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Mini presentation

**Index of Retail Sales**  
**Norway**

Session on distributive trades

**Statistics Norway**  
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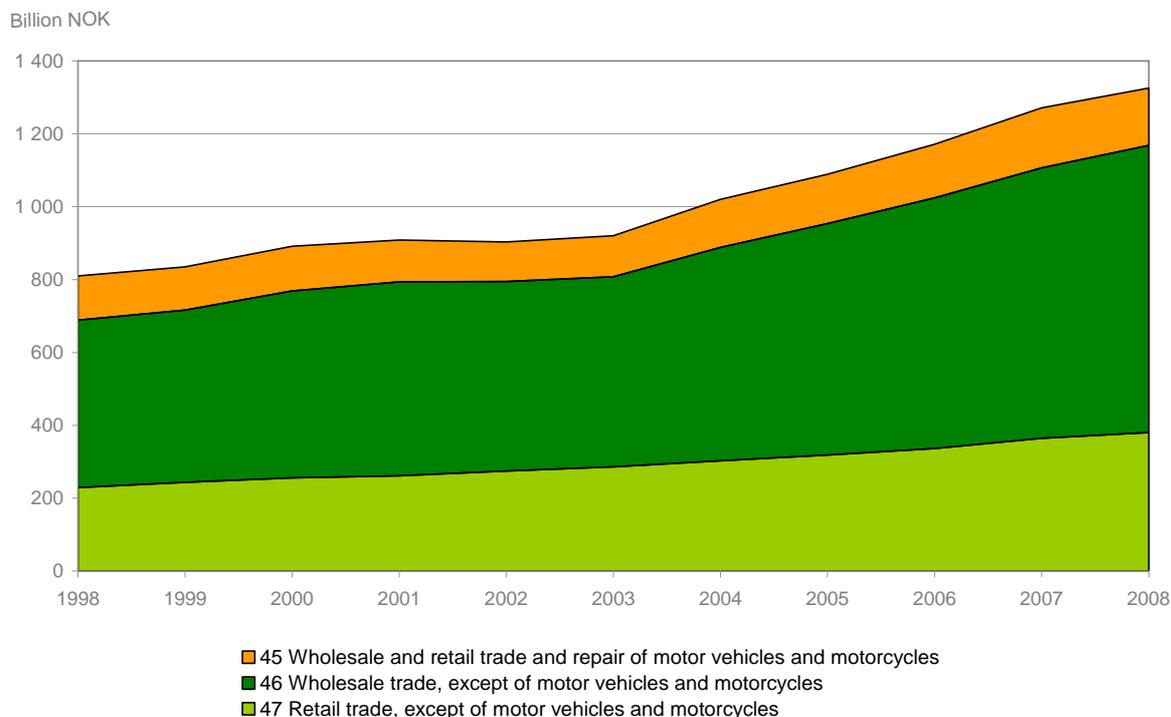
## Introduction

The purpose of this paper is to give a short presentation of Norway's index of retail sales as input to the session on distributive trades at the Voorburg Group Meeting in 2010. Statistics Norway, however, produces a wide range of statistics that describe the distributive trades in Norway. An overview of these statistics is given below, after taking a look at the size of the wholesale and retail trade industry in Norway. Next, the index of retail sales is presented. This paper will explain the background and the purpose of the index, as well as its methodology. Furthermore, the statistical results are shown and compared with other statistics. Improvements that have been and are being made in the statistics are also covered.

## Size of the wholesale and retail trade industry

The turnover of local kind-of-activity units within wholesale and retail trade industries came to NOK 1 326 billion in 2008. That is equivalent to an increase of 64 per cent from 1998. Approximately a third of this turnover was from units within retail trade, except of motor vehicles and motorcycles.

### Diagram: Turnover by wholesale and retail industry division. Local kind-of-activity units. Billion NOK



Source: Statistics Norway, Statbank table 07916: Wholesale and retail trade, structural statistics.

## Overview of statistics that cover the wholesale and retail trade industries in Norway

### Structural business statistics

The wholesale and retail trade structural business statistics are part of the industry statistics and provide detailed information about the activity and structure of section G of the EU's Statistical Classification of Economic Activities (NACE Rev. 2). This section comprises the activities:

- 45 Wholesale and retail trade and repair of motor vehicles and motorcycles
- 46 Wholesale trade, except of motor vehicles and motorcycles



## 47 Retail trade, except of motor vehicles and motorcycles

The following variables are published:

- Enterprises
- Local kind-of-activity units
- Owners
- Employees
- Employment
- Part-time employees
- Man-labour year
- Compensation of employees / wages and salaries
- Social security costs
- Turnover
- Cost of goods
- Value added
- Merchandise sold
- Gross earnings
- Change in stocks
- Acquisitions
- Sale of business assets
- Gross investments
- New investments

The statistics are based on the data needs of the National Accounts and are in accordance with the EU regulation on structural business statistics. In addition, the public's need for information has to be met, and ministries and various trade organisations are among those requesting statistical data. Business, industry and other users also commission customised wholesale and retail trade statistics from Statistics Norway, primarily at the municipal level.

The structural statistics are published twice a year. Preliminary figures are presented 10 months after the end of the reference period, and final figures within 18 months of the end of the reference period. The figures can be found on Statistics Norway's website: [http://www.ssb.no/stvareh\\_en](http://www.ssb.no/stvareh_en).

### More detailed product information

The EU Council regulation on structural business statistics requires a breakdown of turnover by product type every fifth year for all the activities in section G. These figures can be found on Statistics Norway's website: [http://www.ssb.no/vov\\_en](http://www.ssb.no/vov_en).

In connection to this breakdown of turnover by product type, a wholesale and retail earnings survey is made. It gives sales income on merchandise sold for different wholesale and retail trade subclasses (NACE five-digit level) and groups of commodities, as well as gross earnings by product type.

The statistics are based on the needs of the National Accounts, but the Federation of Norwegian Commercial and Service Enterprises strongly desires the production of the statistics too. At Statistics Norway the statistics are used by the Division for National accounts and other research and analysis activity. Other users include public and private sector agencies, organizations and individuals.

### The index of retail sales

The index covers total retail sales of all goods excluding motorised vehicles (SIC2007:47). It is regarded as an important short-term indicator of consumer demand.

The purpose of the statistics is to follow and analyse the ongoing economic development.

The statistics are normally published on the 28th or 29th day of the following month, on [http://www.ssb.no/doi\\_en](http://www.ssb.no/doi_en).

### Bimonthly and quarterly wholesale and retail sales statistics

The purpose of the statistics is to identify the level and the development of wholesale and retail trade. The bimonthly statistics cover all the activities in section G, except of agency business (SIC2007: 45-47, except of 46.1), while the quarterly statistics cover activities 45 and 46.

The bimonthly and quarterly turnover statistics are published on [http://www.ssb.no/vroms\\_en](http://www.ssb.no/vroms_en), about seventeen weeks and sixty days after the expiration of the statistical period respectively.

### The price index for wholesale trade

The purpose of the statistics is to measure the price development for establishments in wholesale trade, except of motor vehicles, motorcycles and wholesale on a fee or contract basis (SIC2007: 46, except 46.1).

The figures are made available on [http://www.ssb.no/engrospris\\_en](http://www.ssb.no/engrospris_en), approximately 5-15 days after the given quarter.



### The volume index for wholesale trade

The purpose of the statistics is to measure the changes in volume for establishments in wholesale trade, except of motor vehicles, motorcycles and wholesale on a fee or contract basis (SIC2007: 46, except 46.1). The volume index is calculated by deflating the value index for wholesale trade with the price index for wholesale trade.

The figures are released on [http://www.ssb.no/engrosvolum\\_en](http://www.ssb.no/engrosvolum_en), approximately 60 days after the given quarter.

### The index of household consumption of goods

The index measures the development of the household consumption of both durable and non-durable goods. Since the definitions in the quarterly national accounts are used in the index of household consumption of goods, it can be interpreted as an indicator of the households' purchases of goods.

It is usually released about a month after the month of reference, on [http://www.ssb.no/vki\\_en](http://www.ssb.no/vki_en).

### Investment statistics for retail sales

The index covers the development in estimated and final investments in retail trade, except of motor vehicles, motorcycles and automotive fuel (SIC2007: 47.1-9, except 47.3).

The purpose of the statistics is to follow and analyse the ongoing economic development.

The index is released on [http://www.ssb.no/detinv\\_en](http://www.ssb.no/detinv_en), approximately 60 days after every quarter.

### The consumer price index

The consumer price index measures the actual changes in the prices for household goods and services including charges and fees.

The statistics are published on [http://www.ssb.no/kpi\\_en](http://www.ssb.no/kpi_en), on the 10<sup>th</sup> of the month, around 3 weeks after the 15<sup>th</sup> of the current month.

### Sales on alcohol statistics

The purpose of the statistics is to map the development in registered turnover for beverages containing alcohol in Norway.

The sales figures are published about 90 days after the given quarter. They can be found on [http://www.ssb.no/alkohol\\_en](http://www.ssb.no/alkohol_en).

### Cross-border trade

Statistics Norway's travel survey (which covers overnight trips abroad) and survey on cross-border trade (which covers day trips abroad) give a total overview of the size of Norwegian households' foreign transactions, which is an important input into the statistics on foreign trade.

They are published on [http://www.ssb.no/grenshandel\\_en](http://www.ssb.no/grenshandel_en), approximately eight weeks after the quarter of reference.

### Sales of petroleum products

The purpose of the statistics is to show deliveries of petroleum products by purchaser group, county and at national level, measured as delivered litres. Furthermore, the statistics compare the delivery figures of the different oil companies (user-financed assignment). In addition, prices on some selected petroleum products are published from February 2010.

The statistics are reported on Statistics Norway's website [http://www.ssb.no/petroleumsalg\\_en](http://www.ssb.no/petroleumsalg_en), about 15-20 days after the given month.

### External trade in commodities

The purpose of the external trade statistics is to give information about the commodity flows between Norway and other countries. Exports and imports are important economic indicators both in describing structural changes and in monitoring the economic trends.

Preliminary figures for the preceding month are released on the 15th, or the first subsequent workday. Final figures for the preceding year are released in April or May. They can be found on Statistics Norway's website: [http://www.ssb.no/muh\\_en](http://www.ssb.no/muh_en).



### Registerbased employment statistics

The purpose of the statistics is to describe the employment situation, distributed by industry division at a more detailed regional level.

The statistics are published annually, on [http://www.ssb.no/regsys\\_en](http://www.ssb.no/regsys_en). Publication normally takes place in mid-June, referring to the situation in the fourth quarter of the previous year.

### Employment and unemployment among short term immigrants.

The purpose of the statistics is to describe the employment situation for persons not registered as residents, i.e. persons who intend to stay in Norway for a short period.

The statistics are published annually, on [http://www.ssb.no/kortsys\\_en](http://www.ssb.no/kortsys_en). Publication normally takes place in mid-June, referring to the situation in the fourth quarter of the previous year.

### Sickness absence statistics

The statistics are intended to shed light on sickness absence trends in the aggregate and distributed by industry, occupation, hours worked and various personal variables connected with those on sick leave. These are intended to form the basis for developing and evaluating measures aimed at sickness absence.

Aims that have governed the planning of the statistics are:

- The possibility for employers and funds-appropriating authorities to make reliable estimates of expenses.
- The possibility for employers' and employees' organisations to evaluate the efficiency of various measures implemented to reduce sickness absence.
- The possibility of identifying risk groups in order to implement preventive measures.
- The possibility of comparison over time as the basis for research in the area.

The statistics are published quarterly and annually. They are normally released 11-12 weeks after the end of the statistical period, on [http://www.ssb.no/sykefratot\\_en](http://www.ssb.no/sykefratot_en).

### Wage index

The purpose of the index is to show changes in average monthly earnings and basic salaries throughout the year.

The index is released on a quarterly basis, no more than 60 days after the end of the quarter. It can be found on Statistics Norway's website: [http://www.ssb.no/lonnkvart\\_en](http://www.ssb.no/lonnkvart_en).

### Accounting statistics

The purpose of the accounts statistics is to compile data for enterprise-related economic overviews and analyses for national accounts and research. The statistics provide a basis for comparisons over time across industries, aggregates and regions. Also, the statistics provide facts for comparisons and evaluations of individual enterprises' accounting data against the groups for which statistics are provided.

Preliminary annual figures are published about 38 weeks and final figures about 75 weeks after the end of the fiscal year. They are reported on [http://www.ssb.no/regnaksje\\_en](http://www.ssb.no/regnaksje_en).

### The quarterly and annual national accounts statistics

The national accounts statistics are designed to provide a consistent and comprehensive survey of the overall national economy. The annual national accounts provide a summarised description of the economy as a whole and a detailed description of transactions between different parts of the Norwegian economy, and between Norway and the rest of the world.

The Norwegian national accounts provide an important source of information for analyses of the Norwegian society. The national accounts have many users, from pupils and students to public or private institutions that actively use national accounts figures in analyses of economic structures and development. Among other things, Statistics Norway's macroeconomic models have been developed based on the annual national accounts. Other major users of the Norwegian national accounts data are the Ministry of Finance, the Central bank of Norway, research and development institutes, and financial analysts. In addition, international organisations such as the IMF, the OECD, the World Bank, the UN and the statistical office of the EU use the reported data in their statistics.



The annual national accounts statistics are published 23 months after the end of the year, on [http://www.ssb.no/nr\\_en](http://www.ssb.no/nr_en).

The quarterly national accounts are published about 50 days after the end of the given quarter, on [http://www.ssb.no/knr\\_en](http://www.ssb.no/knr_en).

## 1. Background

Statistics Norway started publishing an index of retail sales in 1936 - one year after the Norwegian Parliament introduced a bimonthly tax on wholesale and retail sales. The tax was calculated as a fixed percentage of turnover and was, therefore, an acceptable basis for the calculation of a retail sales index. In 1970, however, the replacement of the turnover tax with a value added tax eradicated the data source of the monthly index, which was of fairly high quality at the time (Statistics Norway 1976).

Yet, it did not take long before a new index of retail sales – although not of as good quality - could be calculated, based on data collected directly from a sample (Statistics Norway 1976). In order to improve the quality of the index, the sample drawing plan was altered in 1992 and in 1997. In addition, we gradually started collecting turnover figures for more and more chain stores, directly from head offices, from the end of 1999. The quality of the Norwegian index of retail sales was enhanced greatly because of this. While the sample only covered about 40 per cent of the population's turnover in 1998, the coverage of the sample and the chain stores together was nearly 80 per cent in 2010.

## 2. The purpose of the survey

The purpose of the index of retail sales is to describe the monthly development in the value and the volume of retail trade, except of motor vehicles and motorcycles. It is regarded as an important short-term indicator of consumer demand.

The index is used extensively by the public sector (ministries, the Central Bank of Norway) and the financial sector. Private sector agencies and organisations are regular users too.

At Statistics Norway, the Division for National Accounts relies on timely production of the retail sales index. In the quarterly national accounts statistics<sup>1</sup>, which are mostly used for observation and analysis of the current economic cycle, the index of retail sales is central for the calculation of household consumption and, indirectly, production in the wholesale and retail trade industry. The index is also used in the preliminary figures of the annual national accounts<sup>2</sup> statistics until the bimonthly wholesale and retail sales statistics are available.<sup>3</sup> Moreover, the primary data of the index is used in analysis and research in Statistics Norway.

## 3. Methodology

### 3.1. Data collection

#### 3.1.1. Statistics Norway's Register of Establishments and Enterprises

Statistics Norway's Register of Establishments and Enterprises' first file in October contains the establishments in the population. The establishments' organisation number, state of activity and industrial classification (NACE five-digit sector level or subclass) are important for updating the population and splitting it into subpopulations. The industrial classification is also used together with the number of employees to stratify units. Furthermore, it is the basis for the calculation of the total turnover at NACE two to four-digit sector level..

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<sup>1</sup> [http://www.ssb.no/knr\\_en](http://www.ssb.no/knr_en)

<sup>2</sup> [http://www.ssb.no/nr\\_en](http://www.ssb.no/nr_en)

<sup>3</sup> [http://www.ssb.no/vroms\\_en](http://www.ssb.no/vroms_en)



### 3.1.2. VAT register

The VAT register is the source for the bimonthly wholesale and retail sales statistics. We use the organisation numbers, the turnover figures and the industrial classification of the establishments in the second term (March and April) of these statistics. When updating the population and splitting it into subpopulations, the organisation number and turnover of the units are of importance. Information on turnover is also needed when excluding units from the sample drawing process and inflating sample data to population level.

### 3.1.3. Data from the sample of identical units

From the sample of identical units we collect turnover<sup>4</sup> and VAT-data via postal or Internet-based questionnaire<sup>5</sup>. It is sent to the sample on one of the last days of the statistical month and is due on the 12<sup>th</sup> in the following month.

### 3.1.4. Data from head offices of chain stores

Head offices of chain stores deliver turnover figures for all their stores on an Excel sheet via e-mail.

### 3.1.5. Price index for retail sales

The price index for retail sales is obtained from Statistics Norway's division for price statistics. The index is at NACE four-digit sector level, and is without value added tax.

## 3.2. Population

### 3.2.1. Coverage

The population covers all active establishments<sup>6</sup> in retail trade, except of motor vehicles and motorcycles (SIC2007:47). All regions of Norway are covered, except of the Svalbard Archipelago. State owned units and units owned by the social security administration or local or regional governments are not part of the population.

### 3.2.2. Structure in NACE rev. 2

In NACE rev. 2, the Statistical classification of economic activities in the European Community, Division 47 Retail trade, except of motor vehicles and motorcycles "includes the resale (sale without transformation) of new and used goods mainly to the general public for personal or household consumption or utilisation, by shops, department stores, stalls, mail-order houses, door-to-door sales persons, hawkers, consumer cooperatives etc." (Eurostat 2008) At NACE three-digit level, it is structured as follows<sup>7</sup>:

#### **In stores**

##### Non-specialised:

47.1 Retail sale in non-specialised stores

##### Specialised:

47.2 Retail sale of food, beverages and tobacco in specialised stores

47.3 Retail sale of automotive fuel in specialised stores

47.4 Retail sale of information and communication equipment in specialised stores

47.5 Retail sale of other household equipment in specialised stores

47.6 Retail sale of cultural and recreation goods in specialised stores

47.7 Retail sale of other goods in specialised stores

#### **Not in stores**

47.8 Retail sale via stalls and markets

47.9 Retail trade not in stores, stalls or markets

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<sup>4</sup> **Turnover:** Dutiable and duty-free sales income from goods and services as well as rents, commission fees and royalties. Financial revenues are not included.

<sup>5</sup> Refer to appendix A for an example of an Internet-based questionnaire.

<sup>6</sup> **Local kind-of-activity unit (Establishment):** An enterprise, or part of an enterprise, that is located in one particular place and can be identified geographically. On or from this place economic activity is exercised which, with some exceptions, employs one or more persons in one and the same enterprise.

<sup>7</sup> Refer to appendix B for a more detailed structure of Division 47 Retail trade, except of motor vehicles and motorcycles. Information concerning correspondence with ISIC rev. 4 is also included.



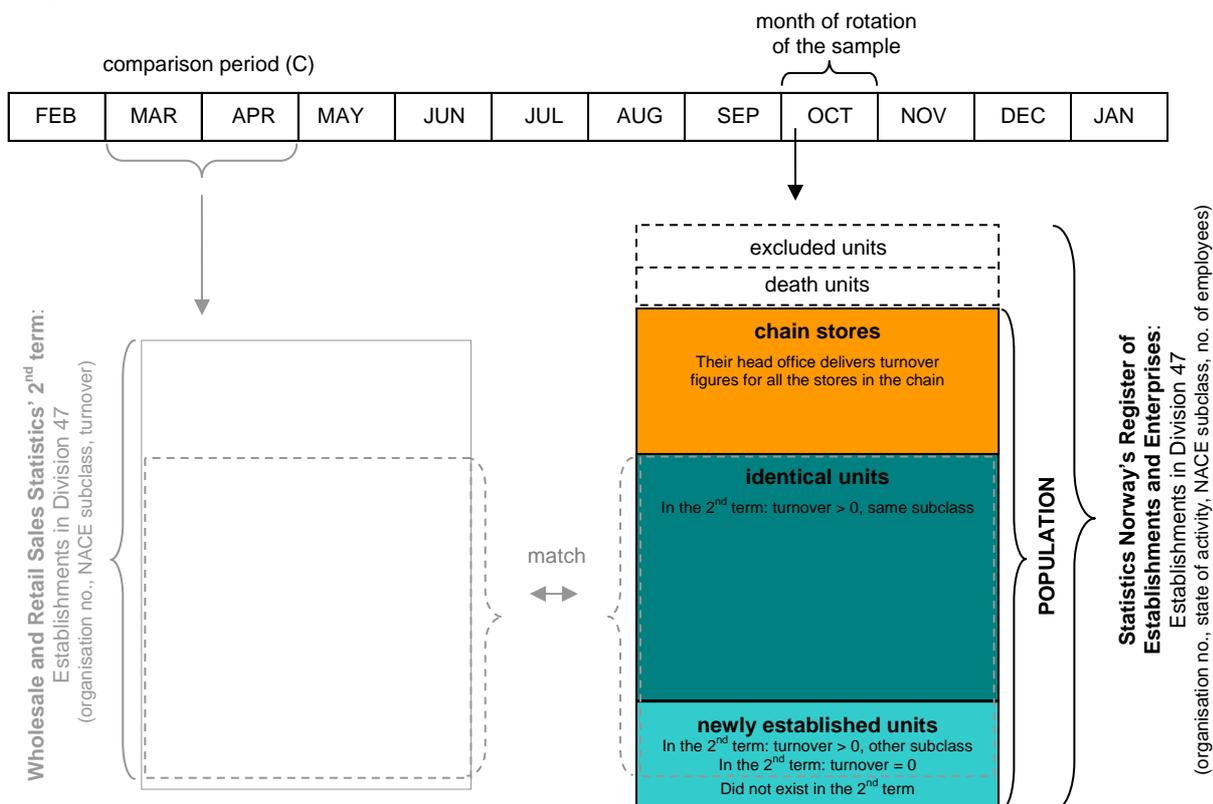
The classification of the International Standard Industrial Classification of all Economic Activities of the United Nations (ISIC rev. 4) is identical at three-digit level, thus ensuring comparability of data (Eurostat 2008).

### 3.2.3. Annual update of the population and division into subpopulations

We update the population of establishments in October, every year, in connection with the rotation of the sample of identical units. The population's establishments are found on Statistics Norway's Register of Establishments and Enterprises' first file in October (Diagram 3.1). We divide them into the subpopulations of chain stores, identical units and newly established units. *Chain stores* in the population are identified based on which head offices have agreed on delivering turnover figures for all the stores in their chain. A whole chain of stores can be omitted from or included in this subpopulation every year in October.

To divide the remaining establishments into subpopulations we first consider those that also existed in the second term (March and April) – the last available term with fully revised turnover figures – of the wholesale and retail sales statistics. Establishments that had turnover in this term and the same industrial classification (NACE five-digit sector level or subclass) in this term as in October, are defined as *identical units*. On the contrary, those units that had turnover but a different classification in the second term are counted as *newly established units*. We carry out quality checks on units that are classified differently in October compared to in the second term and correct their classification, if necessary. The subpopulation of newly established units also includes establishments without turnover in the second term and establishments that did not exist in the second term of the wholesale and retail sales statistics.

**Diagram 3.1: Classification of the establishments in connection with the annual rotation of the sample**



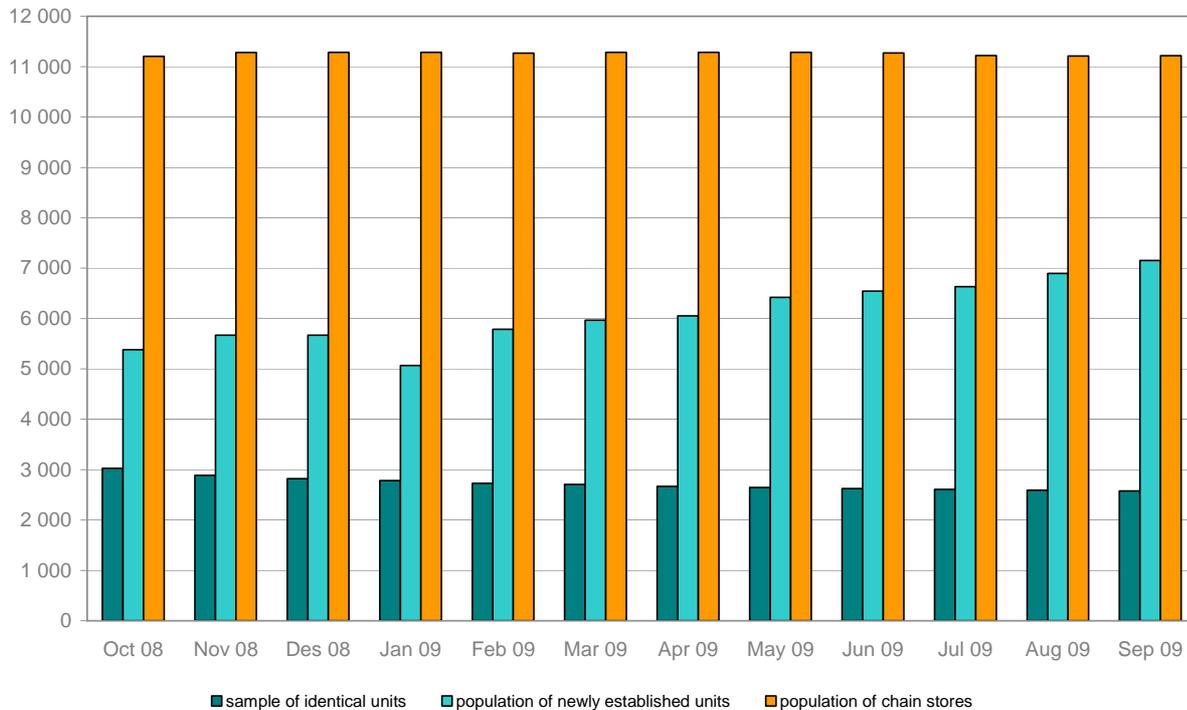
### 3.2.4. Monthly update of the population

We also update the population monthly, based on information from head offices of chain stores and the sample of identical units. In addition, we use information about establishments in the second term (March and April) of the wholesale and retail sales statistics, as well as from Statistics Norway's Register of Establishments and Enterprises first available file after the expiration of the statistical month.



Establishments that cease to exist or become part of a NACE five-digit sector level (subclass) which is irrelevant for the index of retail sales are normally omitted from the population (Diagram 3.2). Units that are established by chains that deliver us turnover figures for all the stores in the chain are included in the population of chain stores. Other new units are added to the population of newly established units (Diagram 3.2)<sup>8</sup>.

**Diagram 3.2: Number of identical sample units, newly established units and chain stores in the course of a year**



### 3.2.5. Stratification

We stratify the subpopulations of identical units and newly established units. It is the basis for the rotation of the sample of identical units and for the calculation of the turnover of both subpopulations. The establishments in each subclass (NACE five-digit sector level) are divided into four size groups:

- Stratum 1: 1-4 employees
- Stratum 2: 5-9 “
- Stratum 3: 10-19 “
- Stratum 4: 20- “

Newly established units are stratified each month, when they become a part of the population. We check whether there is coherence between the establishments' size group and their turnover in the second term of the wholesale and retail sales statistics. If not, we correct their size group. For the population of identical units, we check this on a yearly basis, in connection with the rotation of the sample.

## 3.3. Sample of identical units

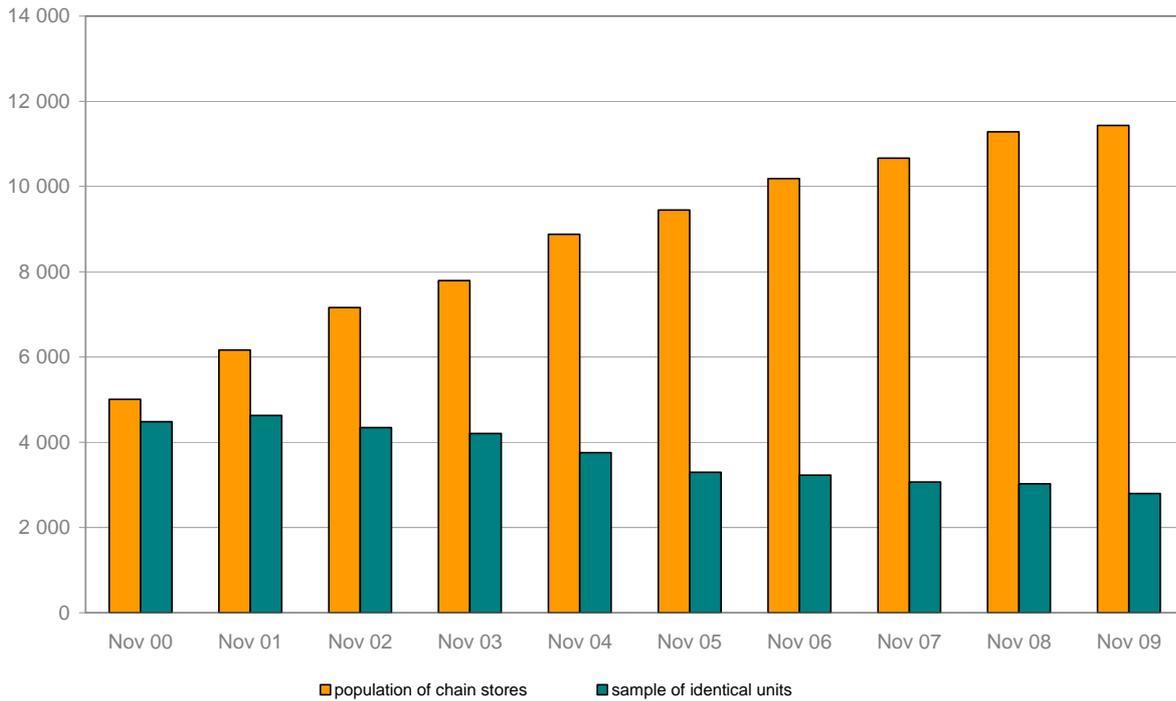
### 3.3.1. Number of units

The number of units in the sample has decreased significantly during the past decade, from approximately 5 000 in 1999 to 2 800 in 2009. This is because we have gradually supplemented turnover figures for the sample with turnover figures for chain stores reported directly by head offices from November 1999 (Diagram 3.3). The amount of chain stores has nearly tripled since then.

<sup>8</sup> In January, the number of newly established units falls due to the implementation of the new standard industrial classification.

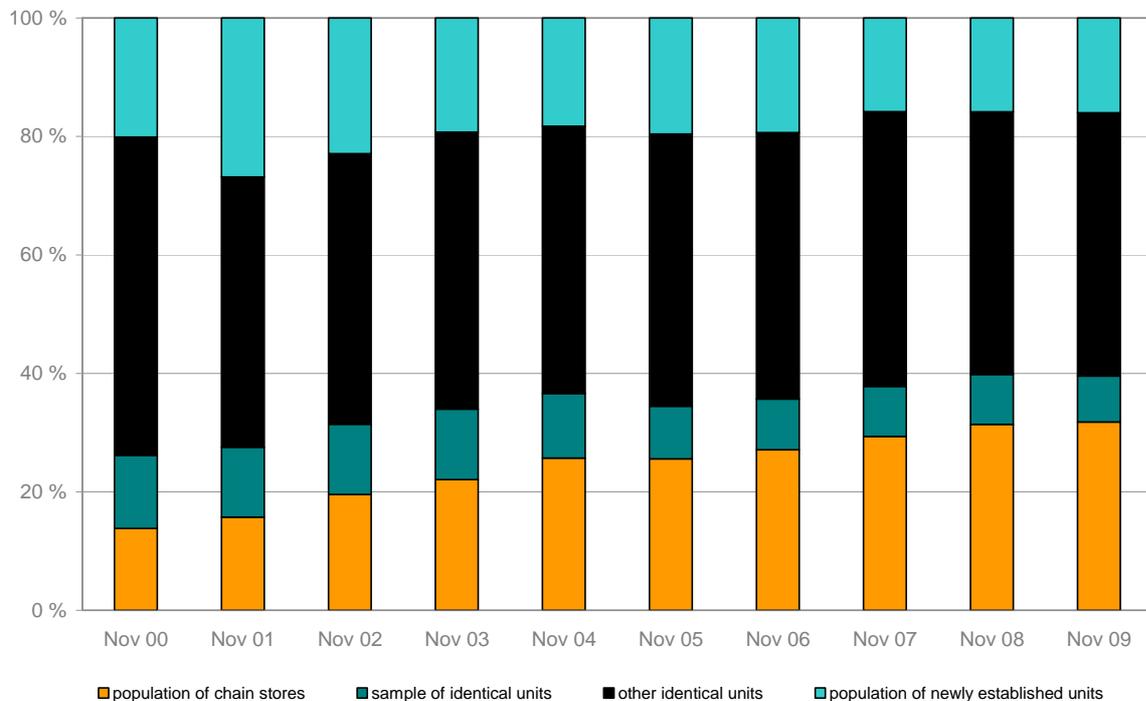


**Diagram 3.3: Number of identical units in the sample and chain stores. November 2000 to November 2009**



In all, the chain stores and the retail stores in the sample represented about 40 per cent of all the units in the population at the end of 2009 (Diagram 3.4).

**Diagram 3.4: Number of chain stores and identical units in the sample compared to the total number of units in the population. Per cent. November 2000 to November 2009**





### 3.3.2. Rotation of the sample

The turnover of the subpopulation of identical units is estimated based on turnover figures from a sample of units. The sample is rotated annually, in connection with the publication of the index for October. Below, we describe this process:

Step 1: We specify which units are to be excluded from the drawing process (the cut-off):

- Units with less than NOK 150 000 in the second term of the Wholesale and Retail Sales Statistics.

Step 2: We make up a stratified sample drawing plan, where we specify the required coverage rates for all strata. The principles for this plan are:

- The sample in each stratum must, normally, cover at least 30 per cent of its population's turnover in the second term of the Wholesale and Retail Sales Statistics.
- The coverage rate for strata with large units is set higher than for strata with small units. Consequently, large units have a bigger chance to be drawn.

Step 3: Before rotation, all units are sorted:

- based on the amount of years a unit has been in the sample minus the amount of years that it has not been in the sample. The more years a unit has not been part of the sample compared to the amount of years it has been part of the sample, the bigger the chance that it will be drawn.
- based on the amount of years in a row they last were or were not part of the sample. The more years in a row a unit last was not part of the sample, the bigger the chance that it will be drawn. The more years in a row a unit last was part of the sample, the smaller the chance that it will be drawn.

Step 4: Rotation principles:

- Units that have been part of the sample for four continuous years are omitted.
- In each stratum, we draw as many units as necessary to attain the specified coverage rate in the drawing plan.

Step 5: After rotation we check whether the coverage rates specified in the plan are attained, because some strata could have had too few units to draw from. In that case, we adjust the coverage rates for those strata in the drawing plan and draw again.

## 3.4. Calculation of the value index

### 3.4.1. Calculation of the index with the aid of chaining

After the implementation of the new Standard Industrial Classification in January 2010, the index has been published with 2005 - the average of the indices for the 12 months - as index reference period.

When calculating the monthly index, we take into consideration that the sample is rotated every year in October. For this month, we collect turnover figures from units that will be omitted from the sample, as well as from units that will become part of the sample. The index for October is calculated based on turnover figures from the old sample, while the development from October to November is calculated based on turnover figures from the new sample. The index  $I$ , at different NACE-levels, can be written as

$$(3.4.1) \quad I^t = I^s \cdot \frac{\hat{T}^t}{\hat{T}^s} \quad \text{for} \quad s_{now} < t \leq s_{next}$$

where



$\hat{T}$  is the estimated turnover  
 $t$  is the statistical month  
 $s$  is the index basis period. This is last October.  
 $r$  is the index reference period. This is the year 2005.

### 3.4.2. Calculation of the turnover in a statistical month

The estimated monthly turnover at NACE two to four-digit sector level is calculated by aggregating the estimated turnover at NACE five-digit sector level (subclass). The estimated turnover at this level, in the statistical month  $m$ , takes the form:

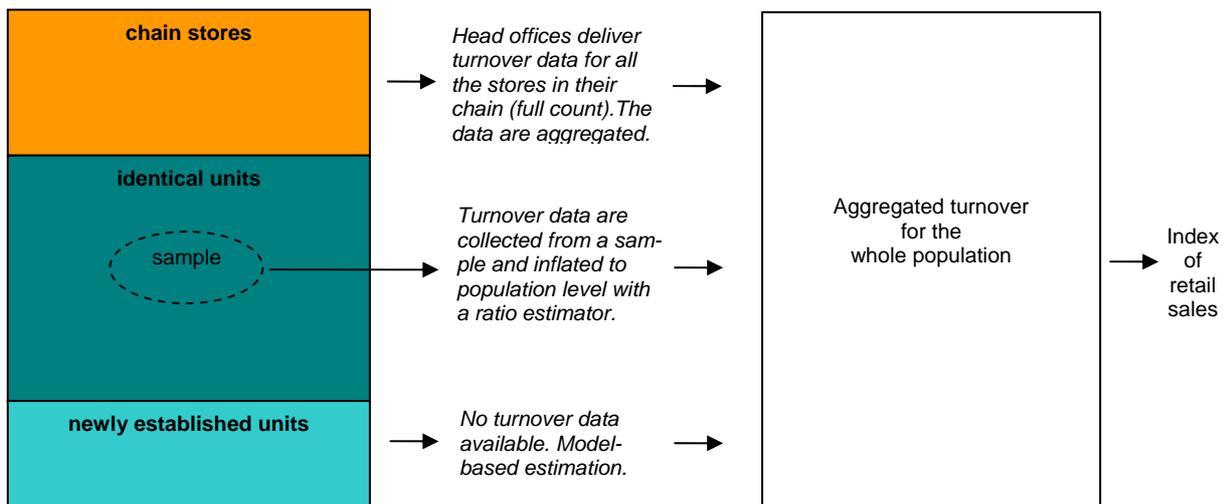
$$(3.4.2) \quad \hat{T}_h(m) = T_h^{CH}(m) + \hat{T}_h^{ID}(m) + \hat{T}_h^{NE}(m)$$

where

$T_h^{CH}(m)$  is the turnover for chain stores in subclass  $h$ , in the statistical month  $m$ .  
 $\hat{T}_h^{ID}(m)$  is the estimated turnover for identical units in subclass  $h$ , in the statistical month  $m$ .  
 $\hat{T}_h^{NE}(m)$  is the estimated turnover for newly established units in subclass  $h$ , in the statistical month  $m$ .

The calculation of the turnover for these three subpopulations is described below, first as a diagram (3.5), and then more detailed per subpopulation.

**Diagram 3.5: From data collection to index of retail sales**



#### 3.4.2.1. Chain stores

As the head offices of chain stores report turnover figures for *all* the stores in their chain, their turnover in subclass  $h$ , in the statistical month  $m$ , is calculated by aggregating those figures. It can be written as

$$(3.4.3) \quad T_h^{CH}(m) = \sum_{i \in \text{pop}_h^{CH}(m)} V_{i,h}^{CH}(m)$$

where

$V_{i,h}^{CH}(m)$  is the turnover for chain store  $i$  in subclass  $h$ , in the statistical month  $m$ .  
 $\text{pop}_h^{CH}(m)$  is the population of chain stores in subclass  $h$ , in the statistical month  $m$ .



### 3.4.2.2. Identical units

The turnover for the population of identical units is estimated based on turnover data from a sample of identical units. A ratio estimator is applied to each stratum to inflate sample data to population level. The ratio estimator uses turnover figures from the second term (comparison period  $C$ ) of the wholesale and retail trade statistics (VAT register) as auxiliary variables. The ratio model is given by:

$$(3.4.4) \quad \hat{T}_{h,s}^{ID}(m) = \frac{\sum_{i \in \text{sample}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(m) \cdot \frac{\sum_{i \in \text{pop}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(C)}{\sum_{i \in \text{sample}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(C)}}{\sum_{i \in \text{sample}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(m)}$$

where

$\hat{T}_{h,s}^{ID}(m)$  is the estimated turnover for identical units in subclass  $h$ , stratum  $s$ , in the statistical month  $m$ .

$V_{i,h,s}^{ID}(m)$  is the turnover for an identical unit  $i$  in subclass  $h$ , stratum  $s$ , in the statistical month  $m$ .

$\frac{\sum_{i \in \text{pop}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(C)}{\sum_{i \in \text{sample}_{h,s}^{ID}(C,m)} V_{i,h,s}^{ID}(C)}$  is the ratio between the population's and the sample's turnover for identical units in subclass  $h$ , stratum  $s$ , in the comparison period  $C$ .

Next, we aggregate the turnover figures for the different strata  $s$  in each subclass  $h$ :

$$(3.4.5) \quad \hat{T}_h^{ID}(m) = \sum_s \hat{T}_{h,s}^{ID}(m)$$

### 3.4.2.3. Newly established units

As we have no information about the turnover of newly established units, it is estimated. We use information from the same period in the previous year on how much newly established units made compared to identical units. In addition, we use the average turnover for identical units in the statistical month  $m$ . The following formula describes the calculation of the turnover for newly established units in the statistical month  $m$ , subclass  $h$ , stratum  $s$ , established in term  $t$ :

$$(3.4.6) \quad \hat{T}_{h,s,t}^{NE}(m) = N_{h,s,t}^{NE}(m) \cdot \bar{V}_{h,s}^{ID}(m) \cdot \frac{\bar{V}_{h,s,t}^{NE}(M-6)}{\bar{V}_{h,s,t}^{ID}(M-6)}$$

where

$\hat{T}_{h,s,t}^{NE}(m)$  is the estimated turnover in the statistical month  $m$  for newly established units in subclass  $h$ , stratum  $s$ , established in term  $t$ .

$t$  is a term that is an element of  $C+1, C+2, \dots, M$ .  $M$  refers to the term to which the statistical month  $m$  belongs.

$N_{h,s,t}^{NE}(m)$  is the number of newly established units in the statistical month  $m$ , in subclass  $h$ , stratum  $s$ , established in term  $t$ .

$\bar{V}_{h,s}^{ID}(m)$  is the average turnover for identical units in the statistical month  $m$ , in subclass  $h$ , stratum  $s$ .

$\frac{\bar{V}_{h,s,t}^{NE}(M-6)}{\bar{V}_{h,s,t}^{ID}(M-6)}$  is the ratio between the average turnover for newly established units and the average turnover for identical units in subclass  $h$ , stratum  $s$ , established in term  $t$ . It concerns turnover figures from the statistical month's term in the previous year ( $M-6$ ).



By aggregating turnover as follows, we find the total turnover for newly established units in subclass  $h$ :

$$(3.4.7) \quad \hat{T}_h^{NE}(m) = \sum_{s,t} \hat{T}_{h,s,t}^{NE}(m)$$

### 3.5. Deflation / Volume index

Volume indices at NACE four-digit sector level are calculated by deflating value indices directly by means of the price index for retail sales. The indices for value and price are without value added tax. At NACE two and three-digit sector level the volume indices are calculated as a weighted sum of the volume indices at the NACE four-digit sector level using value shares in the reference year as weight. The weights are updated monthly.

### 3.6. Working day and seasonal adjustment

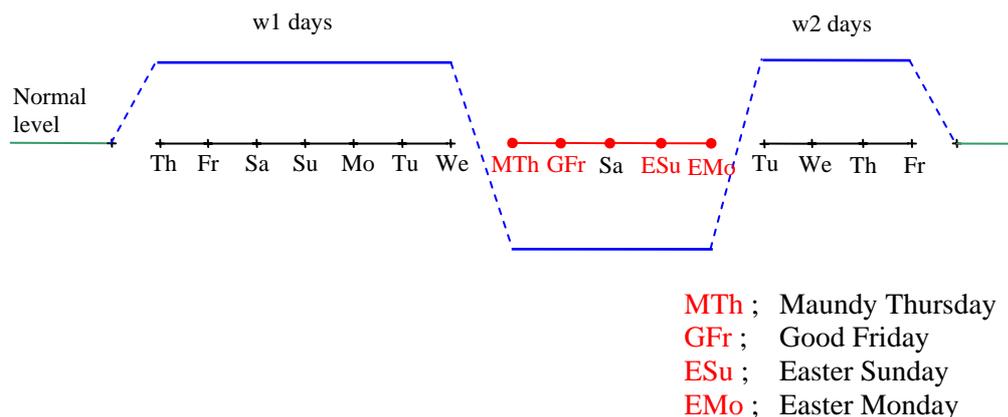
The index is adjusted for seasonal variations applying the X12ARIMA software package with non-fixed seasonal effects and multiplicative model.

Working day adjusted series are calculated for the turnover indices and the volume indices while seasonal adjusted series are calculated for the volume indices.

As a supplement to seasonal variations, a new method developed by Statistics Norway takes into account the effect of weekdays, fixed holidays as 1st and 17th May, Easter, Pentecost, Ascension Day and 1st New Year's Day. 24th to 26th of December is considered as seasonal variations in this model.

The new method also takes into account how sales in a period of days before ( $w1$ ) and after ( $w2$ ) the Easter holidays are affected. See Diagram 3.6.

**Diagram 3.6: Estimated periods before and after the Easter holidays.**



The length of these periods is estimated from the raw data for each of the three-digit sector levels. The method is also used for Ascension Day and Pentecost since they both are holidays with a non-fixed date.



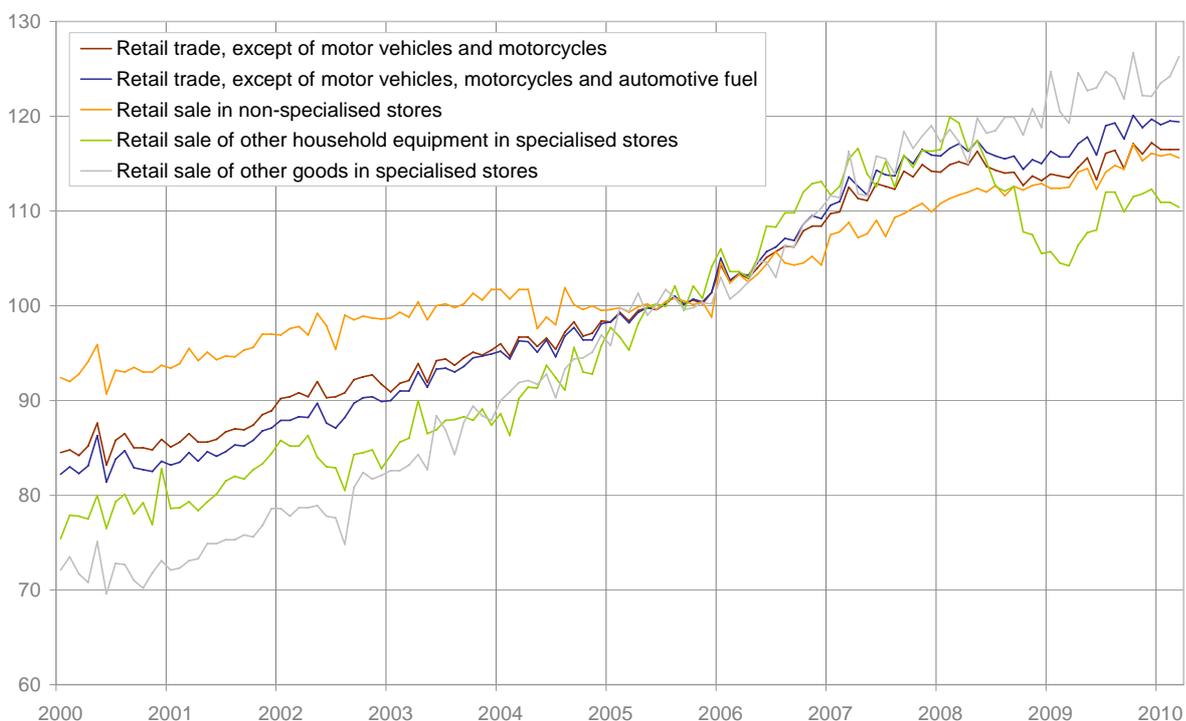
## 4. Results

The index of retail sales is compiled, according to Council Regulation No 1165/98<sup>9</sup> concerning short-term statistics, as a monthly unadjusted and working day adjusted value and volume index. In addition, a seasonally adjusted volume index is computed. We calculate indices at the national level only for all NACE sector levels, but only for certain industries at four- and five-digit sector level.

The figures are released on [http://www.ssb.no/doi\\_en](http://www.ssb.no/doi_en) and in Statistics Norway's statistical database *Statbank*<sup>10</sup>, usually on the 29<sup>th</sup> or the 30<sup>th</sup> of the following month. Reporting to Eurostat, the statistical office of the European Union, happens simultaneously.

From the implementation of the new Standard Industrial Classification (SIC 2007) in 2009, we also publish an index for retail trade that includes retail sale of automotive fuel. The new series is computed back to 2000 (Diagram 4.1), while the former series (SIC 2002) has figures back to 1979.

**Diagram 4.1: Seasonally adjusted volume index for retail trade. 2005=100**



Source: Statistics Norway, Statbank table 07129: Index of retail sales<sup>11</sup>

From January 2000 to March 2010, Norway's retail trade volume, except of motor vehicles, motor cycles and automotive fuel, rose significantly, by over 45 per cent. It rose a little more than the retail trade volume that includes retail sale of automotive fuel.

When comparing the development at different NACE three-digit sector levels (Diagram 4.1), we see that the retail sale volume in non-specialised stores grew relatively slowly, but steadily, during the past decade. On the contrary, the retail sale volume of other household equipment in specialised stores rose more significantly from 2000 to 2007, but fell considerably in 2008.

When comparing to the 27 EU member states' average seasonally adjusted volume growth for retail trade, except of motor vehicles and motorcycles, in the past decade, Norway's growth was considerably stronger, especially during the past four years (Diagram 4.2).

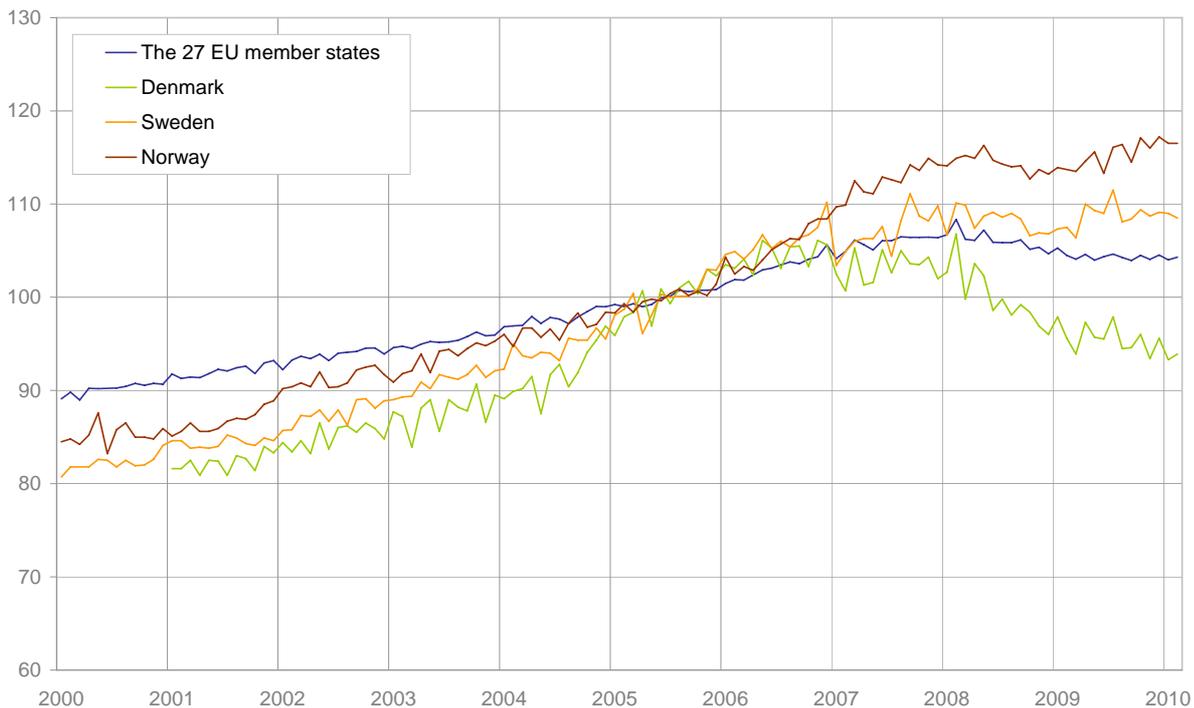
<sup>9</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998R1165:20090807:EN:PDF>

<sup>10</sup> <http://statbank.ssb.no/statistikbanken/?PLanguage=1>

<sup>11</sup> [http://www.ssb.no/tabell/07129\\_en](http://www.ssb.no/tabell/07129_en)



**Diagram 4.2: Seasonally adjusted volume index for retail trade, except of motor vehicles and motor cycles. 2005=100**



Source: Eurostat<sup>12</sup>

## 5. Comparisons with other statistics

### 5.1.1. Index of household consumption of goods

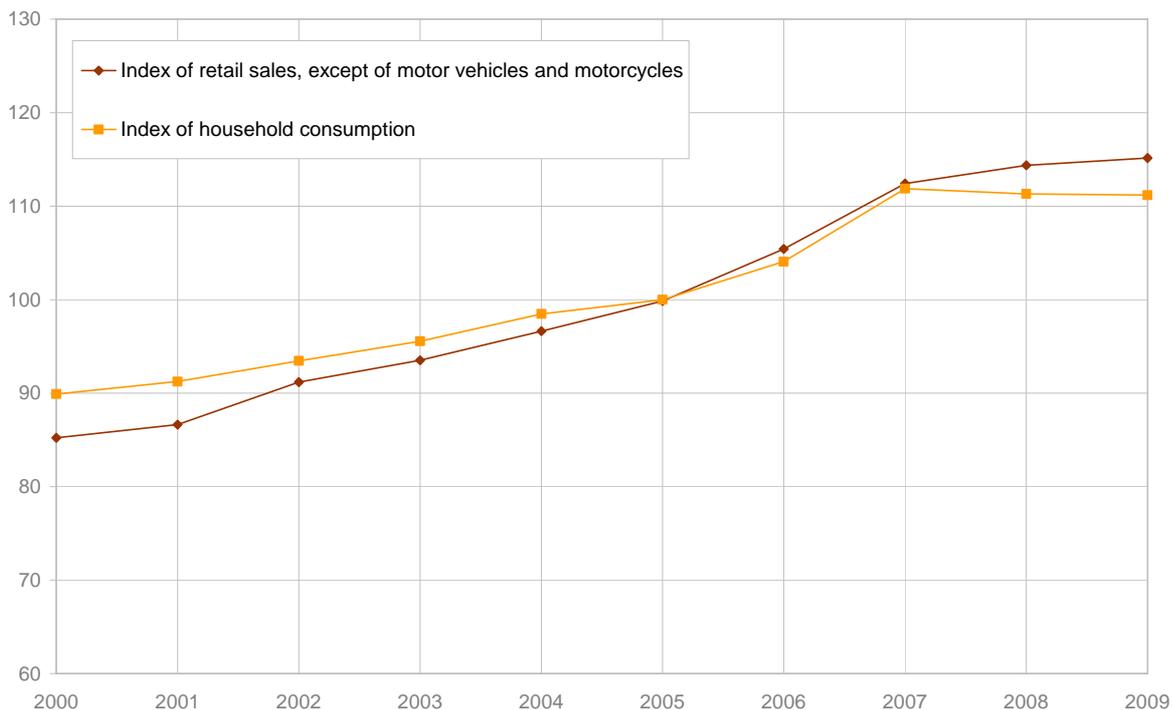
The index of household consumption of goods<sup>13</sup> is compiled by Statistics Norway's Division for National Accounts. This monthly volume index goes back to 1998. It describes the development in household consumption, while the index of retail sales measures the development in retail sales. Compared to the index of retail sales, the index of household consumption of goods has a wider selection of goods. The calculation of the index of household consumption of goods is based on information from the index of retail sales, plus purchases of cars (initial registration) and consumption of electricity and heating fuels. This may result in deviations in the development of the two indices.

<sup>12</sup> [http://epp.eurostat.ec.europa.eu/portal/page/portal/short\\_term\\_business\\_statistics/data/database](http://epp.eurostat.ec.europa.eu/portal/page/portal/short_term_business_statistics/data/database)

<sup>13</sup> [http://www.ssb.no/vki\\_en/](http://www.ssb.no/vki_en/)



**Diagram 5.1: Index of retail sales and index of household consumption. Seasonally adjusted volume index. 2005=100**



### **5.1.2. Structural statistics for wholesale and retail trade and bimonthly wholesale and retail sales statistics**

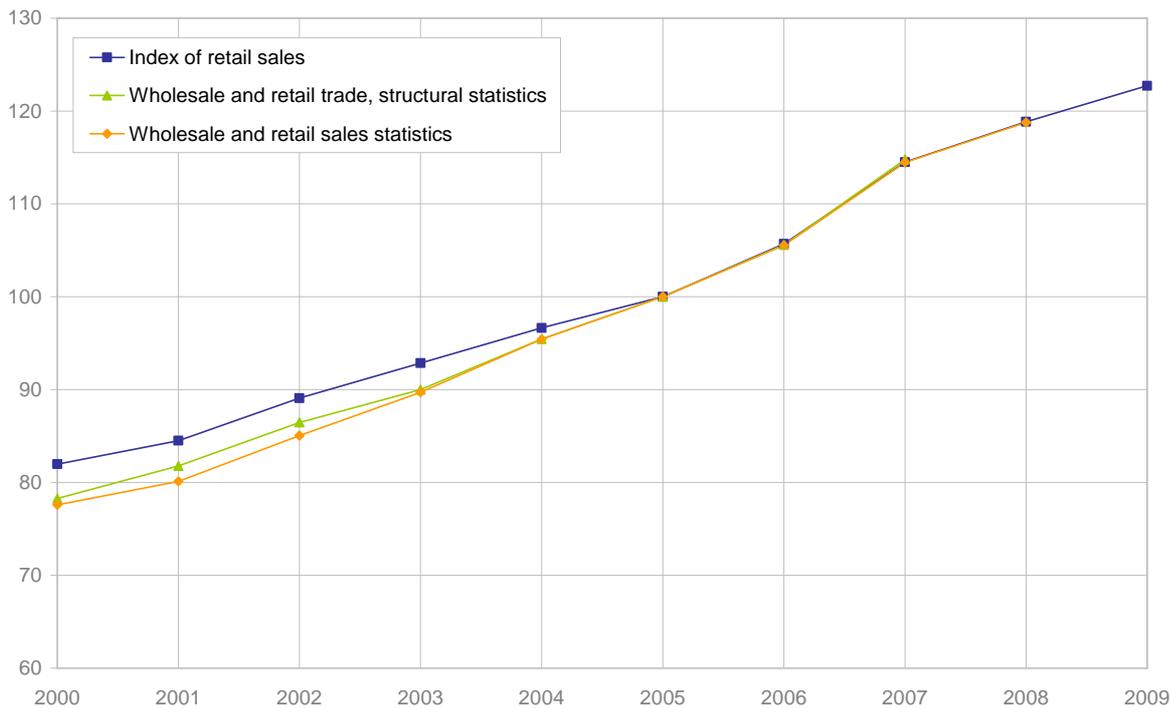
The population for Division 47 in the structural business statistics<sup>14</sup> and the bimonthly wholesale and retail sales statistics<sup>15</sup> are the same as the population of the index of retail sales, only the bimonthly statistics do not include local kind-of-activity units with a turnover below NOK 50 000. While the bimonthly statistics are solely based on data from the VAT register, the structural business statistics also use information from Trading Statements, Annual Company Reports and survey data. When converted to indices, turnover figures for Division 47 in the structural business statistics and the bimonthly turnover statistics can be compared with the retail sales value index (Diagram 5.2).

<sup>14</sup> [http://www.ssb.no/stvareh\\_en](http://www.ssb.no/stvareh_en)

<sup>15</sup> [http://www.ssb.no/vroms\\_en](http://www.ssb.no/vroms_en)



**Diagram 5.2: Retail trade, except of motor vehicles, motorcycles and automotive fuel. Index of value. 2005=100**



In recent years, the development of the value index of retail sales has been more consistent with the development of the structural business statistics and bimonthly turnover statistics (Diagram 5.2). This is mainly because the chain stores and the retail stores in the sample gradually covered a greater share of the population's turnover. In the beginning of 2010, their share was approximately 80 per cent of the turnover of the population, while the sample only covered around 40 per cent before we started collecting turnover figures from chain stores in 1999. More up to date and better quality of data in Statistics Norway's Register of Establishments and Enterprises has contributed to the more correct estimation of the index of retail sales too.

## 6. Improvements

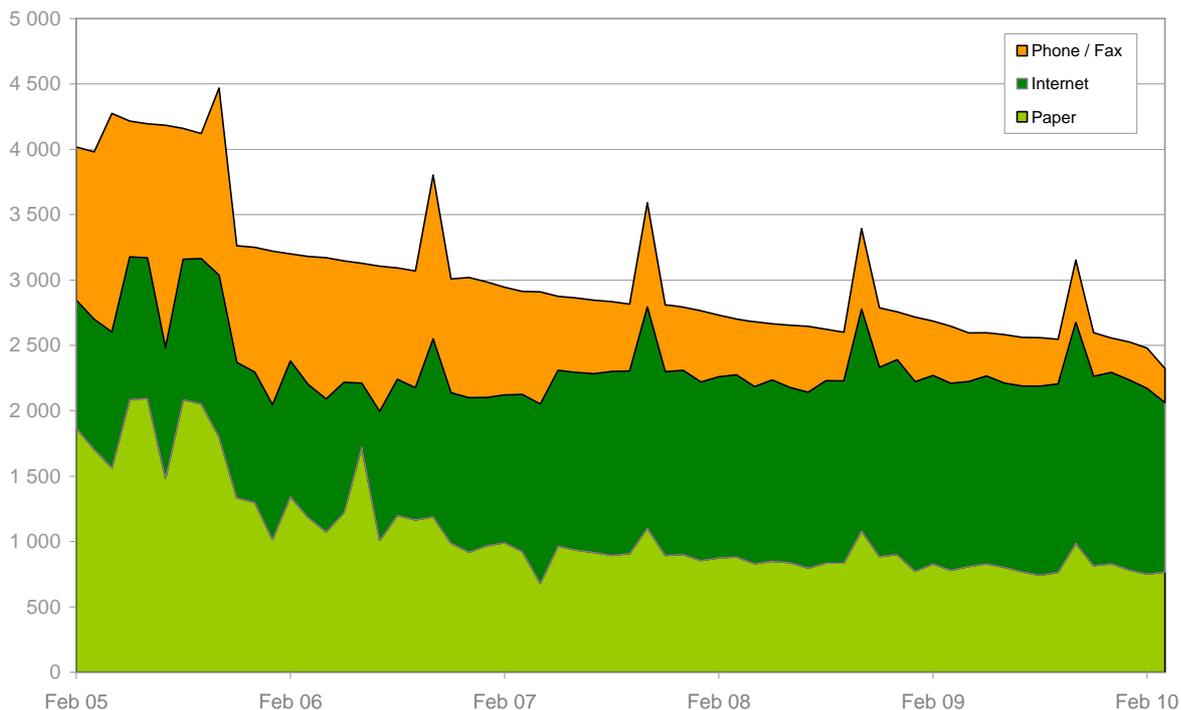
### 6.1. Methods of data collection

#### 6.1.1. Internet-based reporting

Internet-based reporting was introduced to the sample of identical units in 2002, and it has steadily grown in popularity (Diagram 6.1). In February 2010, over half of the respondents reported turnover figures via the Internet. In the same period, 30 per cent answered via mail and 13 per cent via phone or fax. On the contrary, three quarters of all respondents answered via mail (46%), phone or fax (29%) in February 2005.



**Diagram 6.1: Reporting method for sample units**



Internet-based reporting contributes to preventing measurement and processing errors. Arithmetic and logical operators check the responses for errors and lack of internal consistency while the questionnaires are being registered on the Internet. Not only does this reporting method contribute to better data quality, it also saves registration work for the statistical office.

From 2011, head offices of chain stores will be able to deliver turnover data more securely, via an internet portal.

### **6.1.2. Phone-based reporting**

In order to make the data collection process even more efficient, the units in the sample will be given the option to report turnover figures digitally to a phone answering machine instead of to personnel at the statistical office. At present, this solution is in the planning phase.

## **6.2. NorSamu - Coordinated drawing of samples for economic surveys**

Since October 2009, we are using the application NorSamu to rotate the sample of identical units of the retail sales index. It has been developed by Statistics Norway to coordinate the drawing of samples for economical surveys. The system is designed to assure transparency, righteousness and predictability in regards to the total burden of economical surveys on enterprises and establishments. The principles are (Zhang 2010):

- Among similar units, there must be a common speed of rotation in all structural surveys and a common speed of rotation in all surveys for short term statistics:
  - Where possible, a unit shall take part in a structural survey for two years in a row, and for four years in a row in surveys for short term statistics.
  - Where possible, a period of taking part in a statistical survey shall be followed by a period of rest.
- Over time, the expected relation between the amount of years of participation and rest shall be the same for all similar units.



### 6.3. ISEE - Integrated System for Editing and Estimation

“The development of generalized systems for statistical data processing is an important measure undertaken at Statistics Norway, in order to achieve the strategic goals it has set for statistical production. A basic principle is to simplify, to improve and to re-use the production processes. The implementation of the various generalized systems aims to provide more efficient use of resources, greater flexibility in production means, as well as better quality insurance. Integrated System for Editing and Estimation (ISEE) is such a generalized system. [...] The key feature is the complete integration of editing and estimation processes. For instance, inside the ISEE it is possible to examine instantly the final estimate of a population total due to any changes made to the data. One is thus in a much better position to implement the so-called top-down approach to editing (e.g. Grankvist and Kovar, 1997; Grankvist, 1997). However, in its present form the ISEE has its primary applications in processing of business sample surveys, where it is being used in the production of about 60-70 statistics.” (Zhang 2009)

The ISEE consists of three core applications, of which two are currently being implemented in the production of the retail sales index. The first is an application for microdata editing, called Dynarev. The second is Struktur, a SAS-based application that can predict totals and the uncertainty of totals in sample surveys, in addition to making statistical checks as the basis for revision. The program can calculate several robust variance estimates, parameter estimates, an aggregation of variables within strata, weights or inflation factors and predicted values for the statistical variable of units outside the sample. Moreover, it can make regression diagnostics that reveal which units have a big influence on the estimates. If desired, the analyses can be presented graphically too.

## 7. Summary

The index of retail sales – one of Statistics Norway’s many statistics within wholesale and retail trade - describes the monthly development in the value and the volume of retail trade, except of motor vehicles and motorcycles (SIC2007:47). It is regarded as an important short-term indicator of consumer demand and, consequently, used extensively.

From 1936 to 1970, the index was produced based on turnover tax data. It had become of fairly high quality when a value added tax replaced the turnover tax and Statistics Norway had to start producing a retail sales index based on survey data. The quality of the new index was not as good, but has improved greatly over the years, especially due to the collection of data directly from head offices in the past decade.

Turnover figures from head offices of chains are collected as a full count. In addition, we collect turnover figures from a sample of identical units and inflate them to population level in each stratum, with a ratio estimator. The turnover of newly established units is estimated based on how much newly established units made compared to identical units in the same period in the previous year. Based on the aggregated turnover for these three subpopulations at a NACE sector level, we can calculate value indices.

The index is published with 2005 as index reference period and last October as basis period. Thus, the sample is rotated annually, with a periodicity of four years. A stratified drawing plan is made up for every year, but units with less than NOK 150 000 in the second term of the Wholesale and Retail Sales Statistics are excluded from the drawing process. Large establishments have a bigger chance to be drawn.

Volume indices at NACE four-digit sector level are calculated by deflating value indices directly by means of the price index for retail sales. Working day adjusted series are calculated for the turnover indices and the volume indices while seasonal adjusted series are calculated for the volume indices.

In the past decade, Norway’s retail trade volume, except of motor vehicles and motor cycles, has grown significantly, and at a stronger rate than the average retail trade volume of the EU member states. As information from the index of retail sales is used in the calculation of the index of household



consumption of goods, the two can be compared, but they may deviate from each other because of the wider selection of goods in the last. The annual development of the value index of retail sales has, in recent years, been fairly consistent with the development in the structural and bimonthly statistics, mainly due to the increase in turnover coverage of the sample and the chain stores in the past decade.

Several generalized systems have been and are currently being implemented in the production of the retail sales index, e.g. systems for the coordinated drawing of samples, digital data collection via the Internet and the telephone, micro data editing and the prediction of totals in sample surveys. The first mentioned system contributes to transparency, righteousness and predictability in the total burden of economical surveys on enterprises and establishments, while the others aim at more efficient use of resources, greater flexibility in production means, as well as better quality insurance.

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## Appendix A: Example of an Internet-based questionnaire for data collection from the sample of identical units

**Statistisk sentralbyrå**  
Statistics Norway

Du er logget inn som \_\_\_\_\_ og rapporterer for \_\_\_\_\_, avdeling, org.nr. bedrift

Side 1 av 1 Tall sendt 12.04.2010

### Detaljomsætning

**Hvor stor var omsetningen i mars 2010?**

1000

Excluding VAT  
VAT  
Including VAT

How big was the turnover in March 2010?

Excluding VAT  
VAT  
Including VAT

Eksklusiv merverdiavgift  
Merverdiavgift  
Inklusiv merverdiavgift

### Merknad

Send skjema Lagre skjema

Statistisk sentralbyrå(c)

**Om knapper/ feilmeldinger**  
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**Logg ut**

**Aud Midtsundstad**  
Tlf: 62 88 54 31  
Faks: 62 88 54 62  
adm@ssb.no

**Karin Solbakken**  
Tlf: 62 88 54 33  
Faks: 62 88 54 62  
kso@ssb.no



## Appendix B: Detailed structure of Division 47 Retail trade, except of motor vehicles and motorcycles in NACE rev. 2

30.12.2006

EN

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L 393/19

Division	Group	Class	n.e.c. : not elsewhere classified	* part of	
				ISIC Rev. 4	
47	46.9		Non-specialised wholesale trade		
		46.90	Non-specialised wholesale trade	4690	
	47.1		Retail trade, except of motor vehicles and motorcycles		
			Retail sale in non-specialised stores		
		47.11	Retail sale in non-specialised stores with food, beverages or tobacco predominating	4711	
		47.19	Other retail sale in non-specialised stores	4719	
		47.2		Retail sale of food, beverages and tobacco in specialised stores	
			47.21	Retail sale of fruit and vegetables in specialised stores	4721*
			47.22	Retail sale of meat and meat products in specialised stores	4721*
			47.23	Retail sale of fish, crustaceans and molluscs in specialised stores	4721*
			47.24	Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores	4721*
			47.25	Retail sale of beverages in specialised stores	4722
			47.26	Retail sale of tobacco products in specialised stores	4723
	47.29		Other retail sale of food in specialised stores	4721*	
	47.3		Retail sale of automotive fuel in specialised stores		
		47.30	Retail sale of automotive fuel in specialised stores	4730	
	47.4		Retail sale of information and communication equipment in specialised stores		
		47.41	Retail sale of computers, peripheral units and software in specialised stores	4741*	
		47.42	Retail sale of telecommunications equipment in specialised stores	4741*	
	47.5	47.43	Retail sale of audio and video equipment in specialised stores	4742	
			Retail sale of other household equipment in specialised stores		
		47.51	Retail sale of textiles in specialised stores	4751	
		47.52	Retail sale of hardware, paints and glass in specialised stores	4752	
		47.53	Retail sale of carpets, rugs, wall and floor coverings in specialised stores	4753	
		47.54	Retail sale of electrical household appliances in specialised stores	4759*	
		47.59	Retail sale of furniture, lighting equipment and other household articles in specialised stores	4759*	
		47.6		Retail sale of cultural and recreation goods in specialised stores	
	47.61		Retail sale of books in specialised stores	4761*	
	47.62		Retail sale of newspapers and stationery in specialised stores	4761*	
	47.63		Retail sale of music and video recordings in specialised stores	4762	
	47.64		Retail sale of sporting equipment in specialised stores	4763	
	47.65		Retail sale of games and toys in specialised stores	4764	
	47.7			Retail sale of other goods in specialised stores	
		47.71	Retail sale of clothing in specialised stores	4771*	
		47.72	Retail sale of footwear and leather goods in specialised stores	4771*	
	47.7		Retail sale of other goods in specialised stores		
		47.71	Retail sale of clothing in specialised stores	4771*	
		47.72	Retail sale of footwear and leather goods in specialised stores	4771*	
		47.73	Dispensing chemist in specialised stores	4772*	
		47.74	Retail sale of medical and orthopaedic goods in specialised stores	4772*	
		47.75	Retail sale of cosmetic and toilet articles in specialised stores	4772*	
		47.76	Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores	4773*	
		47.77	Retail sale of watches and jewellery in specialised stores	4773*	
		47.78	Other retail sale of new goods in specialised stores	4773*	
		47.79	Retail sale of second-hand goods in stores	4774	
		47.8		Retail sale via stalls and markets	
	47.81		Retail sale via stalls and markets of food, beverages and tobacco products	4781	
47.82	Retail sale via stalls and markets of textiles, clothing and footwear		4782		
47.9	47.89	Retail sale via stalls and markets of other goods	4789		
		Retail trade not in stores, stalls or markets			
	47.91	Retail sale via mail order houses or via Internet	4791		
	47.99	Other retail sale not in stores, stalls or markets	4799		