

*Country-stratified European Sample for
Retail Trade Index - Finland*

Final report

Subject: Community grants in the field of short-term statistics

Re: Grant agreement between the European Community and Statistics Finland – Tilastokeskus under the contract **Eurostat nr. 2002 44401 014**

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1. Introduction

The Council regulation concerning short-term statistics (No 1165/98) requires the Member States to transmit the retail trade turnover to Eurostat within two months after the end of the reference period. Proposed by the FROCH Group and endorsed by the SPC in May 2002, the Member States made their commitments on developing 19 principal European economic indicators, one of them being turnover index for retail trade. The EU target release delay was set to 30 days and in October 2002, Finland committed to respect this aim as part of the European sample. In spring 2002, Commission announced subsidies for developing STS-indicators included in the PEEIs. Finland applied and received a grant for developing and speeding-up the retail trade index.

Finland set the target transmission delay to 27 days in order to allow few days for Eurostat for internal processing before publishing at 30 days delay. The classification groups for which data was requested were 5201 (= NACE 52 excl. 527), 5202 (= NACE 5211+522) and 5203 (= NACE 5212 +523 +524+525+526).

In order to implement this project Finland carried out various kinds of methodological and practical reformations in the compiling procedure so that the transmission delay could be cut from T+52 to T+27 keeping at the same time the quality of the T+27 compiled index as high as in preliminary indices. The project started in the case of Finland in March 2002 and was completed by the end of 2003. Finland applied for a grant for the period of September 2002 - December 2003.

The first delivery of the European sample index took place June 30, 2003 (reference month May). Between July and December 2003, the monthly indices have been transmitted with a delay of 28–31 days. From the beginning of 2004, the delay has been cut to 27 days.

The structure of this report is following. Chapter 2. describes the schedule of this project. In chapter 3. it is described how the retail indices were compiled before this project. Chapter 4. is concerned with methodological issues. It outlines our index calculation and sampling methods. In addition, it describes two methodological improvements that had to be developed during this project to sustain the good quality of the preliminary indices delivered T+27. In chapter 5. it is described what practical issues had to be solved to achieve the delivery delay of 27 days. In chapter 6. is evaluated the quality of the T+27 indices that have already been delivered to Eurostat for the reference months 05-12/2003. Last chapter 7. includes the conclusions.

2. Progress of the project

The implementation of this project was divided into preparatory and project phases. The preparatory phase lasted from January 2002 to August 2002. The project phase lasted from beginning of September 2002 to the end of year 2003. The project phase meant that from beginning of September 2002 a designated project team started the implementation of this project. A project management team was also formed to support the work of the project team.

In table 1. are described the different matters that were solved each month to implement this project.

Table 1. Schedule of implementation of this project

YEAR	MONTH	ACTION	DESCRIPTION
Preparatory phase			
2002	March	Determination of the new Finnish stratification by size classes based on Neyman sampling.	
	May-August	Monitoring of the number of enterprises responding in each of the strata considered by Eurostat for the quick estimate	chapter 3.3
	June-August	Planning the potential changes for the data collection phase.	chapter 5.3.3
	August	The project teams were formed and the problems and targets of this project were evaluated.	chapter 2.2
Project phase			
	September	Researching the impacts of different kind of weighting systems for stratified sample.	chapter 5.4.1
	September	Test-calculations using different sample structures and calculation methodological approaches.	chapter 4.1, 4.2 and chapter 5.2
	October-December	Co-operating in developing the electronic data collection system (=EDC). The aim was to encourage primarily the T+30 sub-sample firms to give their monthly turnover figures via internet. Over 70 % of the T+30 sub-sample firms give us their figures via internet.	chapter 5.3.1
2003	January – February	Negotiations with approximately 10 firms who were not willing or and not able to deliver their monthly turnover figures us T+17	chapter 5.3.3
	January	Creating weighting system and designing a client server application for managing the firms included in the T+30 sub-sample. Development of treatment of split-offs.	chapter 5.4.1 and 4.4.
	February	The changes for the calculation software were fulfilled. The base year was changed in all produced time-series to 2000. The same time the traditional calculation method was revised. The new method includes an assessment of the impact of enterprise start-ups and closures. The time-series are recalculated from the beginning of the year 2002. The new method can't be used in the case of preliminary data. It's used only in the case of comprehensive release T+75 when we have in use the VAT data from the tax administration.	
	March-May	Monthly test-calculations of indices T+30.	chapter 4.3
	April-May	The T+30 compiling process was integrated with the regular production of indices. The T+30 indices delivery via Stadium to Eurostat was integrated with the regular delivery. A result evaluation procedure was created to evaluate the quality of the delivered T+30 indices.	chapter 5.4.4
	June	The demanded negotiations with the representatives of the respondents to decrease the due day from T+22 to T+17 were held. The change was permitted.	chapter 5.3.3
	June	30.6 first delivery of the T+30 indices to Eurostat (reference month May)	chapter 6. Evaluation of the T+30 indices
	June-July	We became aware that including the effect of the start-ups and closures in the comprehensive release also induced a need to revise the calculation methodology of the preliminary indices. The needed change was made.	chapter 4.3
	July	30.7 second delivery of the T+30 indices to Eurostat (reference month June). The methodological improvement in the calculation of the T+30 indices was introduced.	chapter 6. Evaluation of the T+30 indices

YEAR	MONTH	ACTION	DESCRIPTION
	September	1.9 third delivery to Eurostat of the T+30 indices (reference month July).	chapter 6. Evaluation of the T+30 indices
	October	1.10 delivery to Eurostat of the T+30 indices (reference month August).	chapter 6. Evaluation of the T+30 indices
	October	28.10 delivery to Eurostat of the T+30 indices (reference month September).	chapter 6. Evaluation of the T+30 indices
	November	28.11 delivery to Eurostat of the T+30 indices (reference month October).	chapter 6. Evaluation of the T+30 indices
	December	30.12 delivery to Eurostat of the T+30 indices (reference month November).	chapter 6. Evaluation of the T+30 indices
	November-December	A specific sample updating program for the T+30 sample was developed.	chapter 5.4.2
2004	January	The delivery delay was cut to T+27 from beginning of year 2004.	

3. Traditional compilation of retail trade statistics (=before the project started)

Statistics Finland's short-term statistics in retail trade fulfil the requirements enacted in EU's regulation concerning short-term statistics (No 1165/98).

3.1 Practise before the project

The retail trade turnover index is published once a month. The first release (preliminary) and the consequent releases (comprehensive) differ from each other mostly by the data source used and by the published activity detail. The preliminary release (published around T+52 days) is based solely on a sample and it includes the largest enterprises measured by turnover. The comprehensive release (published around T+82 days) is based on administrative (VAT, value added taxation) data complemented by survey data.

The sample data is collected monthly. In addition Finnish tax authorities deliver us the value-added tax data monthly. This value added tax data becomes **comprehensive** after a delay of eight months (after the reference month) as the material from the tax records is being completed and revised. The monthly calculated indices do not alter due to changes in VAT data after this delay. The direct inquiry data is comparable with the administrative data.

The variable under consideration is turnover excluding VAT. We compile and publish price-, value- and volume indices of trade. Price indices based on COICOP classification are used in compiling volume indices.

3.2 Sample structure and methodology

The only stratification criteria in our sample is the activity class. Retail trade (excl. NACE 52.7) is divided into 19 sub-industries (some equal to NACE 3- or 4- or national 5-digit classes and some are regroupings).

The largest units measured by turnover within each strata are selected to the sample. The size threshold varies among classes. The small enterprises (relative to activity classes examined) are not surveyed at all.

The main statistical unit used is the enterprise (which is equal to legal unit in our case). However, few large enterprises have been divided into kind-of-activity units on which data is collected and compiled. In retail trade the total sample size is 329

enterprises and 36 kind-of-activity units. The sample size and coverage is described in further detail in table 2.

Table 2. Coverage and sample size of retail trade.

Published industries in Finland	NACE 2002	coverage %	sample size
Retail sale of food in non-specialised stores	52.11	51	46
Retail sale of food in specialised stores	52.2 exc. 52.25	13	14
Retail sale of alcoholic and other beverages	52.25	100	1
Retail sale of daily consumer goods	52.11 +52.2	56	61
Retail sale in department stores	52.12	89	31
Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	52.3	14	18
Retail sale of textiles and clothing	52.41+52.42	51	29
Retail sale of footwear and leather goods	52.43	8	14
Retail sale of furniture, lighting equipment and household articles	52.44	42	17
Retail sale of electrical household appliances and radio and television goods	52.45	22	21
Retail sale of hardware, paints and glass	52.46	23	29
Retail s. of books, newspapers and stationery	52.47	72	20
Retail sale of photographic equipment; photography services	52.485	45	36
Retail sale of optical goods	52.486	4	10
Retail sale of jewellery, watches and clocks	52.487	14	15
Retail sale of sports and leisure goods, and boats and boating accessories	52.488, 52.491	25	20
Retail sale of computer hardware, telecommunication equipment and office machinery	52.492, 52.493	29	16
Other retail sale	52.481-84, 52.494-99	25	13
Retail sale via mail order houses and net commerce	52.61	80	10
Retail sale via stalls and markets and second hand goods in stores	52.50,52.62,52.63	4	5
Retail trade without sale of daily consumer products*	52.12 + 52.3 to 52.6		304
Retail trade	52.1 to 52.6	55	365

* not published in Finland

Sample size refers to the number of enterprises included in each sub-industry.

Coverage % relates to the share of turnover in each sub-industry.

The preliminary results (T+52 days) are published, however, only for three classes: retail trade (NACE 52 excl. NACE 52.7), retail sale of daily products (NACE 5211 + 522) and retail sale in department stores (NACE 5212). The comprehensive release (T + 82 days) is published for retail trade as a whole (excl. 52.7) and for the 19 classes used in the stratification.

When the preliminary figures are being published (T+52) approximately 47 % of total turnover in division 52 (excl. 52.7) is covered. At the time of comprehensive release (published T+82) our data includes 93 % of the total turnover. After a delay of 112 days 97 % of total turnover is covered and after 142 days the data is exhaustive.

Approximately 55 % of total turnover (= 365 enterprises) in division 52 (exc. 52.7) is included in the survey. The year-on year change percentage is revised in average by 0.7 % when indices based mainly on VAT data are published monthly.

Approximately 56 % of total turnover (= 61 enterprises) in division NACE 52.11+52.2 is included in the survey. The year-on-year change percentage is re-

vised in average by 1.0 % monthly when compared to the publication from VAT data.

Approximately 89 % of total turnover (= 31 enterprises) in division NACE 52.12 is included in the survey. The year-on-year change percentage is revised in average by 2.0 % when indices based mainly on VAT data are published monthly.

Attention is paid to changes in structural features in the sample target population. The sample is updated several times a year. Imputation methods or treatment of non-response are not used.

3.3 The data collection process before the project

In this chapter it is described our data collection process during the period 11-12/2001. Delays and response rates given are calculated as an average of reference months of November and December 2001.

Eleven days after the reference month (T) questionnaires were send by post to all enterprises included in the sample. The first answers were received T+15 days. The first due day was T+21 and the response rate was then 42%.

About 60 % of the enterprises included in our sample had answered at T+26 when postal reminders were send to the unresponded enterprises. The second due date was T+34 and the response rate rose at that point of time to 60%

Telephone reminders were carried out at T+35. When the calculation procedure began approximately 86 % of the enterprises included in the sample had responded. Table 3. illustrates the accumulation of data.

Table 3. Preliminary release, events and response rates, ref. months 11-12/2001

Event	Delay from the end of the reference month	Response rate (measured as number of enterprises)
Sending of questionnaires	T+11 days	–
Due date	T+21 days	42 %
Sending of reminders	T+26 days	60 %
Due date of reminders	T+34 days	71 %
Contacts by telephone	T+35 days	
Start of calculation	T+41 days	86 %
Publishing	T+52 days	–

3.4 Calculation procedure before the project

In the first step of the calculation process the year-on-year changes are calculated for every 19 sub-industry and the turnover indices of previous year's corresponding month are multiplied with the obtained changes. In the next step NACE aggregate level indices are formed by weighting the calculated indices of sub-industries with coefficients. The weight-coefficients are defined so that the turnover of each sub-industry is divided with the turnover of the whole 2-digit class. The coefficients have been calculated in advance from the year 2000 tax authorities' records and they will stay constant.

Until the end of 2002 the calculation was based only on panel method that uses information from the enterprises that have data on a reference month and on the same month year before.

As of the beginning of 2003, the calculation will still be mainly based on estimations of change, but the impact of enterprise start-ups and closures has been in-

cluded to the calculation of retail trade indices. This impact can be calculated provided the data on value added tax are available for the statistical reference month concerned.

Because preliminary data can only be calculated from the information collected by Statistics Finland directly from enterprises, the estimations of changes method will continue to be used in calculation of preliminary data, whereas calculations of final, revised data will take into account the impact of enterprise start-ups and closures.

4. Methodological background and improvement

4.1 Index calculation

As opposed to most participating NSIs', Statistics Finland calculates turnover indices using estimation of change rather than level estimation. The basic index formula for the country stratified index is the same as the formula for preliminary figures:

$$i_t = \frac{T_{panel,t}}{T_{panel,t-12}} i_{t-12}.$$

Above t is time index and $T_{panel,t}$ is sum of turnovers in the panel, which is formed by selecting all continuing businesses from the sample, i.e. enterprises which have an observation for both the month in question and for the corresponding month of the previous year. Split-offs and mergers, and a certain type of outliers are treated specially. For the revised indices, we use a more sophisticated method, which also takes closures and start-ups into account.

To illustrate how the panel is formed, see the next table. Enterprises A and B have observations on both months t and $t-12$, so they are included in the panel. Enterprise C, on the other hand, has not reported its turnover for month t , so it's excluded from the panel.

<i>Firm</i>	<i>Turnover on month t</i>	<i>Turnover on month t-12</i>	<i>Status</i>
A	1 000 000	900 000	in the panel
B	20 000	0	in the panel
C	missing	50 000	not in the panel

As the data accumulates and enterprises like C report their turnover the indices will revise. The sign of the revision depends on whether the change in unaccumulated turnover is greater or less than the change in accumulated turnover. In practice we have not detected any bias in our indices, so the assumption that the change in panel depicts also the change in the enterprises outside the panel, seems correct.

The change estimation method has been very efficient considering accuracy vs. sample size. This is possible mostly because of the VAT data. Since we have almost a total data for all months prior to $t-6$, the indices for those months have no error due to sampling. Therefore, all error in the index calculation for preliminary figures is caused by error in estimating the change. Obviously, change estimation is "easier" than level estimation, so the number of observations required to reach a given accuracy is reasonably low.

4.2 Sampling

The sample for the country stratified index is a sub-sample of the large enterprise sample for trade. Because of the index calculation method, guidelines for sampling differ from the textbook sampling scheme. Denoting $i_{panel,t}$ as the index based on the sample and $i_{total,t}$ as the index based on fully accumulated data, the formula for proportional error of the index $i_{panel,t}$ can be calculated using the next formula:

$$e_{panel,t} = \frac{i_{panel,t}}{i_{total,t}} - 1 = (1 - c_{panel,t}) \left[\frac{g_{panel,t}}{g_{total-panel,t}} - 1 \right]$$

Above $c_{panel,t}$ is sample's proportional coverage of the total turnover,

$g_{panel,t} = T_{panel,t} / T_{panel,t-12} > 0$ is proportional change coefficient calculated from the panel and $g_{total-panel,t} = (T_{total,t} - T_{panel,t}) / (T_{total,t-12} - T_{panel,t-12}) > 0$ is the unknown change coefficient of unaccumulated enterprises.

This means that accuracy of the preliminary index depend linearly on:

- The percentage of total turnover covered by the sample – a higher percentage gives better indices.
- The proportional difference of change of the sample enterprises from the change of the not sampled enterprises – the more differently enterprises outside the sample develop compared to the enterprises in the sample, the less accurate the index is.

Thus, when updating the sample, there are returns to scale, i.e. greatest gain in accuracy can be obtained by selecting the largest enterprises still left out of the sample. This explains the focus of our sample.

As we designed the implementation of the country stratified index, we did test our sampling and index calculation methods against possible alternatives, including level estimation in conjunction of stratified sampling with Neyman allocation. The current method performed best in each test.

For classes 5202 and 5203, we do not do any grossing up whatsoever – the indices are calculated directly from a panel formed from enterprises which are in each class. The class 5201 is grossed up from 5202 and 5203 using weights from the base year 2000.

This is a point, where a minor improvement might be possible. It's technically possible to gross up the indices even from the Finnish 5-digit extension to NACE 2002. Because the sample is not evenly distributed among different NACE classes, some classes may be slightly overweighted in the country stratified index. Grossing up the classes using e.g. changing weights from $t-12$ would be useful if this was a problem. However, currently we do not see this as a relevant issue.

4.3 Development of treatment of outliers

Because the country stratified index relies solely on the sample, new problems emerged in index calculation. First was the outlier problem. Lately some new enterprises have entered the Finnish retail trade market by opening several big stores. These enterprises have been growing rapidly and because they are in the sample, they tend to cause an upward bias to the index. This is because the outliers have too great weight in calculating the change for the entire industry.

We had to develop a method to reduce their weight. Solution was to utilise information on last year's total turnover to estimate how big influence the outliers would have if the data were fully accumulated.

First we calculate the outlier-clean index

$$i_{-O,t} = \frac{T_{panel,t} - O_t}{T_{panel,t-12} - O_{t-12}} i_{t-12},$$

where O_t is the turnover of the outliers in month t . After this, we make an assumption (a crucial one!) that the change $(T_{panel,t} - O_t)/(T_{panel,t-12} - O_{t-12})$ is roughly equal to the real proportional change of turnover in the whole sector, excluding outliers. That is: the "other" enterprises in the sample represent correctly the whole sector, excluding outliers.

Total outlier-clean turnover $T_{total,t-12} - O_{t-12}$ for the month $t-12$ is calculated. In general $T_{panel,t-12} \neq T_{total,t-12}$. This turnover is then inflated to month t by multiplying by the outlier-clean change. Outliers turnovers are added to both months and the index is recalculated using these figures. To sum up, in the presence of outliers:

$$i_t^* = \frac{\left(\frac{T_{panel,t} - O_t}{T_{panel,t-12} - O_{t-12}} \right) \times (T_{total,t-12} - O_{t-12}) + O_t}{T_{total,t-12} - O_{t-12} + O_{t-12}} i_{t-12}.$$

That is,

$$i_t^* = i_t + \frac{O_t - \left(\frac{T_{panel,t} - O_t}{T_{panel,t-12} - O_{t-12}} \right) O_{t-12}}{T_{total,t-12}} i_{t-12}.$$

We do not use any statistical methods to detect outliers. Rather, the person doing the data validation step simply assesses, which enterprises are influential and develop very differently compared to the other enterprises in the sector. Method has worked well; outlier correction was implemented in spring 2003 and it has reduced index revision notably.

4.4 Development of treatment of split-offs

The developing of the T+30 index caused also a problem which is sample related and is caused by split-offs.

In general, when enterprise A splits into B_1, \dots, B_n (which are not necessarily in the same NACE sector), the panel has to be formed so that for 12 months after the split-off, turnover for month $t-12$ is calculated for each B_i by dividing A 's turnover between the B_i 's. The explicit formula for this is

$$T_{B_i,t-12} = \frac{T_{A,t-12} T_{B_i,t}}{\sum_{i=1}^n T_{B_i,t}} = d_{B_i,t} T_{A,t-12}.$$

Again, the next table illustrates. Consider A , which splits into three parts, B_1, B_2 and B_3 .

<i>Firm</i>	<i>Turnover on month t</i>	<i>Turnover on month t-12</i>
B_1	30 000	$\frac{30\,000}{65\,000} T_{A,t-12}$
B_2	20 000	$\frac{20\,000}{65\,000} T_{A,t-12}$
B_3	15 000	$\frac{15\,000}{65\,000} T_{A,t-12}$

We use information from all the new parts to calculate each part's turnover for the previous year. This is a bit problematic, because when an enterprise in the sample splits into several enterprises, it's not always possible or even reasonable to include all parts in the sample. Since in the calculation of $d_{B_i,t}$ requires figures from *all* parts B_i , a missing $T_{B_i,t}$ makes it impossible to calculate previous years' turnover for *any* B_i , leaving enterprises outside the panel even if they have reported their turnover.

This problem is not really hard to solve, and it has been overlooked so far only because it has not had any serious effects. The rather good coverage of the VAT data and the sample for preliminary indices has allowed us to simply ignore the few missing enterprises, without having to be concerned about accuracy. Sometimes, we have had to estimate turnovers for the missing parts, but this has by no means been frequent. In the country stratified index however, where indices are calculated from a small sample, we cannot afford to leave any information unused. Thus a solution for the split-off problem was adopted within this project.

For those months, on which we have missing B_i 's, we use "old" coefficients to divide A 's t-12 turnover for enterprises, which have reported turnover. Specifically

$$T_{B_i,t-12} = \frac{T_{A,t-12} T_{B_i,s}}{\sum_{i=1}^n T_{B_i,s}} = d_{B_i,s} T_{A,t-12},$$

where $s < t$ and all $B_{i,s}$ are non-missing.

This way the previous year's turnovers will somewhat revise. However, we believe that the solution is rather good, at least often better than mechanically estimating the missing turnovers for month t . Of course, the solution will not work in all situations, and case-specific decisions will have to be made in the data validation step, as has been done before.

5. Production of retail trade index in 27 days

5.1 New practise

The monthly production and delivery of the retail trade index T+30 to Eurostat started in 06/2003. In the beginning the data was sent to Eurostat approximately in **31 days** after the reference month. The lag was cut from beginning of year 2004 to 27 days.

The classification groups for which data are send are as requested 5201 (= NACE 52 excl. 527), 5202 (= NACE 5211+522) and 5203 (= NACE 5212+523+524+525+ 526). Turnover and volume index series will be delivered as original and trading day adjusted. Volume index delivery includes additionally seasonally adjusted series and trend series.

The T+27 delivery includes only new information for the latest reference month under consideration. The adjusted index-series (=trading day adjusted, seasonally adjusted and trend) included in the delivery are compiled using only new figures for the latest reference month. But using the X11-procedure of course updates the whole adjusted time-series.

The preliminary results at T+27 are not published in Finland. Finland will only participate in the European sample of retail trade. From the beginning of 2004 the traditional preliminary release is published in Finland around 44 days after the reference month and the comprehensive release within a lag of 74 days. The preliminary release includes, as before, indices for three retail trade classes: retail trade (NACE 52 excl. NACE 52.7), retail sale of daily products (NACE 5211 + 522) and retail sale in department stores (NACE 5212). The comprehensive release includes, as before, new results for all 19 classes in retail trade.

5.2 Sub-sample structure

We have chosen a sub-sample of 127 enterprises from our total retail trade sample of 365 enterprises. In the sub-sample, 48 enterprises belong to retail trade of consumer goods (classification group 5202) and 79 enterprises to other retail trade (=5203). The enterprises chosen to the sub-sample are the largest enterprises of each branch measured by turnover.

The turnover indicator of retail trade (=5201) covers 51 % of total turnover in the total population. Classification groups 5202 and 5203 cover 57% and 43 % of total turnover.

The test calculations based on this sub-sample design were done at the end of year 2002. In the test calculations year-on-year changes were calculated both using the data of the enterprises belonging to our sub-sample and of all enterprises belonging to the value added tax data (=VAT) and the results were compared. The time-interval examined was 07/2001-06/2002. The value added tax data for this interval was **comprehensive**. The monthly calculated indices for this time-interval **do not alter** due to changes in data after the point of time the test calculations were made. The results of the test calculations are shown in table 4.

Table 4. Year-on-year changes (%) and revision in retail trade

Month	Sub-sample(%)	Final figures (%)	Revision(%)
07/01	6.8	7.1	-0.3
08/01	8.4	7.8	0.6
09/01	2.3	1.9	0.4
10/01	10.3	9.7	0.6
11/01	8.0	7.4	0.6
12/01	5.8	3.9	1.9
01/02	2.2	2.4	-0.2
02/02	6.5	5.9	0.6
03/02	1.7	1.9	-0.2
04/02	7.1	7.9	-0.8
05/02	6.7	6.5	0.2
06/02	1.5	1.3	0.2
Absolute value, average			0.5

The obtained results using the data of enterprises belonging to the sub-sample are very good. The year-on-year changes compiled using the T+30 sample do not systematically exaggerate or underestimate the real changes. The year-on-year changes compiled using the T+30 sample vary in average from the real figures 0.5 per cent points.

5.3 Data collection

5.3.1 Electronic data collection (=EDC)

An **electronic data collection** (=EDC) system which is based on internet technology was adapted within the duration of this project. Introducing EDC has effected the data collection process in following ways:

- the human resources needed in the data collecting process has declined
- data collection costs have decreased
- the quality of collected data has improved
- the response burden has reduced
- the data accumulation process has been sped up
- the non-response has decreased
- direct individual feedback for respondents has been enabled
- the respondents are able to browse their previously submitted data
- some overlapping collection has been removed.

The EDC is based completely on web based technology and use of EDC does not require any installation of new programs or new javascripts. The EDC consists of two different modules: user authentication and data collection system. User authentication is designed very carefully in the EDC. User profiles are maintained and each enterprise has own password and they are renewed often to ensure that the system is secure and that the confidentiality of data is ensured.

The data validation process is mainly done when the respondents fill out the Internet questionnaires. The browser checks that the turnover figures given by the respondents are reasonable. The respondent has also the possibility to browse previously supplied data. After the respondent have fed the data it's stored automatically to the database.

The EDC also asks respondents to inform us if there are some plans for restructuring (e.g. merging/demerging) in the enterprise for the near future. This has improved the quality of our produced indices. Almost up to date information of struc-

tural changes can be gained in retail trade. This is very important because of the fact that after joining EU, many foreign enterprises have entered the Finnish retail market. And on the other hand Finnish enterprises have merged to improve their competitiveness.

The EDC includes also a mass emailer. An external application was built with visual basic to send emails to the respondents. This replaces the usage of traditional letters and makes data collecting process very efficient.

When this new technology was introduced 40 % of our respondents started instantly to use this channel in giving their monthly turnover figures. After about six months 70% of the respondents included in the T+30 index sample have adopted this technology.

The feedback from respondents has been very positive: response burden has reduced remarkably. Persons involved in the data collection process have been very enthusiastic because the manual treatment of data has decreased at least by 50 %. In consequence the content of their work has developed. They are nowadays more involved in the compiling process of indices than before.

5.3.2 Data collection timetable in July 2003

Eight days after the reference month (T) questionnaires are sent by post to 30 % of the enterprises included in the sub-sample and by email to 70 %. The email reminds the contact person of the enterprise to fill out the enterprise's internet form and offers a direct link to the internet site.

In July 2003 the last answering day was T+21. At that point of time the response rate was 74 %. Email-reminders to the non-respondents were sent the next day. The response rate rose right away to 86 %.

The telephone reminder process started at T+25, and by that time the response rate was 88 % in July 2003. Our telephone reminders worked very efficiently and before the calculation process was ended (T+29) we were able to use the turnover figures of every enterprise included in our sub-sample.

Table 5. T+30 sample, events and response rates, reference month July 2003

Event	Time	Response rate (number of enterprises)
First answer	T+7	2%
Sending of questionnaires	T+8	3%
Due date	T+21	74%
Sending of email reminders	T+22	86%
Telephone reminders	T+26	94%
Starting of calculation	T+28	98%
Ending calculations(=firms included)	T+29	100%
Results are send to Eurostat	T+31	100%

The adoption of the EDC system has been very important in speeding up our data collection system. It has also released resources which are used in the extra telephone reminder process (T+26).

5.3.3 Speeding up data collection process

We anticipated that it is not possible to reach the scenario T+27 without decreasing the due date from T+22 to T+17. The demanded negotiation with the representatives of the respondents were held in June 2003. Their approval for decreasing the due date to T+17 was attained. The new due date T+17 was adopted in the beginning of year 2004. That enabled us to produce the retail trade indices in the needed 27 days.

During the year 2003 the due date was still T+22. As the speeding of data collection started there were 10 enterprises who refused in the beginning to give turnover figures in the timetable (T+21-22) needed. Six enterprises stated that they use a separate bookkeeping agency which produces and supplies the monthly turnover figures to the tax office and to Statistics Finland in a delay of T+40. Further they stated that they don't have themselves the possibility to compute the figures because of lack of knowledge and/or lack of human resources.

The remaining four enterprises claimed that they have an own accounting division but their own data collecting system can't be reformed so that they would be ready to give us the figures needed in a delay of T+21. They stated that in their industry they are themselves satisfied to have their own turnover figures in a delay of T+40. The representatives of all 10 enterprises referred to that the response burden of the enterprises should not be increased. Further they stated that they fulfil the legislation that obliges them to give monthly the value added tax declarations to the tax authorities in a delay of T+45.

We needed to negotiate with these enterprises. Statistics Finland has also the legal right to get the data needed to compile statistics and the enterprises are obliged to supply them. After long negotiations three enterprises of six who used a separate bookkeeping agency said that they are capable of supplying us turnover figures within a lag of T+25. The remaining three enterprises promised after negotiating with our director in charge to give us good estimations of their monthly turnover.

Of the four enterprises who had an own accounting division but could not supply the figures in time three promised to develop their own accounting procedure so that they are able to supply the figures in a delay of T+25. The remaining one enterprise promised to evaluate their situation and after three months informed us that they can give us a good estimate about their turnover in T+25.

The speeding up of the data collection process has also created new problems. Four to five enterprises included in the sub-sample are not able to give us the exact turnover figures in T+22. They give us first at T+22 an **estimation** of their monthly turnover and later at T+40 the **revised** one. This can cause additional revision.

5.4 Calculation procedure

5.4.1 Grossing up

When compiling indices for the **preliminary** (T+44) and **comprehensive** (T+74) releases the year-on-year changes are calculated for every 19 sub-industry and the turnover indices of previous year's corresponding month are multiplied with the obtained changes. Then the calculated indices of sub-industries are multiplied with weight-coefficients in order to get the NACE aggregate level indices. The coefficients are defined so that the turnover of each sub-industry is divided with the turnover of the whole 2-digit class. The coefficients have been calculated in advance from the year 2000 tax authorities' records and they will stay constant.

When we were designing the optimal grossing up for compiling the T+30 index we realised in test calculations that the grossing up procedure used in compiling preliminary and comprehensive indices is not the optimal choice for this system. Different possibilities were tested. As a conclusion it was found out that the optimal procedure is not to use the grossing up method at all when compiling indices for classes 5202 and 5203. But when attaining the index for whole retail trade 5201, previously calculated coefficients are used in grossing up the indices for classes 5202 and 5203. The coefficients are calculated in advance and they determine how big share classes 5202 and 5203 have of total retail trade 5201 in base year 2000. This was done for the reason that without grossing up the indices for classes 5202 and 5203 (to attain the overall index for retail trade) the enterprises included in the

T+30 sample in class 5202 would have had an overly huge impact to the overall index.

5.4.2 Updating the sample

A specific sample updating programs for the T+30 index were developed in December 2003. The program is run twice a year. The sample will be updated using this program.

The program tells the effect of each firm to the calculated year-on-year change per cent of each published class during the last year on monthly basis. It also calculates on the monthly level what share each firm has of the total amount of turnover of each class.

It also gives some background information of the firm which can be used in evaluating in which period in life cycle the enterprise is.

5.4.3 Data validation process

Approximately 70 % of monthly turnover figures in our T+30 sample are validated by the EDC system. When the respondents fill out the forms the system asks if there are any plans for restructuring in the enterprise's near future. Further if the entered new figures are very high or low compared to the historical data the respondent is asked to confirm the correctness of the new data.

We have also designed a client server application which informs the person compiling the T+30 indices if some of the respondents have written down any remarks of their enterprise. This way it is possible to react to structural changes timely.

30 % of the enterprises still supply their monthly turnover figures to us via email, letter or fax. These answers are handled right away and stored to the database when we receive them. If there are some structural changes happening we have enough time to contact the respondents and to solve the problems in the calculation procedure.

Also enterprises who deliver their monthly turnover figures to us the traditional way (=email, letter or fax) are asked on the inquiry-form to inform us if there are any plans for restructurings in the enterprise. They are also asked to inform us about other issues influencing their monthly turnovers (e.g. renovations) and making their given figures not comparable.

The calculation system can handle mergers, demergers or changes in the identifying codes of enterprises. The development of enterprises under structural changes do not need to be abolished from the calculation. But the enterprises included in a structural change are handled so that their turnover figures are after adjustment in the calculation program able to be compared before and after the incidence.

5.4.4 Delivery to Eurostat

All required indices compiled in Statistics Finland are Gesmes-coded and send centralised via Stadium to Eurostat. The department in charge used to want all indices supplied to them two days in advance in order to convert the indices to the form needed for sending them via Stadium to Eurostat.

After negotiations the process could be rationalised. Now the indices can be send to Eurostat during the same day of delivery. This was an essential improvement. Otherwise the scenario T+27 could not have been achieved.

It was also evaluated if we should build a new data stream for Stadium for the T+30 index or whether the same data stream could be used as is in use for the preliminary and comprehensive indices. We decided to use the same data stream to avoid confusion. In consequence Eurostat receives twice a month approximately T+27 and T+44 index-series associated to retail trade via the same data stream.

The T+27 delivery includes only new information for the latest reference month under consideration. The adjusted index-series (=trading day adjusted, seasonally adjusted and trend) included in the delivery are compiled using only new figures for the latest reference month. But using the X11-procedure of course updates the whole adjusted time-series.

The delivery T+44 includes updated new data for the reference month and comprehensive data for the six earlier months.

6. Revision

The first delivery of the retail trade index T+30 took place 30.6.2003. The revision figures of seven reference months 05-12/2003 are now available. The comprehensive year-on-year changes (%) are calculated using value added tax data where at least 97% of the total turnover in retail is included. There will be only minor changes in the comprehensive figures after this point of time. The calculated non-adjusted year-on-year changes are compared and the revisions are shown in tables 6a-6c.

Table 6a. Year-on-year changes (%) and revisions in retail trade (=5201)

Ref. month	T+30 index (%)	Comprehensive figures (%)	Revision real value (%)	Revision abs. value (%)	response rate %	delivery day
05/03	3.9	3.3	0.6	0.6	99	T+30
06/03	0.7	3.1	-2.4	2.4	97	T+30
07/03	5.3	4.4	0.9	0.9	99	T+32
08/03	6.4	5.5	0.9	0.9	100	T+31
09/03	4.1	4.2	-0.1	0.1	100	T+28
10/03	7.4	5.9	1.5	1.5	98	T+28
11/03	4.9	5.4	-0.5	0.5	97	T+30
12/03	2.1	4.2	-2.1	2.1	94	T+27
Average revisions			-0.2	1.1	98	

In retail trade the revision has been in average 1.1 %. The calculation methodology of the preliminary estimate was improved from starting of reference month July 2003. In the calculation procedure was included a treatment of outliers. The revisions don't have regularly a positive or negative bias.

As we see from the revision of the reference month 06/2003 the calculation methodology had to be improved after this point of time. We detected that some enterprises in the population had doubled their turnover from one month to another. In the sample they didn't anymore represent the population. When calculating the T+30 index for reference month 06/2003, these enterprises had to be dropped out from calculation. After this point of time we development an **outlier treatment** procedure. The outlier treatment is used for enterprises that are confronted by above mentioned incidences and in consequence they can be kept in calculation. After outlier treatment these enterprises represent their share of the population in the sample. This methodology is described in this report in chapter 4.3. After this treatment the revision has decreased considerably.

The high revision figures of December relates both to the factor of cutting the delivery delay to T+27 and that many recipients had to provide the same time data for the approval of the financial statements. Although the response rate was very high 95 % the effect of the firms who not provided us information to the calculated indi-

ces was significant. The year-on-year change rate would have been for December 2003 3.6 % if the response rate would have been 100 %. January 2004 the response rate rose again to 97 % though the deliver day was also T+27.

Table 6b. Year-on-year changes (%) and revisions in retail trade of consumer goods (=5202)

Ref. month	T+30 index (%)	Comprehensive figures (%)	Revision real value (%)	absolute value (%)	delivery day
05/03	2.0	2.7	-0.7	0.7	T+30
06/03	-0.6	1.1	-1.7	1.7	T+30
07/03	5.8	4.0	1.8	1.8	T+32
08/03	3.4	3.1	0.3	0.3	T+31
09/03	3.8	3.6	0.2	0.2	T+28
10/03	6.7	5.1	1.6	1.6	T+28
11/03	4.4	4.4	0	0	T+30
12/03	2.0	2.9	-0.9	0.9	T+27
Average revisions			0.1	0.9	

The revision figures for retail trade of consumer goods are very low after the outlier treatment was introduced in July 2003.

Table 6c. Year-on-year changes (%) and revisions in retail trade excluding consumer goods (=5203)

Ref. month	T+30 index(%)	Comprehensive figures (%)	Revision real value (%)	absolute value (%)	delivery day
05/03	5.5	4.3	1.2	1.2	T+30
06/03	1.8	4.1	-2.3	2.3	T+30
07/03	5.2	4.8	0.4	0.4	T+32
08/03	8.0	6.8	1.2	1.2	T+31
09/03	4.7	5.0	-0.3	0.3	T+28
10/03	7.9	6.4	1.5	1.5	T+28
11/03	4.8	5.5	-0.7	0.7	T+30
12/03	2.2	5.0	-2.8	2.8	T+27
Average revisions			-0.2	1.3	

In retail trade excluding consumer goods was the revision in average 1.3 %. Factors that caused the high revision figures for June and December 2003 are described earlier in this chapter.

7. Conclusions

Objectives of the project

In the grant agreement of the project (No 2002 44401 014) the expected result of the project was defined as a statistical production system which enables the production of the retail trade index in 30 days using the sample design and reaching the precision level which is required by Eurostat. Further, it was mentioned that Finland is going to participate in the country-stratified European sample which will be fulfilled by the end of 2003.

The project plan included following main items:

- sampling
- managing of the sample, especially getting the responses in due course
- assessment of the possible changes needed in the data collection and reminder procedure
- carrying out the needed changes in the data collection and reminder procedure
- development of the weighting system
- development of the calculation procedure

- monthly calculation of the indices
- evaluation of the results.

Implementation of the objectives

The production system of the T+30 retail trade index has been developed and implemented. The regular production and transmission to Eurostat started in June 2003. The time delay reached in January 2004 which will continue is even shorter than was the objective, 27 days instead of 30 days.

Finland implemented a sub-sample of the traditional sample in retail trade for the country-stratified European sample. The quality of the index measured by revisions is considered good. The project has carried out all the main tasks defined in the agreement.

Statistics Finland considers the project finalised, since all the objectives are met and all the tasks have been carried out.