking consecutive years.
3. Chained-linked volumes by reference year: values calculated with chained indices on the base of reference year (value of the reference year is multiplied by the chained index of accounting period).

#### **What is the difference between the base year and the reference year?**

1. Base year: the year preceding the accounting period (t-1) the prices of which are taken as a base for the calculations of accounting periods.
2. Reference year: a year (currently 2010) that is used as a base for presenting chain-linked indices and volumes. After some time, the reference year can be changed. Chained indices and values change when changing the reference year, but the growth rates remain exactly the same.

#### **Based in what indices can the change of the GDP and its components be found?**

Values of the GDP components at previous year's prices are not comparable due to the changing base years, special indices are calculated for chain-linking consecutive years, and based on them, the chained volumes are calculated by the reference year. Chained indices or chain-linked volumes have to be used for calculating the change of the GDP and its components. Changes of the GDP components calculated on the base of these indices give the same results.

#### **Why do the growth rates of GDP components calculated by chain-linking method differ from those calculated at constant prices?**

1. Since the price structure of the previous year is used as a base in case of the chain-linking method, and the price structure of the fixed base year is used as a base for constant price calculations, larger discrepancies emerge in the growth rates gained by different methods if cyclical changes in prices and volumes are involved.
2. Changes in product structure have an impact on the results of calculations and the more the product structure changes, the wider the discrepancies that arise.
3. The use of volume indices brings about the larger discrepancies for some components between the growth rates when comparing the two different methods.