1. Overview of the system of accounts

1.0 Introduction

1.1 Main approaches

In accordance with the Commission Regulation (EC) No 109/2005, the Danish national accounts cover the economic territory of the Kingdom of Denmark except for the Faeroe Islands and Greenland.

The Danish national accounts consist of both annual and quarterly accounts. The official balance of payments estimate is consistent with the national accounts rest-of-the-world account. As from 2014 the Danish national accounts are compiled in accordance with the guidelines in the European System of Accounts (ESA 2010). Consistent time series are available back to 1966.

The final Danish national accounts are built around a set of supply and use tables. Initial unbalanced GDP estimates are to a large extent calculated independently from the output and expenditure sides and balanced in a detailed product balance system covering around 2 350 products. With the balanced supply and use tables as a starting point, symmetrical industry x industry input-output tables are constructed annually on the basis of the "industry technology assumption". Annual institutional sector accounts are compiled using information on institutional sector and industry from the accounting statistics and the balanced supply-use tables as a starting point.

Annual financial accounts are also produced and net-lending from the financial transaction account and the non-financial accounts are reconciled in a balancing process. In addition capital stock estimates (produced fixed assets) are compiled using gross fixed capital formation series at industry level, which secures consistency between investment and capital stock series. This system also produces consumption of fixed capital series.

Finally, labour productivity and total-factor productivity figures and regional accounts are produced for annual figures. Also supplementary accounts related to the environment are compiled.

As regards the classifications of industries, both the primary statistics and the national accounts are based on the NACE Rev. 2. The Danish industry classification *Dansk Branchekode*, DB 07, is a national, more detailed version of the NACE Rev. 2.

As regards commodity classifications, both product statistics covering manufacturing and external trade statistics use the EU's CN (Combined Nomenclature). The national accounts' product classification (around 2 350 products) likewise complies with the CN classification, but at a higher level of aggregation. The national accounts' product balances can be converted to the EU's CPA product classification at the 4-digit level

As regards the classification of household final consumption, the Danish national accounts are based on the international classification of individual consumption by purpose, COICOP, and there are no exceptions of any kind. The most detailed consumption grouping comprises 72 groups.

All units and transactions in the general government sector are classified according to the COFOG. Product transactions involving general government are cross-classified by transaction type (ESA 2010), by industry for the producer unit concerned (DB 07), by sector for the institutional unit concerned (ESA 2010) and by function for the relevant transaction (COFOG).

1.1.1 Organisation of national accounts work in Statistics Denmark

Statistic Denmark's organisation chart as at January 2016 is attached in Annex 1 and the organisation chart for the national accounts as of February 2016 in Annex 2. Statistics Denmark is divided into five directorates, three for statistics on particular fields, one for user services and one for communication and sales. Under the Act on Danmarks Statistik *[Lov om Danmarks Statistik]*, the institution is independent of government as regards all technical aspects of statistics. It is headed by a Board of Governors whose members are appointed by the Minister of Social Affairs and the Interior. Since the Act was passed in 1966, the members of the Board have been experienced representatives of the business world, the world of research and local government. No

ministries are represented. Under the legislation, the National Statistician, who is appointed as a permanent official, is responsible for the technical and administrative management of the institution and is also Chairman of the Board. He reports directly to the Minister of Social Affairs and the interior all administrative and economic issues. It is Danish parliamentary practice for all draft EU legislation which is to be negotiated in the Council to be put before the *Folketing*'s Europe Committee, which gives the Minister a negotiating brief. This ensures that Parliament retains control over the extremely important share of statistical output which arises from EU legislation and which therefore actually comes within the scope of the Board.

From the organisational point of view within Statistics Denmark, responsibility for national accounts falls to the Directorate for Economic Statistics. The work is divided among two divisions known as "National Accounts" and "Public Finances". In addition the balance of payments is compiled in the division “External Economy” and it is ensured that the rest of the world account is consistent with the balance of payments. As annex 2 shows, the National Accounts division employs 35 persons. In the division for Public Finances about 20 persons are working on national accounts.

The National Accounts division is responsible for the estimates of the “functional” national accounts, that is the goods and services account including supply and use tables and input-output tables in current and constant prices. The division is also responsible for non-financial institutional sector accounts for households, non-financial corporations, the rest-of-the-world account and the reconciliation of the non-financial sector accounts. In addition it is responsible for capital stock estimates, labour productivity, regional accounts, environmental accounts and quarterly accounts. It is also responsible for administrative uses of the national accounts, i.e. fourth own resource (GNI), third own resource (VAT).

The Public Finance division calculates the general government sector including financial accounts. In addition, the division is responsible for non-financial sector accounts for financial corporations and NPISH (Non-Profit Institutions Serving Households) and annual financial accounts for all sectors. Regarding administrative use of the national accounts, the division is responsible for the excessive deficit procedure (EDP). The division also covers accounting statistics for industries dominated by publicly controlled corporations and it collects and publishes primary statistics for local government (municipalities and counties) and some credit market statistics.

1.1.2 Supervisory and control systems in place

The use and control of primary statistics – from preliminary to final accounts

Danish quarterly national accounts are published up to eight times a year, the general rule being that the first “flash” version of a new quarter is replaced by a revised version of the same quarter as well as the two previous quarters. Quarterly accounts are calculated by a much smaller system that uses indicators to extrapolate the majority of its series from a certain point of time. Some series are however determined by data received from other divisions of Statistics Denmark for instance data on foreign trade and balance of payments from the division of External Economy, government accounts and financial accounts from the division of Government Finances. The first version of the figures for a calendar year is the sum of the quarterly figures for four consecutive quarters. When new estimates of annual figures are compiled, the quarterly figures are revised accordingly.

The final accounts are published almost 3 years after the end of the respective year. The final 2012 figures were published in November 2015. The system for compilation of final accounts is a much bigger system that as far as possible utilises all available statistical sources at a very high level of detail. At the same time new provisional figures for the two following years are published. The figures for the year following the “final” year are generally calculated with a lower level of detail like in the quarterly system, but where it is feasible to use calculation systems and methods from the system for final accounts (except the supply-use framework), the results from these calculations are preferred to results from the quarterly calculations. For the most recent preliminary year, the data sources used in the final accounts are in general not yet available, so here it is necessary to fall back to the methods used for the quarterly accounts.

It follows from the brief description that statistical sources are as far as possible taken into account in the national accounts calculations as soon as the data is available.

Several important statistical sources are used in preliminary accounts before they are used in the final system. This is an opportunity to first test the reliability of such sources. If what seems to be obvious errors are detected the problems are as far as possible solved in cooperation with the office responsible for the source data in question. However, the tight production schedule for preliminary figures does not leave time for thorough investigations into the content of data files received a few days before they must be used for the actual calculations. The early use of data sources can, however, at least give us a hint on problems we need to give some special attention before the final calculations.

A few examples can illustrate how data is received from other divisions of Statistics Denmark:

External trade: Preliminary data are received for the quarterly accounts. The data is updated as more information is collected. The final version of the annual figures may be agreed upon close to the point of time where it is needed for the calculations, often after discussions with the national accounts division on the precise interpretation of specific transactions.

Industrial accounts statistics is the most important source for economic information on private units. It is prepared in Statistic Denmark's division for Business Development. In this case the national accounts division receive a single final version in the form of data-files containing the individual data – including the estimated values - for all units in the survey. The Results are received in time to be used in preliminary annual figures one year before they are needed for the final annual accounts. If some year-to-year developments in the data seem suspicious investigations into the matter may already start here well before the data is needed for the final accounts. Before the files from the industrial accounts statistics are processed to be used as input into the systems of the final accounts they are run through a number of checks and comparisons with information from other sources.

Data for General government is received from the division for Government Finances as a file containing the full system of coded records from that division's "DIOR" database. It is coded by COFOG groups, ESA 2010 codes and industry codes. In the national accounts division data are converted into the form that is needed, when data is entered into the SUT-framework. DIOR-data are extracted for use in preliminary as well as final accounts. Before the data is declared final, a number of corrections to the original data are usually agreed upon. A short time before the data is needed as input in the final SUTs, the final version is "frozen". Hereafter further corrections are only accepted in exceptional cases when both divisions agree on the necessity of changes.

The central position of the balanced SUT as a control system

Danish national accounts are characterised by the central position of the supply and use tables in the estimation of the main aggregates of the national accounts. A description of the balancing system can be found in chapter 6: "The balancing or integration procedure and validating the estimates". As the title indicates the purpose of the compilation of SUTs is not alone to provide a reliable base for I-O tables, but also to provide a confrontation between estimates from different sources at a very detailed level.

Already when data are combined into files for targets for total output, input, GFCF etc. a considerable number of suspicious values are encountered. When the first version of the – unbalanced – SUT file is put together it is furthermore necessary to compare the initial estimates of supply for certain product groups with estimated use. A closer study usually reveals errors in primary statistics – often of types that would have been difficult to find if accounts statistics had been the only source. A few examples of such errors are:

- A unit has outsourced all domestic production of goods, but its headquarters is still classified as manufacturing and the remaining domestic sales of products is classified as own produced products.
- One or more affiliated units abroad are included in the activity shown as domestic production of an enterprise.
- Units that have changed ownership, taken part in reconstructions or fusions with other units have sometimes been found to have been included in accounts statistics more than once under different identifications.
- Turnover in some big enterprises have in some cases been recorded as taking place simultaneously with production, whether delivered to customers or not, while it is recorded as purchased at a later time or at the time when it has left the country (crossed the border) on the uses side.
- Bankruptcies and restructuring of enterprises can lead to strange omissions in the various statistical sources. We have for instance experienced that important goods were missing from imports according to foreign trade statistics, but were needed for input or GFCF according to other statistical sources.

- Imports or exports may have been included both in trade in goods and trade in services. This type of problems has turned up for instance in airlines, airports and oil-companies.

In the recent years many of the problems detected have emerged in connection with globalisation, for instance outsourcing abroad, more or less complete recording of foreign trade in industrial services (between affiliates or between non-affiliated units) and management services between affiliates.

In practice the work on preparation and balancing the SUT-files raises a number of questions that need to be answered by the people responsible for the relevant statistical sources. Often the explanation is found in cooperation. It may, however, be too late to correct the published figures as primary statistics is often declared final before the errors are detected, but the feedback from national accounts will usually lead to correction of similar errors in the following years. It is our clear impression that inquiries into these balancing problems are of considerable importance for the quality of the SUT and hence the national accounts.

The establishment of a "large case unit" in 2015 is expected to have a positive impact on the national accounts in the future. The "large case unit" will take care of the complex business models for large multinational corporations (*profiling*) and make the confrontation of primary statistics as part of data validation (in the primary statistics) before entering the national accounts. This work is in line with the work described in chapter 2 leading to a revision of the balance of payments in October 2016 and the national accounts in November 2016.

Service Level Agreements and the like

The publication schedule for national accounts determines the deadlines for the various versions of quarterly, provisional and final annual accounts. The publication schedule is based on policies decided within Statistics Denmark as well as the deadlines for reporting to Eurostat. Each year a formal "Office contract" is set up between the division and the management that stipulates targets for timeliness, correctness and reliability of the published national accounts figures.

The final accounts are incorporated in the "November version" of the annual national accounts. As the final accounts will provide a new benchmark for the provisional annual accounts for the following two years, a production plan is prepared to ensure, that the various components are ready when they are needed for the calculations and that the final accounts are available when they are needed for production of preliminary and quarterly accounts.

It is obvious that planning of the production process for quarterly, provisional and final annual data would be very difficult without knowledge on when to expect the versions of the primary statistics that are needed for the various versions of the national accounts. It is also important to be able to foresee the introduction of new statistical sources, the phasing out of existing sources or just the changes in file formats, software or other techniques that influence the statistical product.

There is a tradition for coordination meetings with "External Economy" and "Government Finances". Participants are typically the Heads of divisions and the people belonging to the sections directly involved in the work on these issues. The output of these meetings is agreement on a time schedule and deadlines for data deliveries to the national accounts. It is also common practice that people from national accounts are invited to participate in meetings preceding the establishment of new primary statistics that can provide information for national accounts purposes.

Recently six coordination groups have been established in order to further formalise the cooperation within macro-economic statistics. The task of these coordination groups is in the first place to make and follow up on service-level agreements but also to have follow-up discussions on specific data problems and development projects. For the time being service level agreements exist for the following data sources:

- Foreign trade in goods
- General government (non-market)
- Financial sector including FISIM

In addition, a formal agreement on the cooperation between Statistics Denmark and the Central Bank exists. The cooperation with the Central Bank relates to quarterly financial accounts and property income and financial transactions of the balance of payments.

Quality-reports, internal audits and the like:
An analysis of revisions is carried out and published with the July and November versions. The analysis of revisions is based on the assumption that the final accounts represent "the truth" about that year. When looking at differences between preliminary and final figures for Denmark it should be kept in mind that the level of detail, the available data and not least the available time and resources used on final accounts are of a fully different magnitude than those used for preliminary figures. Furthermore the methods for compilation of final accounts are qualitatively different from those used for provisional figures.

Detection of errors in final accounts is not entirely unknown. When such errors can be corrected without significantly disturbing growth rates, they corrected figures are introduced in the SUT that is being balanced[1]. A comprehensive system of notes is used to document the adjustments made during the work on the final accounts as well as those adjustments that will need to await the next general revision.

Regular meetings are held with representatives of the suppliers of primary statistics in connection with the publishing of the first version of each new quarter. These meetings tend to concentrate on the relations between the most recent developments in preliminary statistical sources and the corresponding figures in the national accounts.

Another type of meetings is known within Statistics Denmark as "Konjunkturforum". The name covers a number of small groups, each of which covers a specific statistical product and consisting of members from those division that have a common interest in the statistics in question. Meetings are held regularly before the releases of new figures. It also covers regular joint meetings for all members of these groups. In these meetings the latest published version of the national accounts is a fixed item on the agenda, but the meetings will usually discuss any important new developments of common interest.

As mentioned previously in this section, the establishment of a large case unit, in which the national accounts division is highly involved, is expected to have a positive impact on the quality of the national accounts.

1.2 The revisions policy and the timetable for revising and finalising the estimates; major revisions since the last version of the GNI Inventory

Revision policy for current revisions
Final national accounts data are calculated three years after the reference year (year t+3). Several versions of preliminary accounts are calculated before that. The first version is available as the sum of quarters two months after the end of the reference year, and the last preliminary version is published at the end of year t+2 (see table 1.1).

Table 1.1 illustrates the revision policy (apart from benchmark revisions) for the Danish national accounts followed by Statistics Denmark from November 2001. The revision policy is announced to the users so that they always know how many periods will be revised.

[1] In other cases it might be decided to keep the time-series at the present level until the entire series can be corrected in the next major revision.

Table 1.1 Revision policy of the Danish NA, from 2001

Year	Month of publishing	Year T, Q1	Year T, Q2	Year T, Q3	Year T, Q4	Year T
T	End May	P				
	Begin. July	R				
	End August	-	P			
	Begin October	R	R			
	End November	-	-	P		
T+1	Begin. January	R	R	R		
	End February	-	-	-	P	P (SQ)
	Begin. April	R	R	R	R	R (SQ)
	Begin. July	R	R	R	R	R (SQ)
	Begin. October	-	-	-	-	-
	End November					R (AP1)
T+2	Begin. January	R	R	R	R	-
	Begin. April	-	-	-	-	-
	Begin. October	-	-	-	-	-
	End November					R (AP2)
T+3	Begin. January	R	R	R	R	-
	Begin. April	-	-	-	-	-
	Begin. October	-	-	-	-	-
	End November					F
T+4	Begin January	F	F	F	F	

Note:
P First published SQ: Sum of quarters
R: Revised AP1: First preliminary annual calculation
F: Final AP2: Second preliminary annual calculation
Figures are published unchanged compared to the earlier published figures.
The revisions of the quarterly figures in January T+2, T+3 and T+4 are made in order to make the quarterly figures consistent with the annual figures.

Revision policy for benchmark revisions

It is important to understand that in the Danish national accounts compilation system, which has been the basis since the first publication of a supply-use table in 1973, every year is compiled in "level". The concept of "benchmark revisions" in the case of the Danish national accounts is therefore related to the introduction of new international guidelines, new classifications, new sources that need to be introduced in level instead of as growth rates or eventually the correction of larger errors. These revisions are usually pooled together as described in chapter 2.

The most recent major revision was published in September 2010. It introduced ESA 2010, addressed GNI reservations set in 2012 and also implemented other well defined revisions. In November 2016 a revision of the national accounts is planned. This revision is mainly related to goods sent abroad for processing and merchanting and it follows a revision of the balance of payments back to 2005 to be published in October 2016.

Impact of the transition from ESA 1995 to ESA 2010

In September 2014 the most recent major revision was published. It introduced ESA2010, addressed GNI-reservations and also implemented other well defined revisions. The major revision was carried back to 1966 at the level of input-output tables.

As appears from table 2.21, the transition items, that have an effect on GNI, are Research and development market (1a); Research and development, non-market (1b); Valuation of output for own final use (2); Non-life insurance (3); Weapon systems (4); Sector classification (6) and VAT based EU resource (8). The by far largest effects come from Research and development that accounts for 2,6 of the total impact of 2,8 percent on GDP.

The transition items that do not have an impact on GNI are Decommissioning costs (5); Small tools (7); Index-linked debt instruments (9), Central bank – allocation of output (10); and land improvements (11).

Table 1.2 shows the transition table from the GNI questionnaire 2015. It presents the total effect of the transition items on GDP for the years 2010-2014.

Table 1.2 Transitions from ESA95 to ESA2010

		2010	2011	2012	2013	2014
		DKK mill.				
R&D created by a market producer	(1a)	37 399	34 236	36 121	37 154	38 936
R&D created by a non-market producer	(1b)	14 186	14 750	15 290	15 292	16 026
Valuation of output for own final use	(2)	86	88	42	43	43
Non-life insurance	(3)	-4 624	-3 477	-1 556	-1 292	-1 124
Weapon systems	(4)	1 611	1 109	1 291	1 337	1 200
Decommissioning costs	(5)					
Sector classification	(6)	23	29	48	56	53
Small tools	(7)					
VAT-based EU resource	(8)	1 609	2 083	2 105	2 170	2 239
Index-linked debt instruments	(9)					
Central bank – allocation of output	(10)					
Land improvements	(11)					
Total		50 290	48 817	53 341	54 759	57 372

Note: For 2012 and onwards it should be noted, that data are not consistent with other chapters of this documentation. Data in this table are from the GNI questionnaire September 2015, where 2012 onwards were preliminary figures. The reference year in the GNI inventory is final 2012 as published in November 2015.

1.3 Outline of the production approach

For 2012, the calculation of output-based GDP can be summarised in table 1.3 below:

Table 1.3 GDP Production approach, 2012

	Value	Pct. of GDP
	DKK mill.	pct.
Output at basic price	3 362 422	179
- Intermediate consumption	1 738 713	92
+ taxes on products	272 919	14
- Subsidies on products	14 003	1
GDP	1 882 625	100

The aggregate estimate of value added is based on an estimate at the level of the national accounts' most detailed industry grouping. The calculations of value added up to the initial output-based estimate of GDP are for most industries at a much more detailed level, namely the DK-NACE extremely detailed grouping of 726 industries.

GDP according to the production and expenditures approaches are balanced at the 117-industry level in the supply and use tables. Balanced values for value added divided by industry appears in the final national accounts for 117 industries in prices for the year in question and as time series of Laspeyeres chain indices based on estimates in the previous year's prices.

The statistical unit for the estimate of output and value added in the ESA 2010 is the local KAU (local kind-of-activity unit, which in Danish is synonymous with the producer unit, the workplace[2]). In the ESA 2010, these units are grouped into industries. When discussing the estimate of GDP from the production side, it is therefore logical to proceed industry by industry. However, the primary statistics available will almost always be based on

[2] "Workplace" and "Local kind of activity unit" are used synonymously throughout this inventory. The same applies to the word "producer unit" except in a few cases where referred to as "institutional producer unit".

a grouping of the somewhat broader institutional units (firms) by main activity (a grouping into "sub-sectors", or "firm branches"). Throughout the process of estimating value added on the basis of primary statistics, we have to look out for and take account of the relationships between institutional producer units (firms) and local kind-of-activity units (producer units).

If we look at the statistical coverage of the economy in primary statistics in the form of accounting statistics, we see that there is a broad division into four sectors/subsectors:

1. Sectors with complete accounts and (virtually) full coverage of the population via administrative or statistical returns
2. Sectors with complete accounts and partial coverage of the population via administrative or statistical returns
3. Sectors with a combination of physical and economic accounts
4. Sectors with no accounting statistics

In group 1, there is, of course, no noticeable problem with sampling or grossing up, since virtually all producer units are covered by the ongoing estimates. The challenge here is basically to convert the primary statistics' accounts to the concepts of national accounts. This group contains for example general government.

In group 2, which covers the vast majority of activity in the economy, much of the work of producing exhaustive and reliable estimates consists in ensuring that the samples used are representative and that the figures are grossed up to the total population. This group contains for example sectors/industries covered by account statistics for non-agricultural private sector and account statistics for industries predominated by public corporations.

In group 3 the basis for the national accounts estimates are physical quantities or areas. This group contains agriculture and dwellings.

Group 4 is empty because all industries/sectors are covered by account statistics. Prior to the major revision published in September 2014 this group contained non-profit institutions serving households (NPISH), but new account statistics has moved this sector to group 3.

Table 1.4 shows a breakdown of gross value added (GVA) 2012 by the four groups.

Table 1.4 Gross value added based on various accounting statistics, 2012

Breakdown of gross value added according to the four sectors/subsectors in chapter 3.1.2		
		pct.
1	Sectors with complete accounts and (virtually) full coverage of the population via administrative or statistical returns	27.4
2	Sectors with complete accounts and partial coverage of the population via administrative or statistical returns	63.2
3	Sectors with a combination of physical and economic accounts	9.4
4	Sectors with no accounting statistics	0.0
	Total	100.0

After initial processing of the various accounting statistics, data are transferred to a common accounting plan in the so called *Intermediate System*. The Intermediate System comes in two versions.

The *Intermediate System I* is simply a file that contains the data from the four main compilation systems after they are transformed to the common codes. In this file firms (institutional units) are broken down wherever necessary into producer units, so that the statistical unit for the calculation of value added, as required in ESA2010, is the producer unit or a constructed unit of homogeneous production. Despite the detailed level of information in the intermediate system, various accounting items still do not correspond to national accounts concepts because information from accounts alone is insufficient to perform the full transition. These corrections include corrections for borderline cases on the supply and use side. The adjustments made for the transition to ESA2010 national accounting concepts and borderline cases are described in more detail in chapter 3.

The *Intermediate System II* is the result of a number of corrections to the first version of the system that transfers the data from business accounts to ESA2010 principles. These corrections are made to production and to intermediate consumption.

The following corrections are made to the *production estimate*:

1. Own-account gross fixed capital formation
2. Production, storage and processing of agriculture products for own-account by households
3. Dwelling services produced by owner-occupiers
4. Household services produced by employing paid domestic staff
5. Products used for payments in kind
6. Products added to the inventories of finished goods and work-in-progress
7. Revenue from licenses and royalties

Volunteer activities that result in goods and products bartered are considered insignificant in the Danish economy and there is no corrections made to the production for this in the national accounts. The account statistics for non-agricultural private sector is on local KAU. After the transformation of accounting statistics to the intermediate system there are no specific corrections made for products supplied by one local KAU to another within the same institutional unit to be used as intermediate input or for final use.

Price corrections to changes in inventories are made on the production for finished goods, work in progress and goods for resale. On the expenditure side price corrections are made to changes in inventories of raw material. The price corrections are described in section 3.3 and chapter 5.11.

The following corrections are made to *intermediate consumption* for the transition to ESA2010 and the *inclusion* of borderline cases:

1. Inexpensive tools used for common operations and small devices
2. Non-life insurance service charges
3. FISIM purchased by resident producers
4. Financial intermediation services paid for directly
5. Expenditure on licenses and royalties

The following borderline cases are assumed to be a part of *intermediate consumption in the business accounts*, and further corrections for theses borderline cases are therefore *not needed*:

1. Costs of using rented fixed assets
2. Subscriptions, contributions or dues paid to non-profit business associations
3. Goods and services received from another local KAU of the same institutional unit that comply with the definition of IC
4. Goods and services used as inputs to ancillary activities
5. Expenditure by employees, reimbursed by the employer, in items necessary for the employers' production
6. R&D acquired to be used solely in the creation of further products of R&D

The following corrections are made to *intermediate consumption* for the transition to ESA2010 and the *exclusion* of borderline cases:

1. Research and development
2. Expenditure by employers to be treated as wages and salaries in kind
3. Payments for government licences and fees that are to be treated as other taxes on production

The Following borderline cases are assumed to be excluded from *intermediate consumption in the business accounts*, and further corrections for these borderline cases are therefore *not needed*:

1. Items to be treated as GFCF (except R&D)
2. Expenditure to be treated as the purchase of non-produced assets

3. Use by market or own-account producers units of collective services provided by government units
4. Goods and services produced and consumed within the same accounting period and within the same local KAU
5. Payments for licenses for using natural resources (e.g. land) that is to be treated as rents, i.e. a payment of property income
6. Decommissioning for large capital assets

The main initiative aimed at ensuring that coverage is exhaustive consists primarily of the very important work carried out to ensure that the business register is updated to include new units. This work is made easier by the fact that the threshold values in the VAT and tax systems are extremely low, so that all regular economic activity currently has to be registered in a public administrative register which feeds into the business register. It is estimated, that all regular economic activity is captured via the use of the business register. Hidden activity and wages and salaries in kind are captured via special calculations that are not based on the business register.

1.4 Outline of the income approach

For 2012, the calculation of income based GDP can be summarized as in table 1.5:

Table 1.5 GDP, income approach, 2012

	Value	% of GDP
	DKK mill.	pct.
Compensation of employees	977 516	51.9
+ Gross operating surplus and mixed income	640 958	34.0
+ Taxes on production and imports	312 445	16.6
- Subsidies	48 293	2.6
= GDP	1 882 625	100.0

All components of GDP from the income side (GDP(I)) are compiled at the 117 national accounts industry level. Compensation of employees and taxes and subsidies on production are compiled directly using independent sources. Compensation of employees is based on the Working time accounts (WTA), and taxes and subsidies are based on government accounts. Gross operating surplus and mixed income is compiled as a residual using value added after the balancing of GDP(P) and GDP(E).

The main sources used for compiling GDP from the income side are:

1. The annual working time accounts (WTA) (compensation of employees)
2. The system for compiling fixed capital in the national accounts (consumption of fixed capital, CFC)
3. Administrative data (accounting information) for compiling general government (other taxes on production and imports and other subsidies on production)
4. Value added at industry level as a result of balancing GDP(P) and GDP(E)
5. Gross operating surplus and mixed income are compiled as residuals.

All components and sources are collected – directly or indirectly - through regular enterprise surveys or administrative registers. Taxes and subsidies are available from general government accounts, compilation of CFC is based on annual estimates of capital stocks for various types of capital, compensation of employees is to a large extent based on administrative tax information and gross operating surplus and mixed income is compiled as a residual using value added after balancing GDP(P) and GDP(E).
The most important independent source used for GDP(I) is the annual working time accounts (WTA) which is used for the compilation of compensation of employees in the national accounts. Compensation of employees includes all payments in cash and in kind that employers pay their employees for the work done. Compensation of employees consists of wages and salaries on the one side and employers social contributions on the other side.

For compensation of employees adjustments are made to WTA in order to arrive at the national accounts estimate. Table 1.6 shows at the aggregate level the relation between compensation of employees in the WTA and the national accounts.

Table 1.6 Compensation of employees in the WTA and the national accounts, 2012

	DKK mill.
Working Time Accounts	954 386
Alternative or additional sources	24 104
of this, national accounts population	-133
of this, employers' imputed pension contributions	4 829
of this, employers' actual non-pension contributions	2 018
of this, supplement for black wages	3 552
of this, supplements for wages and salaries in kind	11 071
Final harmonisation	-975
Final national accounts estimate	977 515

In general, the estimate of the consumption of fixed capital (CFC) is not relevant to GDP or GNI. There is, however, one very important exception to the rule, namely non-market activity, where by convention output is calculated from the costs point of view and where CFC is one of the cost components. Non-market activity occurs in general government (S.13) and non-profit institutions serving households, NPISH (S.15).

General government and NPISH capital stock consists of buildings, structures such as roads, bridges etc., machinery, transport equipment and intangible fixed assets. Prior to the introduction of ESA2010, Winfrey curves and straight line depreciation was applied. With the introduction of ESA2010 in September 2014 the geometric depreciation method was incorporated into the calculations from the year 2008 and onwards, except for dwellings and non-residential buildings, where geometric depreciation was incorporated from 1995 and onwards. For the new types of capital, Research and Development and Military Weapon Systems, geometric depreciation was applied for the whole time series.

1.5 Outline of the expenditure approach

For 2012, the calculation of expenditure-based GDP can be summarised as in table 1.7 below:

Table 1.7 GDP, expenditure approach, 2012

	Value	% of GDP
	DKK mill.	pct.
Total final consumption expenditure	1 410 337	74.9
Household final consumption expenditure	877 971	46.6
NPISH final consumption expenditure	30 731	1.6
General government final consump. expenditure	501 635	26.6
Gross capital formation	370 127	19.7
Gross fixed capital formation	356 786	19.0
Changes in inventories	9 851	0.5
Acquisitions less disposals of valuables	3 490	0.2
Exports of goods and services	1 008 578	53.6
Imports of goods and services	906 417	48.1
GDP	1 882 625	

The table shows that household final consumption expenditure in Denmark made up a little less than half of GDP in 2012, general government final consumption expenditure a good quarter, gross capital formation one-fifth and net exports the final 6%. Exports of goods and services accounted for 54% and imports 48%.

By far the largest share of expenditure-based GDP is calculated using a direct estimate. The most important exceptions are household final consumption expenditure of hotel and restaurant services, dwelling services and final consumption expenditure in NPISH, which are all calculated indirectly from the supply side.

Regarding the estimate of the black economy, data are based on survey data obtained from supplementary questions asked once a year in connection with the LFS. Also illegal activities are included.

Since the Danish national accounts are adjusted in a detailed product balance system, there is a systematic confrontation in connection with the balancing. One of the strongest cross-checks for the compilation of national accounts consists in comparing information from purchasers on their acquisitions less disposals of the individual products or groups of products with information on the sellers' side on supplies to the domestic market.

Other than for those areas of the economy (general government, owner-occupied dwellings, NPISH), where the output- and expenditure-based calculations cannot by definition be independent, GDP from the production side and GDP from the expenditure side are largely independent of one another prior to balancing. These independent estimates are described briefly below.

The main idea behind the calculation of household consumption expenditure is a breakdown into groups by purpose/products, each group being calculated on the basis of the most reliable of the available sources, but in a way which seeks to make optimum use of all available information. The basic breakdown of household consumption expenditure is into retail and non-retail consumption expenditure. The former is the share of final consumption expenditure of goods which involves retail trade. In this context, retail trade excludes motor vehicles etc. and energy goods, which are not covered by the DOI. The two most important sources are:

- The retail index (Danish abbreviation DOI), which contains information on level of sales to private individuals, and
- The household budget survey (Danish abbreviation FU)

For gross fixed capital formation, all components are as far as possible estimated using the expenditure approach. Since the accounts for non-agricultural private sector in 1999 was extended to cover most industries with market producer units, it has been possible to estimate the capital formation in tangible fixed assets in most industries with a distribution by buildings, structures and a residual consisting of machinery, transport- and other equipment. The estimates from the uses side are confronted with the available information on the domestic supply of investment goods by product in an “investment matrix” framework similar to the framework used in supply and use matrices. The estimates for the construction of new buildings are based on either the accounting statistics which provides a very detailed coverage of the actual observations, or a calculation based on the exhaustive register of buildings (the BBR), and prices per square meter for the different types of buildings. The estimate of private market Research and Development (R&D) is mainly based on R&D statistics (in line with the so-called Frascati manual) and foreign trade statistics. Non-market R&D is based on government accounts.

For changes in inventories, account statistics are used. For a correct estimate of GDP, it is necessary to split changes in inventories (reported at market prices on the respective dates) between the start and end of the period in question into product transactions in national accounts terms and revaluations (plus, in some cases, other volume changes). In the national accounts, changes in inventories (product transactions) are posted to the capital account whereas revaluations go to the revaluation account. It is also ensured that the estimate of changes in inventories at industry level is consistent with the estimate based on special information on the individual products.

For imports and exports of goods and services, the sources are the foreign trade statistics and the balance of payments statistics. Im- and export figures are consistent with the balance of payments.

1.6 The balancing or integration procedure, and main approaches to validation

Before the balancing of GDP can take place in the supply and use tables (SUT), so-called target totals for supply and use are compiled. This is done by collecting the information from intermediate system 2 and other systems

in the target total module. When the target totals for supply and use are compiled, they are subsequently distributed by 2 350 products.

The current system of SUTs for Denmark was established in the mid-seventies. Since then the calculation of annual SUTs has been a totally integrated part of the compilation of final annual National Accounts in both current and constant prices.

The integration of SUT in the compilation of National Accounts implies that a number of NA aggregates are derived directly from the SUT. This in particular relates to all the NA aggregates in the "Goods and services account" and the "production account". The integrated procedure is in contrast to a procedure where SUT are compiled after the production of the NA figures implying a number of restrictions on the totals of the SUT.

The Danish SUT are compiled in connection with the final annual accounts, which are released with a delay of almost three years (November t+1). The structural information entailed in the SUT for the latest final year is used in the compilation of preliminary annual and quarterly national accounts but no balanced preliminary or quarterly SUT are produced.

The process of constructing the SUT for a given year can be summarised into the following steps:

The first step is to gather all the available data on the actual year on target totals and other values that can be entered directly into the system as predetermined.

The next step is to create a complete initial version of the SUT. This version is compiled using automatic processes, but at this stage a number of unsolved problems will remain: For some products supply will not equal uses. For most categories of use the totals will usually differ from their targets. Total trade and transport margins and total VAT may also differ from their respective targets. This step is referred to as "Automatic balancing".

Then follows a step, where the initial version of the product-balances is adjusted manually. The unsolved problems are examined closely. In many cases such problems will reveal errors in the calculations that produce data-input to the product-balances or in the primary statistics itself. Solutions to such problems may be found in co-operation with the relevant divisions of Statistics Denmark and may involve changes in supply, predetermined uses or target-totals. A number of products are redistributed between uses to bring the distance between totals and targets within an acceptable range for each category of use. Corrections to the initial balances are entered into the system to create a new - but not yet final - version. This step is referred to as "Manual balancing"

In the last step the differences between totals and targets are removed except where such differences are considered acceptable. In this step trade and transport margins and VAT are finally adjusted to their targets. This step is referred to as "Final balancing".

As described above, the balancing of GDP from the production side, GDP(P), and GDP from the expenditure side, GDP(E), takes place in an integrated supply-use framework.

Table 1.8 shows an extract from the process table for 2012. Process tables show how initial primary statistics are corrected, adjusted and balanced in order to compile GDP. Annex 7 shows the full process table. Table 1.8 shows that the balancing accounts for -0,5 percent on GDP(P) and +0,9% on GDP(E).

Table 1.8 Compilation of GDP, extract from the process table, 2012

	Total sources	Data validation	National accounts adjustments	GDP before balancing	Balancing adjustments	Balanced GDP
	DKK mill.					
GDP(P)	1 840 308	13 407	38 426	1 892 141	-9 515	1 882 625
GDP(E)	1 847 469	-6 344	25 474	1 866 599	16 027	1 882 625
	pct. of GDP					
GDP(P)	97.8	0.7	2.0	100.5	-0.5	100.0
GDP(E)	98.1	-0.3	1.4	99.2	0.9	100.0

Note: The difference between balanced GDP(P) and GDP(E) is purely due to rounding errors in the process table

GDP from the income side, GDP(I), is not described in the process table, because it is not an integrated part of the balancing in the supply-use framework. It is therefore not relevant to show GDP(I) before balancing and balanced GDP(I) in this context.

1.7 Overview of the allowances for exhaustiveness

GDP from the production side is generally considered the most reliable. Therefore, the exhaustiveness adjustments have mainly been described from the production side in the tabular approach to exhaustiveness (TAE) and the process tables. However, some exhaustiveness adjustments are calculated from the demand side, for example Illegal activities relating to narcotics and areas in the black economy where the household budget survey (HBS) is considered more reliable; the so-called discrepancy method.

Explicit allowances for exhaustiveness

Allowances for exhaustiveness are made for the following N-types (TAE taxonomy):

N1 Producer should have registered
N2 Illegal producer
N3 Producer not obliged to register
N5 Registered entrepreneur not included in statistics
N7 Not all required data are asked

N1 covers output in the “black economy” which includes both work that is hidden to the authorities in order to avoid taxes and under-reporting and associated VAT-fraud. There is no allowance for intermediate consumption associated with output in the “black economy” as this is assumed to be already accounted for.

N2 covers illegal activity relating to smuggling, drugs and prostitution. There is no allowance for intermediate consumption associated with illegal activity as this is assumed to be already accounted for.

N3 adjustments cover values for farmers’ output for own consumption etc. They are available from agricultural statistics and are assumed to cover farm-gate sales as well, most of which presumably come under the “black” economy (N1). The values are based on agricultural selling prices for the products concerned, i.e. they are at basic prices, as required by ESA2010. Table 7.11 shows the adjustments by industry. Total adjustments to value added amount to 78 mio. DKK.

N5 covers adjustments for value threshold in source statistics. There are adjustments to both output and intermediate consumption.

N7 covers adjustment for production for own final use by market producers and wages and salaries in kind (“fringe benefits”). There are only adjustments to output.

There are no adjustments for N4 Registered legal person is not included in statistics (they are included in N5).

Adjustments for N6 Mis-reporting by the producer are included in N1.

Table 1.9 gives an overview of explicit exhaustiveness adjustments according to the TAE, which is the result of carrying out the TAE exercise.

Table 1.9 Summary of TAE (table 3A), 2012

	N1	N2	N3	N4	N5	N6	N7	Total	Percent of GDP
	DKK mill.								pct.
S11	-	-	-	-	570	-	19 216	19 786	1.05
S12	-	-	-	-	-	-	-	-	-
S13	-	-	-	-	-	-	0	0	0.00
S14	9 522	2 859	78	-	1 298	-	557	14 314	0.76
S15	-	-	-	-	-	-	-	-	-
Nace A	13	-	33	-	-	-	31	77	0.00
Nace B	-	-	-	-	0	-	32	32	0.00
Nace C	104	-	45	-	136	-	3 913	4 198	0.22
Nace D	-	-	-	-	-	-	160	160	0.01
Nace E	-	-	-	-	1	-	28	29	0.00
Nace F	2 989	-	-	-	166	-	1 037	4 192	0.22
Nace G	977	1 930	-	-	569	-	2 377	5 854	0.31
Nace H	174	-	-	-	74	-	562	810	0.04
Nace I	1 454	-	-	-	65	-	5 571	7 090	0.38
Nace J	314	-	-	-	181	-	1 736	2 232	0.12
Nace K	-	-	-	-	-	-	-	-	-
Nace L	-	-	-	-	52	-	161	212	0.01
Nace M	27	-	-	-	393	-	3 711	4 131	0.22
Nace N	15	-	-	-	214	-	269	498	0.03
Nace O	-	-	-	-	-	-	14	14	0.00
Nace P	39	-	-	-	-	-	12	51	0.00
Nace Q	56	-	-	-	-	-	63	119	0.01
Nace R	355	-	-	-	-	-	39	395	0.02
Nace S	1 901	928	-	-	18	-	55	2 903	0.15
Nace T	1 104	-	-	-	-	-	-	1 104	0.06

The adjustments as presented in the table are mainly made at the detailed level using the supply use tables (SUT), which contain information at product level for explicit adjustments for the “black” economy (N1), illegal activity (N2), production of output for own final use (N3) and fringe benefits and production of capital goods for own final use (N7). This makes it possible to extract the detailed information at industry level and it also ensures that the allowances are balanced in the different approaches to GDP.

1.8 The transition from GDP to GNI

The transition from GDP to GNI is conducted by applying information from the Danish balance of payments statistics (BOP). This information is applied directly, that is without any correction to the BOP figures being performed. The BOP is used directly in The Rest of the World account in the national account.

For BOP the competency is divided between Statistics Denmark and the Central Bank, *Danmarks Nationalbank*. The former conducts the compilation of the current account and the capital account and the latter the financial account and the international investment position. Danmarks Nationalbank also conducts the compilation of property income except for a minor item. Property income is the most important item in the GDP-GNI transition. The BOP compilation is compatible with IMF's Balance of Payments Manual, sixth version (BPM6). BOP is published by Statistics Denmark.

1.9 Main classifications used

The national accounts' grouping by industry – used for *compiling GDP from the production side* (GDP(P)) - is based on the six digit classification DB07 (Dansk Branchekode 2007) which again is a more detailed version of NACE rev. 2 at the four digit level.

There are five levels of grouping for publication of the final national accounts, covering 117, 69, 36a2, 19a2 and 10 industries respectively. The compilation of GDP(P) is done at the level of 117 industries. The national accounts level of 117 industries is based on the DB07 standard grouping of 127 industries. There are two reasons why the national accounts cannot use the 127 standard grouping as their most detailed level of publication. Firstly, it does not match the functional breakdown of construction activity in the national accounts, and secondly, within some of the 127 groups, the national accounts need to separate market activity and output for own use from (other) non-market activity.

The 117 grouping of industries is also used for compensation of employees, which is the most important independent component of *GDP from the income side* (GDP(I).
For the expenditure approach (GDP(E)), the classification of household final consumption expenditure (72 groups) based on COICOP is the most important. In addition the classification of government final consumption expenditure (10 groups) according to COFOG and a classification by 13 types of assets are used.

1.10 Main data sources used

The most important sources used for the production approach are:

- Accounts Statistics for Non-Agricultural Private Sector
- General Government Finance statistics
- Account statistics for industries predominated by public corporations

The most important source used for the income approach is:

- Quality Declaration for the Annual and Quarterly Working Time Accounts

The most important sources used for the expenditure approach are:
• Household-budget-survey
• International-trade-in-goods
• International-trade-in-service

The source used for the transition from GDP to GNI is:
• Balance of Payments

All the source statistics are described on Statistics Denmarks' website in "Documentation of statistics". Extracts of these "Documentation of statistics" are shown in chapter 10.