

**New industry classification based on NACE ver.2 in
the Danish National Accounts.**

Contact information:

Søren Larsen
Senior Adviser
National Accounts
Statistics Denmark
Sejroegade 11
DK-2100

Phone: +45 3917 3917
Direct: +45 3917 3483
E-mail: Shl@dst.dk

Brian Südel
Head of Section
National Accounts
Statistics Denmark
Sejroegade 11
DK-2100

Phone: +45 3917 3917
Direct: +45 3917 3327
Bsu@dst.dk

Carmela Moreno Baquero
Head of Section
National Accounts
Statistics Denmark
Sejroegade 11
DK-2100

Phone: +45 3917 3917
Direct: +45 3917 3066
E-mail: Cam@dst.dk

Christian Gysting
Senior Adviser
National Accounts
Statistics Denmark
Sejroegade 11
DK-2100

Phone: +45 3917 3917
Direct: +45 3917 3665
E-mail: Cgy@dst.dk

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Executive summary

Background From September 15th 2011 the Danish National Accounts uses a new classification based on “Dansk branchekode 2007”, usually referred to as “DB07”, the Danish implementation of NACE ver.2 adopted by the countries of the European Union. The previously used 130 industries are replaced by 117 industries at the most detailed level. The number of industry groups is reduced within Manufacturing and retail trade while the number of service industries has increased.

Contents The areas that are affected by the transition from the old DB03-based to the new DB07-based industry classification are those that contain an industry dimension. The report contains a description of the methods used in the calculations within each of these areas:

- Supply and use tables in current, constant and previous year's prices
- Energy accounts
- Employment and compensation of employees
- Investment matrices in current, constant and previous year's prices
- Capital stock and Consumption of Fixed Capital

The transformation was carried out in a way that ensured that the transformed data exists at a level of detail comparable to the detail of the previous versions of the systems. Back to 1993 the original data is transformed at the most detailed level. Before 1993 and back to 1966 calculations are based on more aggregated data.

Other areas that are also affected by the reclassification include Input-Output tables, Quarterly National Accounts, Productivity by industry and Regional Accounts.

Sources of information The Danish business register for 2007 was double-coded, meaning that it was coded by DB07 as well as DB03. Based on this register it was possible to produce relevant source statistics for 2007 in double-coded versions. This was an important prerequisite for the transformation. It was, however, also important that the systems behind the compilation of Danish National Accounts contain very detailed information that could be fully utilized when time series for old industries were split up between two or more new DB07-based industries.

No general revision Early in the process it was decided that the transformation should only affect the industry classification. No main aggregates of the National Accounts should be revised.

1. Introduction

From DB03 to DB07 From September 15th 2011 the industry classification hitherto used in the Danish National Accounts is replaced by a new classification based on “Dansk branchekode 2007”, usually referred to as “DB07”. The previously used classification dates back to 1997 when it was introduced in the general revision that implemented the “ESA 95” manual in the Danish National Accounts and it had survived a minor revision in 2003 of the Danish detailed industry classification named ”DB03” based on NACE rev. 1.1 .

Implementation of DB07 in Danish primary statistics started back in 2008. As the calculations behind the final version of the national accounts figures depend on the finalization of numerous statistical sources, the National Accounts is among the last statistics to implement the conversion from old to the new classification in its publications. Furthermore the publication and transmission of the new data had to be scheduled in accordance with requirements agreed between the countries in the EU-system.

The Danish implementation of NACE rev.2 “DB07” is a Danish implementation of NACE rev.2 industry classification adopted by the European Union countries. A detailed description of its codes and standard industrial groupings for publishing purpose is available in the publication “Dansk Branchekode 2007 (DB07)”. It is available (in Danish) from the address www.dst.dk/DB07. Relevant chapters in English can be reached through the address: www.dst.dk/db07-en.

The new industry-classification for the National Accounts defines 5 aggregation levels, 10a3, 19a2, 69 and 117 groupings that are connected through a strictly hierarchic structure. See <http://www.dst.dk/upload/nr-erhvervsgrupperingerdb07.pdf>

New National Accounts industries are mostly, but not always, aggregations of DB07 industries The majority of the 117 new industries that make up the most detailed industry classification in published National Accounts data are defined as aggregations of a number of specific industries from “DB07”. With a few exceptions the definitions follows the 127 standard groups used in other publications from Statistics Denmark. There are, however, differences. In the new as well as the old National Accounts a number of industries are “defined by activity”, meaning that all economic activity of a specific sort is classified as belonging to a specific industry whether the producer is a unit classified in this or in another industry. Examples of such “activity defined” industries include agriculture, wholesale- and retail trade, construction, dwellings and letting of non-residential buildings. The activity defined National Accounts industries for construction and dwellings are different from the corresponding standard groups used in primary statistics. Furthermore some standard groups are further subdivided by market and non-market (mostly government) activity in the National Accounts.

The magnitude of reclassifications can roughly be illustrated by the table below. It shows – in percentages – the conversion from the 9 old main groups to the 13 new main groups. The example shows the redistribution of gross value added at current prices in 2007. Similar tables could be drawn up for other years and/or other National Accounts concepts. Such tables will be different even though they can be expected to show significant similarity.

Gross value added in current prices.

New industries (level 10a3) as percentages of old industries (level 9).

Old industries New industries		Agriculture, fishing and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade, hotels, restaurants	Transport, post and telecommunications	Finance and insurance	Letting and sale of real estate, business activities
		1	2	3	4	5	6	7	8
Andel i pct.									
A	Agriculture, forestry, fishing. . .	19.9	0.1	-	-	-	-	-	-
B	Mining and quarrying	76.9	-	-	-	-	-	-	-
C	Manufacturing.	0.2	95.7	-	-	-	-	-	-
D-E	Utility services	-	0.1	100.0	-	-	-	-	2.2
F	Construction	-	-	-	100.0	-	-	-	-
G-I	Trade and transport etc.	-	-	-	-	99.3	80.6	-	-
J	Information and communication	-	3.9	-	-	-	18.0	7.6	1.4
K	Financial and insurance.	-	-	-	-	-	-	23.2	-
LA	Real estate; rent of non-res. buildings.	-	-	-	-	-	-	10.1	0.2
LB	Dwellings	-	-	-	-	-	-	30.3	-
M-N	Other business services	3.0	-	-	-	-	1.3	28.7	0.4
O-Q	Public adm., education, health. Arts, entertainment, other	-	-	-	-	-	-	-	84.6
R-S	service.	-	0.1	-	-	0.7	0.1	0.1	11.2
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2. Supply and use tables

The final version of the Danish National Accounts relies heavily on compilation of detailed "Supply and Use tables" that show supply by origin and use by destination disaggregated for approximately 2400 specific product groups. It is used for compilation of annual symmetric Input-Output tables, but the system has a value of its own as an effective check on inconsistencies within the underlying data. This massive level of specification dates back to a general revision based on 1966-data, and for the years since 1993 the content of each product group has – with some minor exceptions – been relatively uniform. By international comparison the Danish system of Supply- and Use tables has for many years been among the most comprehensive systems of its kind.

Supply and Use tables are converted back to 1993.

As earlier when the industry classification have been subject to major revisions, there was a pronounced wish that the existing Supply- and Use tables and symmetric I-O tables should be transformed in a way that retained the original level of detail. This time it was, however, found that the product-classifications in the Supply and Use tables from the years before 1993 diverged to an extent that would make a full scale conversion difficult. It was decided that for the years 1966 to 1992 the transformation of old data would only be implemented on the level of the symmetric I-O tables. For the years from 1993 to 2007 it was decided to convert the full Supply and Use tables from old to new industries without any reduction of the number of products (rows). It means that the new tables would have to show outputs and inputs by the approx. 2400 products for each of the new 117 DB07-based industries. A conversion of this scale could never be based on source data on the new structures of inputs and outputs for the entire period. Comprehensive information on the transition from old to new industries is available in the source data for 2007. Some information of this kind can also be found for the later years up

to 2007, but it is scarce for earlier years. Furthermore the sheer number of figures involved required that the computer would have to do most of the job by automatic methods.

*No general revision.
Revisions are restricted to
reclassification of industries*

It was decided that introduction of the new industry classification should not have character of a general revision of the national Accounts. No main aggregates of the system should be changed by the regrouping of industries and institutional accounts should be left unaffected by the changes. Within the Supply and Use tables the changes would take place within those parts that contain an industry-dimension. On the supply side this includes the columns showing supply from domestic production, on the uses side it is the columns showing intermediate consumption, and the distribution of gross value added. Similar regroupings would take place for compensation of employees, employment, actual hours worked, other taxes and subsidies on production, capital stock, consumption of fixed capital and an operating surplus/mixed income by kind of activities. Supply and use of energy-products was regrouped in volumes as well as values in a separate project. In the figure below the affected areas are shown in grey colour, values in all other areas are left unchanged.

Supply		Use						
Danish output by 130 activities is converted into 117 activities	Imports	Input by 130 activities is converted into 117 activities	Private consumption expenditure 72 groups	Cons. of NPISHs	Government consumption expenditure 30 groups	Capital formation 10 types	Change in inventories by type	Exports
about 2400 Products								
		Compensation of employees						
		Other net taxes on production						
		Consumption of fixed capital						
		Operating surplus, net						

The distribution of the various types of Gross Fixed Capital Formation by industries takes place in a separate subsystem outside the central SUT-system, referred to as the “Investment Matrices”. The existing matrices had 57 DB03-based industries in their most detailed form. It was decided that a new system should use the 69 DB07-based industries that replace the old 53 industries used in the compilation of quarterly and preliminary National Accounts.

3. Double coded source data.

*Double-coded business
register for 2007. Double-
coded primary statistics.*

The starting point for the reclassification was the creation of a “double coded” Danish business register for the year 2007. Each of the register’s local kind of activity units was coded by the new DB07 as well as the old DB03 classification. Based on the register double-coded versions were produced of practically all primary statistics used for national accounts purposes. In a few, but important, cases double coded source data has also been available for other years between 2005 and 2008. In most cases the double-coding is done by the most detailed level of DB03 and DB07.

Overview of double coded source data used for National Accounts:

Statistics	Level of detail	Available for the years	Coverage
Industrial Accounts statistics (SBS)	Detailed DB03/DB07	2007-2008	VAT-registered industries
Government finances (The DIOR database)	Detailed DB03/DB07	2007	General Government
Industrial commodity statistics by comm.-groups	NA130/NA117	2005-2007	Manufacturing
Purchase of raw materials by comm.-groups	Detailed DB03/DB07	2007	Manufacturing (enterprises)
Use of energy in manufacturing industries	NA130/NA117	2009	VAT-registered industries
Working Time Accounts	DB03/DB07	2007	All industries

It is more an exception than the rule that National Accounts figures are identical to figures found in primary statistics that have been used for their calculations. This is due to a number of reasons of which a few can be mentioned: National accounts figures are adjusted for differences between National Accounts definitions and the concepts used in business accounts. National accounts figures are always grossed up to cover the entire economy. National accounts figures are a result of reconciliation between conflicting information from many kinds of source data.

Double coded source data is used to calculate "conversion tables".

Whenever double-coded source data is used to split old industries into parts that are classified in different new industries, the source data are used to calculate "conversion tables" that show each old industry's distribution by new industries as percentages. The conversion tables that are derived from 2007 data are used to split data from earlier years in those cases where the conversion cannot be based on information from the actual years. It must, however, be emphasized that the use of conversions based on the shares from 2007 is preferably used to split data at the most detailed level of DB03 with 286 industries. It was not, however, possible to break down all information by detailed DB03-industries. Alternatively the conversion tables from 2007 had to be used on a more aggregated level of the industry classification.

4. Methods used for conversion of the supply and use tables.

4.1. Breakdown of series for industry-totals.

The methods used in the regrouping of industries depended on the ways in which respective industries are defined. One should here distinguish between on one hand, the conversion of total output, input etc. by industry – without a product dimension – and, on the other hand, the conversion of the interior of the tables that contains the product structures for output and input of each industry. The source data available for conversion of the totals has a relatively good coverage and is often available further back in time compared to the most important sources for the conversion of the interior of the tables that exist for the year 2007 and – in a few cases – one or two previous years.

Activity defined industries are easily converted.

The activity-defined industries are as a general rule reclassified into new activity defined industries according to the new classification. The conversion is here simple and reliable. In the case of dwellings the old industry is now split between rented and owner-occupied dwellings based on the calculation of outputs, inputs, investment etc. for each type of dwellings. It should be noticed that in these industries the distribution by products of outputs and inputs takes place in the same process as the conversion of the respective industry totals.

Secondary production from other industries that by definition belongs to an activity defined industry was already transferred to this industry in the old version of the SUTs. It follows that it can be assumed that nothing should be transferred between activity defined industries and other industries. To the extent that the double coded source data seems to move activity across such borderlines, the corresponding combinations of codes are removed from the conversion tables.

Market producers. Most of the market activity is, however, grouped in national accounts industries according to the classification of individual local kind of activity units. In principle the reclassification takes the form of regrouping of these units by the new industry classification. For the year 2007 this regrouping is shown in “double-coded” information received from the various suppliers of primary statistics. For years before 2007 such information is – with a few exceptions - unavailable. Here it was necessary to construct time-series of double coded data using any type of useful information on how to reclassify the content of each old industry into one or – often several – new industries.

Breakdown into detailed DB03 industries. At its most detailed level DB07 contains 726 industries compared to the 825 in the previous DB03. Even when many old “DB03” industries are split between two or more new “DB07”-industries the majority of detailed industries from “DB03” just get another code according to “DB07”. To the extent that it is possible to break down the 117 old National Accounts industries into their underlying “sub-industries” the conversion into the new classification can be done in a quite reliable way. Where data sources for such breakdowns are unavailable, the old industries are preferably broken down into smaller parts based on relevant time series data. If no such data is available for the earlier years, a default solution is to use relations from the 2007-breakdown to calculation of the split in earlier years.

4.2. The “Intermediary” system.

A double coded “Intermediate System”. In the annual compilation of final National Accounts data from various types of accounts statistics has been brought on a common form and entered into what is called “The intermediary system”. Within the framework of the system a number of adjustments are made for differences between National Accounts definitions and concepts used in business accounting. The result is a file that contains information on Production value, intermediate consumption and Gross Fixed Capital Formation by the detailed industry classifications that are found in the data supplied to the National Accounts. The system has in principle remained the same for all years since 1993, but data sources and industry-codes have gone through some of changes over time.

Within the area that is now covered by industrial accounts statistics and some additional service industries the classification has followed the most detailed version of DB03 or – before 2003 - the previously used DB93 classification.

Production value, intermediate consumption and GFCF from the intermediary system were aggregated to totals for the 130 National Accounts industries. These values have been used as a first estimate of “targets” for these industry totals. It must, however, be emphasized that some of these targets have often been modified when balancing of supply and use revealed weaknesses in the first estimates. Nevertheless it was assumed that conversion tables based on double coded intermediary systems for the respective years would provide a good starting point for the reclassification into the new 117 DB07-based National Accounts industries.

Transformations at the most detailed DB03/DB07 level rely on 2007-relations

As mentioned above many old DB03-based industries of the intermediary system would still need to be split into two or more DB07-industries. For this purpose a conversion table between detailed DB03 and DB07 industries was compiled based on the double coded “Industrial accounts statistics” for 2007.

Example from the double coded “Industrial accounts statistics” for 2007.

Sum of amount								Census	Comp. of	Gross fixed
nr130	nr117	DB03	DB07	DB03-text	DB07-text	Turnover	Purchases	value added	Employees	Capital Form.
310000	180000	315000	182000	Fremstilling af belysningsarmaturer mv.	Reproduktion af indspillede medier	34.352	47.475	-13.123	8.073	-28
310000	250000	315000	259900	Fremstilling af belysningsarmaturer mv.	Fremstilling af andre færdige metalprodukter	6.150	5.284	866	1.308	-67
310000	270030	315000	274000	Fremstilling af belysningsarmaturer mv.	Fremstilling af elektriske belysningsartikler	2.364.369	1.446.825	917.544	682.033	91.378
310000	270030	315000	279000	Fremstilling af belysningsarmaturer mv.	Fremstilling af andet elektrisk udstyr	22.599	14.037	8.562	9.884	-8.390
310000	460000	315000	464320	Fremstilling af belysningsarmaturer mv.	Engroshandel med radio og tv mv.	44.210	13.284	30.926	21.745	463
310000	470000	315000	475990	Fremstilling af belysningsarmaturer mv.	Detailhandel med belysningsartikler samt tilbehør	2.809	3.083	-274	300	57
		315000 Total				2.474.489	1.529.988	944.501	723.343	83.413
310000	250000	316100	256200	Fremstilling af andet elektrisk udstyr til maskinforarbejdning		22.376	9.828	12.548	9.399	317
310000	270030	316100	274000	Fremstilling af andet elektrisk udstyr til maskinforarbejdning	Fremstilling af elektriske belysningsartikler	47.011	33.250	13.761	9.595	1.049
310000	280010	316100	281500	Fremstilling af andet elektrisk udstyr til maskinforarbejdning	Fremstilling af lejer, tandhjul, tandhjulsvælske	1.606	1.338	268	0	85
310000	290000	316100	293100	Fremstilling af andet elektrisk udstyr til maskinforarbejdning	Fremstilling af elektrisk og elektronisk udstyr	201.252	156.919	44.333	32.328	21.609
310000	450020	316100	453100	Fremstilling af andet elektrisk udstyr til maskinforarbejdning	Engroshandel med reservedele og tilbehør	157.157	4.886	152.271	32.932	4.007
		316100 Total				429.402	206.221	223.181	84.254	27.067
310000	270030	316210	279000	Fremstilling af elektrisk trafikreguleringsudrustning	Fremstilling af andet elektrisk udstyr	106.633	74.249	32.384	28.680	-303
310000	330000	316210	332000	Fremstilling af elektrisk trafikreguleringsudrustning	Installation af industrimaskiner og -udstyr	3.508	2.634	874	314	2
		316210 Total				110.141	76.883	33.258	28.994	-301
310000	330000	316220	331400	Elektromekaniske værksteder	Reparation af elektrisk udstyr	1.048.959	653.190	395.769	273.707	29.806
310000	710000	316220	711210	Elektromekaniske værksteder	Rådgivende ingeniørvirksomhed inden for elektricitet	6.979	1.872	5.107	3.842	69
		316220 Total				1.055.938	655.062	400.876	277.549	29.875

The pattern of transformations is simplified

The red/purple lines contain combinations of old and new industries that are valid according to the correspondence table between the old DB03 code and the new DB07 code. The greyed-out lines are combinations of codes that are eliminated from the conversion table.

- Some – often improbable – combinations are eliminated when they represent insignificant values. The assumption is that they represent errors that were not detected when the data was classified according to DB03. Such errors will, however, always turn up in the data for any year, and it would be inappropriate to include them in a conversion table that is intended for conversion of data for all earlier years.
- Some combinations would move production into or out of an activity-defined industry. It is assumed, that reclassification of this kind had already taken place in the original data. Additional reclassification would here exaggerate the values that are moved between these industries.
- Some combinations would imply that production is moved to or from an industry that entirely belongs to another institutional sector. It is supposed that the reclassification shall not affect the accounts for institutional sectors. If some units should really have been misclassified in this way when they were classified according to DB03, correction of the errors will have to await the next general revision of the National Accounts.
- The values of transfers are that not included in the conversion table between old and new industries are instead in most cases included where they would have been if the conversion had not been supplemented by corrections to the original DB03-based classification of these units.

Data from various sources are brought together in “The intermediary system”

The intermediary system collects data from several sources. The industrial accounts statistics account for the majority of sub-industries, that is other privately owned, VAT registered units.

Sub-industries of the DB03-based intermediate system for 2007 by source:

Type of source	Number of sub-industries	First approximate estimate of production value, mill. DKK
Agriculture, horticulture, forestry	3	54.823
Industrial accounts statistics	636	2.013.051
Accounts statistics for publicly controlled enterprises/public utilities	13	105.609
Accounts of General Government	23	454.368
General enterprise statistics	45	73.059
Other sources	24	462.161
Total:	744	3.163.071

Transformations derived from existing series for industry-outputs

The calculations for activity-defined industries and most of the other sub-industries that are not based on industrial accounts statistics contain information on the distribution of production by the product codes used in the SUT-system. In such cases the transformation from DB03 to DB07 could be calculated by splitting up each year's distribution of output by products.

Some new industries that are covered by industrial accounts statistics are defined to include specific activities that had hitherto been production in several old industries. Examples are the new industries for repair and maintenance, 330000, Repair and installation of machinery and equipment, and 950000, Repair of personal goods (including IT equipment etc.) that cover specific activities previously found in a number of manufacturing or trade industries. It was here considered inappropriate to use conversion tables from 2007 in all years back to 1993. Instead the outputs that are moved to these industries have been estimated as shares of the old industries' output of each relevant product.

4.3. General Government.*Double-coded detailed Government accounts for 2007. Earlier years were converted on a less detailed level.*

The source for non-market activity of General Government is extracts from the central database of Statistic Denmark's division for government account, known as "DIOR". In this database the relevant transactions have been coded by detailed DB03 industries. The data for the year 2007 was coded by old as well as new DB07-based industry codes. Hence the transition to the new industry classification was relatively easy and reliable for the year 2007. It was decided to carry out the transformation of data for the earlier years on a less detailed level because the possible improvement in quality did not seem to justify use of the resources required for double-coding of the database itself. Instead the transition would be based on the most detailed revised series that could be found in the existing Supply and Use tables.

Transformation was carried out at the output-series level.

In the old Supply and Use tables General Government production is found within 23 of the 130 National Accounts industries. Most of this activity belongs to Public administration and defence, Education, Human health activities, Social institutions and Recreational and Cultural and sporting activities. The SUTs had 38 product codes for government non-market production supplemented by 41 product codes for government sales revenue and a code for own-account software. Each product code was defined to include the output from General government belonging to one or more DB03-industries and the code itself was derived from the industry classification. The information from the 2007 DIOR-database was aggregated into a conversion table that shows how old products are converted into production by the new DB07-industries. (For future use the production has also been given new product codes that reflect the DB07 industries where the production takes place). The result was a series of production values by industries for production in General Government.

The estimated components of production value were adjusted to the output figures

Initial series for intermediate consumption, compensation of employees, other taxes on production, net, and consumption of fixed capital had to be calculated using the 2007-based conversion tables for each of the 23 DB03-based National Accounts industries that contain government activity. The results from these calculations did not completely fulfil the requirement that production value within each industry must equal the sum of these components by definition. The quality of the estimated production values was assumed to be better than the quality of their estimated components. It follows that adjustments had to be made to the component series. The small differences were removed by a RAS-like procedure that redistributed intermediate consumption, compensation of employees and consumption of fixed capital between the 23 industries.

4.4. Conversion of the interior of the Supply and Use table. The product dimension.

Transformation at the 130/117 industry level

The starting point for conversion is the columns showing outputs and input distributed by products for each of the original 130 National accounts industries. For each year the old columns had to be transformed into columns showing the distribution by products for the new 117 National accounts industries. The transformation took place on the National Accounts –industry level. Each column with outputs or inputs from an old industry was split into parts belonging to one or – usually – more new industries.

For activity-defined industries the conversion was simple. With a single exception – dwellings - all such industries were transferred to a single new industry. For other industries the task could be more complicated. The typical conversion of a (output or input) column for an old industry can be illustrated by the figure below:

Schematic presentation:

Transformation of output of an old industry into three new industries:

DB03-based industry	DB07-based industries:			Total for the old industry
	Industry 1	Industry 2	Industry 3	
Product 1	15	5		20
Product 2	1	30		31
Product 3			25	25
⋮	⋮	⋮	⋮	⋮
Product n	75			75
Total output by new industries:	2.144	235	150	2.529

Initial “conversion structures” for output. One layer!

The “conversion matrix” illustrates the fact that each new industry typically has its own products mix. For the manufacturing industries information on these differences can be found in the double coded “Industrial products statistics” that is available for the years from 2005 to 2007. For other industries the differences were more of less obvious. In several cases specific outputs had already been used as indicators for the shares that should be transferred to specific new industries. Where no other information was available decisions had to be made based on pure common sense. Typically it was decided that some of the cells should be empty. A complete “conversion structure” was established for the year 2007. Initially it did not fulfill the requirements that for each old industry the interior of the matrix should add up to the row and column totals given by the values of production of each product and the double-coded targets for total production transferred to each

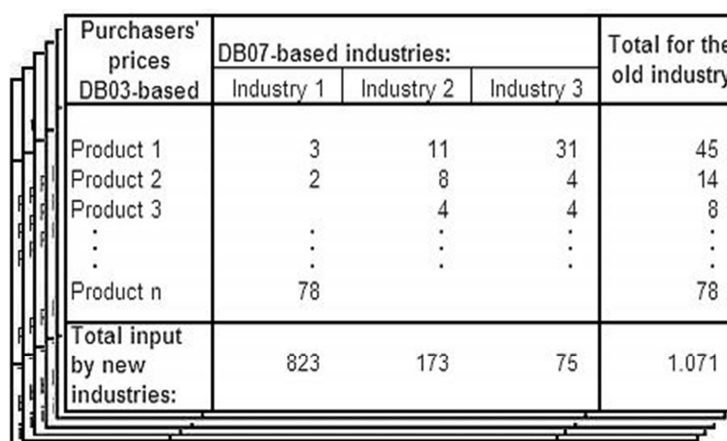
of the new industries. The initial version of the “conversion structure” now had to be adjusted to the targets for row- and column-totals for the double-coded 2007 SUT.

*Initial
“conversion structures”
for input. Seven layers!*

In a similar way a “conversion structure” for intermediate consumption was established based on double-coded surveys of the use of raw materials by manufacturing industries and some service industries combined with a considerable amount of common sense.

Schematic presentation:

Transformation of input of an old industry into three new industries:



Purchasers' prices DB03-based	DB07-based industries:			Total for the old industry
	Industry 1	Industry 2	Industry 3	
Product 1	3	11	31	45
Product 2	2	8	4	14
Product 3	.	4	4	8
.	.	.	.	.
Product n	78	.	.	78
Total input by new industries:	823	173	75	1.071

Transformation of an old column for intermediate consumption into columns for new industries is more complex than the transformation of output. On the uses side the Danish SUTs contain separate “valuation matrices” for basic prices, wholesale trade margins (including transport margins), retail trade margins, taxes less subsidies on products and Value Added Tax adding up to use at purchasers’ prices. The matrices can be seen as stacked one upon the other as shown in the figure above. When an old column is split up between the columns for new industries it is necessary to distribute all layers. In general trade margins and most taxes on products can be distributed in proportion with the distribution at basic prices. VAT can, however, sometimes follow rules that differ between the new industries. As for output, the first version of the structure was as far as possible adjusted to the double-coded targets for total intermediate consumption by industries. However, the restraint that the distributed use of each product must equal the value from the old industry would here refer to all valuation layers.

The 2007-structures were used to fill the interior of the system in earlier years

The adjusted “conversion structures” from 2007 were used as default output- and input structures for the earlier years, but to the extent that values for the specific year were known they were preferred to the automatically generated figures. The combined structures were used as initial “conversion structures” for the earlier years. Accomplishment of this task required some ingenious computer programming. The result was a system, where the modified output and input structures from 2007 were automatically adjusted to the earlier years’ targets for rows (production by products) and columns (double coded output and input for old/new industries).

4.5. Transformation of supply and use of energy products.

The system allowed that the redistribution of specific products could take place outside the general system described above. The double-coded data for such products was entered into the supply- and use framework where it was treated as “predetermined values” that were kept constant during the automatic adjustment to targets described above. This feature of the system allowed the inclusion of data from the double coded energy accounts.

Double coded energy balances from energy accounts project

Transformation of the energy accounts system from old to new National Accounts industries was carried out as a separate project. The transformation of the balances for energy products included transformation of the balances for physical as well as monetary values. It utilized a census of the use of energy in manufacturing or 2009 and double-coded information on reimbursement of energy taxes. It is described in detail in the report "Introduction of DB07 in the Danish Energy Accounts", www.dst.dk/energi.

5. Transformation of data for employment and compensation of employees.

Conversion tables are available for years since 1995. In earlier years the 1995 relations are used.

The original data on employment, hours worked and compensation of employees (henceforth referred to as employment data) are available with a breakdown of 132 industries which pretty much equals the level of our former national publicized data which was on 130 industries. The lack of a more detailed breakdown of the original employment data necessitates the use of year-specific conversion tables in order to accurately capture the distribution of the former industries by the new breakdown. In the case of Denmark, such tables are available from 1995 onwards. Regarding the period prior to 1995, no conversion tables for employment data are available. To compensate, we use an adjusted version of the conversion from 1995. Specifically, we adjust the 1995 transformation to reflect the difference between GVA converted to the new breakdown by two different methods. One was using a static conversion table on the former 130-industry breakdown (corresponding to the employment data conversion tables) and the other was using a static conversion table on a much more detailed breakdown, thereby capturing much of the structural changes that weren't captured by the use of a static transformation on the more aggregated breakdown. The rationale behind this is that the conversion by the more detailed breakdown will mean that most of the detailed old industries will be entirely placed in one new industry in the new breakdown, rendering the use of year-specific conversions unnecessary.

Double-coded Working Time Accounts from 1995 to 2007

The conversion tables used in the transformation of employment data after 1995 are based on the Working Time Account, WTA. The WTA consists of data series combining data from several different registers covering employment, hours worked and compensation of employees. The WTA is collected on the most detailed industry breakdown (726 industries in the new breakdown). When creating correspondence tables based on the WTA data, the double coded The Danish Statistical Business Register (SBR) was used. The SBR contains information on employment at the level of the firm as well as employment at the level of workplace. The latter is used in constructing the working time accounts correspondence tables which are available at the most detailed industry breakdown for the period 1995 to 2007.

Because the national accounts employment data are only available at the more aggregated national accounts breakdown (132/117 industries on the old/new breakdown) the double coded working time accounts data are aggregated to the national accounts industry breakdown and is then used as correspondence tables for the transformation of the national accounts employment data from the old to the new classification. This is done for all data other than data for General Government. In general the WTA correspondence tables are used, but for some industries the WTA information is disregarded. This is the case for industries which in the national accounts are activity-defined. All these industries are unaffected by the conversion. In some other cases where the correspondence tables for the production value and intermediate consumption place an entire old industry in one new industry, the conversion tables based on the WTA are adjusted as to be in accordance with the correspondence for production value and intermediate consumption.

There is an exception to this general rule as for the year 2000 some corrections are made to the construction industry, 420000. This is a consequence of our decision to correct a mistake in our data concerning General Government, as the transformation to the new breakdown revealed, that the compensation of employees used in the employment statistics was not in accordance with the compensation of employees used in the compilation of the production value for General Government in the year 2000. Thus the industry breakdown of employment data for the year 2000 has been corrected to ensure consistency with production data for the same industries. The corrections have not affected the grand total for any sector.

In General Government compensation of employees is used in the distribution of employment

For the General Government the employment data was transformed using conversion tables derived from the double coded general government statistics data on compensation of employees (please refer to for a description of the double coded general government data). This is the case because the SBR at the moment does not meet the demands of the NA in reference to a detailed compilation of general government data on industries. All the employment data are thus transformed to the new industry breakdown using the correspondence table for compensation of employees, implying that for any old industry which was divided between two or more industries on the new breakdown, it is assumed that the earnings per employee and hours worked per employee and earnings per hour worked are the same for all the new industries the data were divided among.

After the transformation of the employment data using conversion tables, the data on the new industry breakdown was confronted with the transformed data on gross value added to ensure a reasonable relation between compensation of employees and GVA. All employment series were also scrutinized to ensure reasonable relations between employment and hours worked, employment and earnings and hours worked and earnings at the most detailed industry level (117 industries). All series were also checked in a time series perspective to ensure that no sudden changes in the series occur as a consequence of the transformation.

6. Other taxes and subsidies on production.

Individual taxes are double-coded and put together in three groups before calculations for the years before 2007.

Other taxes and subsidies on production consist of many different kinds of taxes and subsidies. The taxes include, but are not limited to, taxes on the ownership of cars, real estate taxes and payroll taxes. Each of these taxes is readily available only as totals and different conversion tables are used to distribute them by industries. The numerous taxes are grouped into three categories: Real estate taxes, car ownership taxes and what could be labeled other taxes. For the year 2007 we have double coded taxes and subsidies by double coding each specific tax or subsidy. Real estate taxes are transformed using double coded data on production, with the exception of the following industries: Renting of residential buildings and owner occupied dwellings. The two industries are the sum of the former industry "Dwellings", and the split on new industries is based on the proportion of total rents in the two industries. Car ownership taxes are transformed using double coded data on the distribution of cars. We have used double coded data on employment and compensation of employees to transform taxes related to employment and compensation of employees. Some taxes are specific to one activity, e.g. taxes on the use of roads are paid only by haulage contractors. In such cases the tax is placed in the appropriate new industry regardless of how the old industry is split in other cases. The double coded data are grouped into the three previously mentioned groups and individual correspondence tables for each of these are derived and used to transform the three groups of taxes from the old industry breakdown to the new breakdown for the years prior to 2007.

Similarly individual subsidies are double-coded. The resulting correspondence-table is used to convert subsidies for years before 2007.

Regarding subsidies we have very detailed data available from the general government statistics (DIOR). This makes it possible in many cases to pinpoint the industry receiving the subsidy by simply reading the Budget (Finansloven) where the purpose of every subsidy is described. Most subsidies have been double coded using this method. The more general subsidies, e.g. subsidies on employment have been double coded using double coded data on compensation of employees. Employment subsidies received by general government entities are available from the DIOR database and thus readily available double coded. One single correspondence table is derived for all subsidies and, as is the case with taxes, the double coded subsidies for 2007 are used to transform subsidies for the years prior to 2007.

7. Transformation of Gross Fixed Capital Formation by industries (Investment Matrices).

The SUTs contain 7 columns for GFCF by type, but no industry classification

In the central system of Supply and Use matrices Gross Fixed Capital Formation (GFCF) is shown as columns for 7 types of investment: Machinery and equipment, Transport equipment, Construction, Livestock, Software, Entertainment, literary or artistic originals and Mineral exploration. Each column contains a distribution by products. Approximately 300 of SUT's products are used for investment purposes. The central SUT-framework does not distribute capital formation by industries, hence the SUTs are unaffected by the introduction of the new industry classification.

"Investment Matrices" with fewer industries compared to the SUTs, but compiled by similar methods.

The distribution of Gross fixed capital formation by type, industry and product takes place in a separate subsystem. The industry classification used here is less detailed. The old system has columns for 57 industries, because targets for investment in some of the 130 industries were relatively uncertain and because of lack of information on the distribution by products for the more detailed industries. In the new system it was decided to use the 69 industry DB07-based classification.

The methods used in the conversion are in many ways similar to those used for conversion of the SUTs. The possibilities for disaggregation of the old data before regrouping to the DB07-based industries were, however, somewhat more limited as targets for investment by types had been established from more aggregated data.

The industries covered by the various kinds of accounts statistics had been calculated from fairly reliable detailed data, but a number of more uncertain adjustments to the figures from business accounts were required to bring the data on a form suitable for National Accounts purposes. It is for instance necessary to make specific adjustments for newly established units that have comparatively large investments but are mostly absent from the collected source data. Within a number of other industries GFCF had been calculated by information from statistics collected by public authorities, business associations, published annual reports or various other sources.

The system used to establish targets for investment by the above mentioned 7 types of GFCF has generally remained unchanged during the years 1993 to 2007. As a starting point each year's investment by types had been estimated for the 130 DB03-based industries used in the SUTs. These were aggregated into the 57 industries of the investment matrices before initial estimates of investment by products were entered into the columns of the matrices.

Before conversion to 69 new industries GFCF by the 57 old industries was broken down by 130 DB03-based industries

The original estimates for 130 DB03-based industries were used to break down the totals for the 57-industries into 130 industries before reclassification to the new 69 DB07-based industries. The conversion of these 130 industries was done by methods similar to those used for the SUTs. Activity-defined industries were reclassified into new activity-defined industries. For a number of industries the totals were split up manually. As a default solution the remaining industries were

distributed between new industries using the conversion tables that had been established from the double-coded intermediary systems for the respective years.

As in the similar table shown above on page 9 valid conversions between old DB03-based and new DB07-based industries are shown in red or purple colour. The greyed out lines represent combinations that were ignored in the conversion table between old and new industries. Some represent wholesale or retail trade activity that in the Industrial accounts statistics has been separated out from manufacturing. Others are considered to represent insignificant corrections of errors in the earlier classification of units.

Examples of transformation of GFCF from the double coded “Industrial accounts statistics” for 2007.

Sum of amount						Machinery, Equipment	Buildings, Structures	Other intangible	
nr130	nr118	DB03	DB07	DB03-text	DB07-text			Software	Assets
310000	180000	315000	182000	Fremstilling af belysningsarmaturer mv.	Reproduktion af indspillede medier	-260	39	193	
310000	250000	315000	259900	Fremstilling af belysningsarmaturer mv.	Fremstilling af andre færdige metalprodukter	-29	-54	20	-4
310000	270030	315000	274000	Fremstilling af belysningsarmaturer mv.	Fremstilling af elektriske belysningsartikler	20 640	-1 392	6 524	65 606
310000	270030	315000	279000	Fremstilling af belysningsarmaturer mv.	Fremstilling af andet elektrisk udstyr	-162	-8 291	63	
310000	460000	315000	464320	Fremstilling af belysningsarmaturer mv.	Engroshandel med radio og tv mv.	-27	84	406	
310000	470000	315000	475990	Fremstilling af belysningsarmaturer mv.	Detailhandel med belysningsartikler samt h		10	47	
		315000	Total			20 162	-9 604	7 253	65 602
310000	250000	316100	256200	Fremstilling af andet elektrisk udstyr til mo	Maskinførarbejdning	139	70	15	93
310000	270030	316100	274000	Fremstilling af andet elektrisk udstyr til mo	Fremstilling af elektriske belysningsartikler	943	19	70	17
310000	280010	316100	281500	Fremstilling af andet elektrisk udstyr til mo	Fremstilling af lejer, tandhjul, tandhjulsvæ	37	10	10	28
310000	290000	316100	293100	Fremstilling af andet elektrisk udstyr til mo	Fremstilling af elektrisk og elektronisk udst	950	20 008	573	78
310000	450020	316100	453100	Fremstilling af andet elektrisk udstyr til mo	Engroshandel med reservedele og tilbehør	3 791	134	82	
		316100	Total			5 860	20 241	750	216
310000	270030	316210	279000	Fremstilling af elektrisk trafikreguleringsudst	Fremstilling af andet elektrisk udstyr	-213	-711	516	105
310000	330000	316210	332000	Fremstilling af elektrisk trafikreguleringsudst	Installation af industrimaskiner og -udstyr		0	2	
		316210	Total			-213	-711	518	105
310000	330000	316220	331400	Elektromekaniske værksteder	Reparation af elektrisk udstyr	12 334	-1 793	3 049	16 216
310000	710000	316220	711210	Elektromekaniske værksteder	Rådgivende ingeniørvirksomhed inden for b	19	40	6	4
		316220	Total			12 353	-1 753	3 055	16 220

The conversion was simplified as for output and input.

GFCF in General Government has a special status in the investment matrices because it is the basis for estimation of consumption of fixed capital which is part of the cost that determines the production value in these non-market activities. For this purpose investment matrices for General Government had already been separated out from the matrices for the economy as a whole. It was decided to reclassify GFCF in General Government and other GFCF as two separate systems of matrices to ensure that no investment was implicitly moved to or from Institutional sector for General Government. Hence time series of double-coded industry totals for each of the 8 types of investment were constructed for Government and non-Government.

Double coded matrices with product dimension

The old investment matrices – with product dimension – were split into their Government and non-Government components and each set of matrices was reclassified separately. The matrices for 2007 were then transformed into matrices with double-coded industries. Due to scarce information on investment in machinery and equipment by products in the new 69 industries it was often necessary to rely on a proportional distribution of each invested product by the new industries, but cells representing improbable transfers of products between old and new industries were manually set to zero. As in SUT- case the adjusted “conversion structure” from 2007 was used as default for investment structures in the earlier years.

Transformation often required manual intervention in the automatic process.

In principle the method used for adjustment of the interior of each double-coded matrix to its double-coded column-targets was the same as the one used for the SUTs. However, automatic adjustment of investment matrices proved more complex. Investment matrices are distribution of uses and they always contain the 7 stacked layers from basic up to purchasers’ prices. In many cases an entry in the table can contain a negative value at basic prices while trade-margins are positive and net-taxes may have a positive or negative sign. To avoid strange and improbable values a considerable part of the reclassification of GFCF by products had to be done manually. The manual calculations included all investment in

buildings and civil engineering works where sales and purchases of existing structures are common.

8. Calculation of SUTs and investment matrices in constant and previous year's prices.

SUTs and investment matrices in constant 2000-prices and in previous year's prices were compiled for all years from 1993 to 2007 through calculation of double-coded datasets corresponding to the similar datasets in current prices. The calculations were in practice performed as an integral part of the processes that produced the double-coded matrices by new DB07-based industries in current prices.

Transformation into double coded SUTs due to similar restraints as in current prices.

The conversion from old to new industries in constant and previous years' prices should of course reflect the regrouping that had taken place in the current price version of the tables and they should also be subject to the same restraints: That no main aggregates of the system are changed and that changes only take place within those parts of the tables that contain an industry-dimension. Within each table every column for an old DB03-based industry should be split into a sub-matrix with double-coded columns.

Uniform price-indices assumed in sub-matrix rows.

Each product should be distributed along the row in the sub-matrix proportionally with the similar row in the current-price version of the table, implying that the same price-index applies to all cells in row within the sub-matrix.

On uses side of the SUT it is assumed that trade margins and net taxes on products from the original column should be distributed proportionally with the similar distributions in current prices. If such trade margins or taxes/subsidies in current prices have disappeared over time, the value in constant prices was instead distributed proportionally with the distribution of the value in basic prices.

Automatic calculation of SUTs. Frequent use of manual calculations in investment matrices.

An automatic solution to this kind of problem is simple. The more complicated part is redistribution of VAT between new industries, because difference tax-rules may be relevant to different new DB07-based industries (as for old DB03-based industries). Conversion of the SUTs could in practice be done – almost – automatically. However, big areas of the investment matrices had to be converted manually due to the same reasons that required manual calculation of similar values in current prices.

9. Transformation of Capital stock and Consumption of Fixed Capital.

Capital Stocks have hitherto been published with a breakdown by 53 industries in accordance with the NACE rev. 1 classification for each of 9 types of assets: Machinery and equipment, Transport equipment, Dwellings, Non-residential buildings, Other structures, Livestock, Software, Mineral exploration and Entertainment, literary or artistic originals. The transformed figures contain a breakdown by 69 industries which can be aggregated to NACE at level A*64. A breakdown by institutional sectors is also available. Published figures cover the period 1966 to 2010. The transformation from old to new industries is described in more detail in "Capital stock, NACE rev. 2" that can be found at the address www.dst.dk/nationalregnskab-db07.

Restrictions and requirements regarding the transformation.

Transformation had to observe the constraints common to the transformation exercise. They can be summarized as:

- **Totals for institutional sectors should be unaffected by the reclassification;** assets are classified by the new classification of industries but the “owners” (the sectors) are in principle the same. The sums for sectors S11, S12, S13 and S14+S15 should remain unchanged.
- **Totals for each type of assets should be unaffected;** Sums for each of the nine types of capital should remain unchanged for all variables (Consumption of Fixed Capital (CFC), Net Stock, Gross Stock, Other Changes in Volume and Revaluations).
- **A double-coded file with old and new industries;** a set of data which show the bridge between NACE rev. 1 and NACE rev. 2 should be compiled. This should be done for all variables (Gross Stock, Net Stock, CFC and Other Changes in Volume) except Revaluations.
- **Accounting restrictions should be respected;** the basic restriction between the Net Stock at the beginning and the end of a year (beginning of next year) should still be observed, meaning that: *net stock (ultimo) = net stock (primo) + GFCF – CFC + Other changes in volume + nominal revaluations*.
- **Reliable figures;** the transformed Capital Stock data should be reliable at the level of industries.

The transformation of the Capital Stock figures fulfills all the conditions mentioned above.

Revaluations by industries were only compiled for new industries and no data file was derived with a bridge between old and new industries. Since revaluations are compiled as a residual, Capital Stock figures broken down by new industries were used to compile revaluations at the industry level.

PIM-approach Roughly the PIM-method means that the value of capital at a given time is estimated by adding together the value of the surviving shares past investment by vintages: At Statistics Denmark, the following types of asset are compiled by PIM: Machinery and Equipment, Other Structures, Software, Originals, Mineral Exploration and Costs of Ownership Transfer for buildings. All types of capital stocks compiled by PIM are transformed into NACE rev. 2 by the same approach. The approach can be summarized in the following steps:

- (1) Adjustment to original micro data (by product and industry) at constant 2000-prices
- (2) Automatic balancing of micro data at constant 2000-prices to match published figures
- (3) Transformation of micro data at constant 2000-prices to NACE rev. 2 standard
- (4) Inflation of balanced micro data at constant 2000-prices into current prices
- (5) Automatic balancing of micro data at current prices to match published figures
- (6) Calculation of breakdown by institutional sector
- (7) Final balancing, if required

Costs of ownership transfer for buildings are not balanced etc., in the transformation process they are only subject to step 1, 3 and 4 mentioned above.

Direct measurement approach Direct measurement is used to calculate Capital Stocks for Dwellings, Transport Equipment, Non-Residential Buildings (Benchmark and PIM) and Livestock. Direct measurement can be described as a price multiplied with quantity estimation of the value of the (gross) stock, for example the price per square meter multiplied with the number of square meters. A price multiplied with quantity calculation can be applied for a single year (benchmark) combined with PIM to take the compilation forward. Or it can be applied for a number of years.

The old industry for dwellings is split into two new industries With the old DB03-based classification, all Dwellings were classified in only one industry, but with the new DB07-based classification, Dwellings are divided into two industries; “renting of residential buildings” and “owner-occupied dwellings”.

Information to break dwellings down into the new industries was found in the Register for Buildings and Dwellings (Byggnings- og Boligregistret (BBR) in Danish) that classifies dwellings, among other things, by its use. In the estimation of the break down by institutional sectors, it was assumed that the non-financial corporations can only hold dwellings classified in the industry “renting of residential buildings”.

The breakdown into the two new industries was done at the dwelling-type level (farm houses, detached, terraced or semi-detached houses, multi-storey houses, students residences, holiday cottages and garden houses, garages, carports and other residential buildings) measured in squared meters.

Due to the information available, a specific annual breakdown could be done for the period 1993-2010. For the previous years (1966-1992) a constant breakdown was assumed.

Non-residential buildings. Compilation of Capital Stock for Non-Residential Buildings is done by using a combination of the values for a 1995 benchmark and the PIM method. Separate figures were estimated for Costs of Ownership Transfer which were added to the previously estimated Capital Stocks and CFC for Non-Residential Buildings. The value of GFCF concerning Costs of Ownership Transfer was estimated from the Investment Matrices. PIM-estimation, using assumptions on service life and survival patterns, was carried out for the Gross and Net Stocks as well as of the CFC derived from Costs of Ownership Transfer. Compilation was first done at constant prices and subsequently inflated to current prices by use of relevant price indexes.

The first year when it was possible to classify the stock of Non-Residential Buildings by DB07-based industries was 2007. So for this year, and at the most detailed level (measured in square meters and divided by building type) and use (as for example industry buildings, offices or hotels), a relation between old and new industries was calculated and applied to the whole period. The results were adjusted to the existing DB07-based GFCF series.

Transport equipment All types of transport equipment were classified into new industries independently for the year 2007. When each transport equipment type was transformed DB07-based industries, they were summed up and the breakdown for the whole stock of Transport Equipment in 2007 could be calculated. A bridge between DB03- and DB07-based industries for the Capital Stock for Transport Equipment was calculated for 2007 and applied to the rest of the period. The results were adjusted to the existing DB07-based based GFCF series.