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Evaluation study of the 1990 Census

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Preface

The 1990 population and housing census was carried out for the first time entirely on the basis of existing register data, without any inquiries posted to the population. In connection with the census the same data sets were collected in a sample survey using questionnaires. This report compares the findings of the register-based census and the questionnaire survey.

The study was carried out by Jorma Heimonen. Planning and design of computer analysis was by Raija Kannusmäki. Arto Ilander, Harri Kananoja, Marita Oksman, Ilkka Ripatti, Riitta Rosenberg, Anne Sipiläinen and Raija Tikkanen took part in data analysis; in addition, Leo Kostiainen was involved in the analysis of housing data. Virtually all interviewers from Statistics Finland were engaged in data collection.

Helsinki, September 1994

Aarno Laihonen

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1 Introduction

The purpose of this study is to look at how census statistics were affected by the introduction of a register-based census method. With this method any errors in the registers employed will be repeated in the statistics compiled. It follows that this study also describes the quality of the registers used and the amount of errors they contain.

The registered-based census is far more economical than the old method. With the new system it is no longer necessary to send out millions of questionnaires for people to fill in; to motivate people to reply to census questionnaires; to handle and record data from millions of questionnaires; or to recruit temporary staff to complete the census.

There is no major difference between the two methods in terms of the time it takes to generate the necessary information; in both cases the time required is from one to two years. The explanation is that completion of the registers used in the register-based census (such as those on taxation) takes up a certain amount of time in any case.

One of the definite disadvantages of the register system is that it produces register statistics, i.e. it allows for no unregistered data. This means, for example, that all moonlighting will remain outside the statistics even though the people concerned should, in a census, be counted as gainfully employed. Similarly, the traditional questionnaire method has the important advantage that it can always ask whatever questions are considered relevant. For instance, there exists no register with details on commuting; whereas in the questionnaire for the 1980 census the respondents were asked to specify how they travelled to and from work.

2 The 1990 census

It is required by law that a census, complete with a count of existing dwellings and buildings in the country, shall be carried out in Finland once in every ten years. Prior to 1990, censuses have been conducted in 1950, 1960, 1970, and 1980. In addition, studies corresponding to censuses were carried out in 1975 and 1985 on the basis of separate laws.

The use of register-based data has been steadily increasing ever since 1970. In 1980, there was no actual count of the population, but the number of people permanently resident in the country was determined on the basis of data from by the central population register. All demographic data were also drawn from the same source. In the questionnaire for the 1985 census, the only items queried concerned main type of activity, industrial status, place of work, occupation and number of months employed/unemployed. All data on buildings, dwellings and housing conditions were compiled from registers. The decision to rely exclusively on the register system in population censuses was made in spring 1988, and legislation concerning the 1990 census was passed in September 1990.

The most important registers and administrative sources used in the 1990 census were as follows:

- central population register (including data on buildings and dwellings)
- registers maintained by the tax authorities
- employment registers maintained by the Central Pension Security Institute, the State Treasury and Municipal Pension Institute
- Statistics Finland business register and register on the non-corporate public sector
- registers of the Social Insurance Institution
- student registers
- Ministry of Labour registers on job applicants
- Statistics Finland register on degrees and examinations, and
- the conscript register.

A census project was specially set up to organize and coordinate the operation. However, the statistics for the different areas and phenomena covered were produced by different units at Statistics Finland.

Data categories

The categories of data collected in the census were determined primarily on the basis of the data collected in earlier counts, the current need for information, and UN recommendations. Current data needs, in turn, were evaluated in collaboration with the most important end-users in support groups specially set up for this purpose. Ultimately the goal was to ensure maximum comparability with the results of earlier censuses. However, every census always has to make some changes to its schedules of data collection, and that obviously complicates the task of comparison.

Censuses produce statistical data on the following units:

- persons
- families
- household-dwelling units
- dwellings
- business premises
- buildings and
- summer cottages.

The units are linked up with one another through personal ID numbers and domicile codes (see Figure 1). In addition, where data on people's place of work were linked with data on companies' business location, use was also made of company and business codes as well as addresses. All units singled out in the census and the data describing those units can be tied down to a system of coordinates. With this system it is possible to generate printouts for marked-out areas, for population centres and for map grids as well as various calculations of distances between units.

The point of measurement was set at December 31st, 1990; all data on the basic population (the people permanently resident in the country), families and households as well as on buildings and dwellings are for that date. Data on gainful employment were collected for the last week of the year, i.e. from December 25th to December 31st.

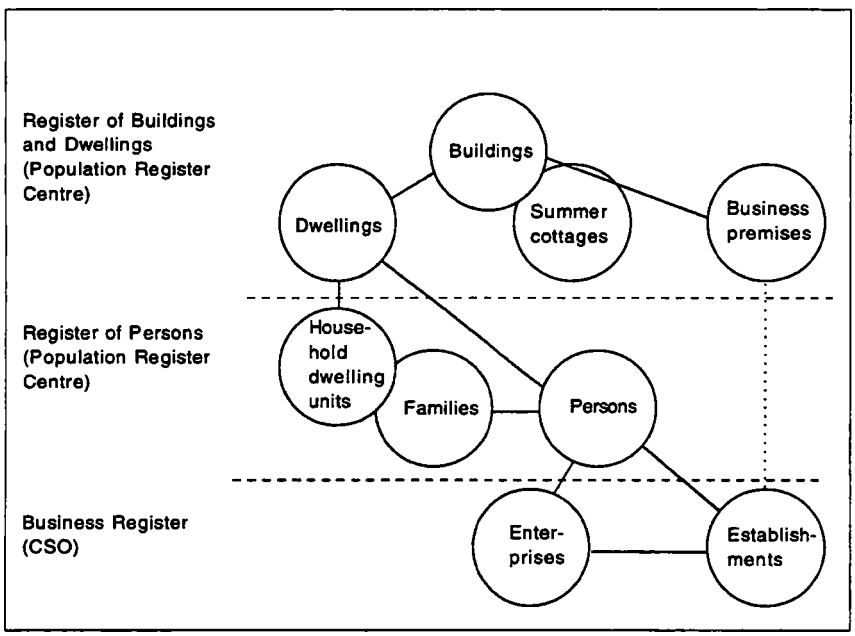


Figure 1.
Units included in register-based census and links between those units

3 Evaluation study of the 1990 population census

3.1 Earlier studies of reliability

The quality of the data collected in censuses has been monitored and evaluated since the 1970 census. The first evaluation study concentrated on processing errors. In 1975 the focus was on the coverage of people and dwellings; in 1980 on data coverage and the reliability of the main data sets; and in 1985 on the reliability of data describing economic activity in different demographic groups.

The first comparisons between register and questionnaire data were carried out with the 1980 census data. In 1985, an inclusive comparison was conducted to determine how census data on main type of activity and industrial status compared with data extracted from registers. In addition, register data for 1987, 1988 and 1989 on gainful employment have been compared with a corresponding sample survey. The results of all these comparisons indicated that the level of agreement between register-based data and questionnaire data was sufficiently high to warrant the decision in 1988 to carry out the 1990 census entirely on the basis of register data.

The study to measure the reliability of the 1990 census differed from earlier evaluations in that the census itself collected no 'real' data at all. In 1980 and 1985, samples were interviewed to obtain as accurate and up-to-date information as possible. The data for the 1990 evaluation study were collected by questionnaires in the same way as the census data proper in earlier years.

As far as data quality was concerned, the aim in the evaluation study was to maintain the same standards as in questionnaire censuses. The comparative data collected by questionnaires were compared with the register-based data of the 1990 population census.

The project was launched with a seminar where producers of census data and end-users gathered to discuss the objectives of the study, the type of data it would generate, as well as strategies of implementation.

3.2 Purpose of the study

It is important to bear in mind that the data used in the register-based census have been collected for various administrative purposes: taxation, pension accrual, social benefits. The possibility that they might be used for census statistics has never been a consideration in compiling the data.

The purpose of the evaluation study was to

- provide a description for end-users of census statistics as to how the register-based data differed from questionnaire data
- determine the quality of the data in the registers employed and describe what kind of differences (if any) were found between register data and questionnaire data
- evaluate the relevance and accuracy of inferences drawn from register data, and to
- collect data that are important for census purposes but that are not available from registers.

3.3 Research plan

The original plan for the evaluation study was to have a sample of 30 000 real estates. Postal questionnaires were to be sent out to collect details on buildings, dwellings and people living on these real estates; and this data set was to be used in a comparative analysis with the results of the census. In addition, the purpose was to draw a subsample consisting of approximately 5 000 household-dwelling units and to interview the people in these units in order to obtain as accurate and up-to-date 'real' information as possible. The subsample would have corresponded to those examined in the evaluation studies of the 1980 and 1985 population censuses. The data collected from the sample in the first stage would in turn have corresponded to questionnaire-based data, which were to be compared with register-based data.

However, for reasons of budget restraints these original plans had to be cut back somewhat. Data were not collected on families, summer cottages or business premises. Further, the plans to collect 'real data' were scrapped, and the sample size was reduced by one third to 20 000 real estates.

3.4 Sample

The sample for the study was drawn from the central population register, which at the time of sampling was updated for the situation as at February 1990. The random systematic sample covered the whole country. According to the register there were a total of 23 000 buildings, 45 000 dwellings and 96 000 residents on the 20 000 sample real estates.

Given the sampling design adopted in the study, the evaluation study was independent of the registers used in the census. However, in the posting of questionnaires to buildings that according to the register were located on the sample real estates, it is possible that some buildings not included in the register were omitted from the mailing list. As a general rule all buildings on the same real estate have the same owner, and in the inquiry the owner was given the opportunity to fill in the relevant data on any buildings not mentioned on the form.

The large sample size of the evaluation study was motivated first and foremost by the intention of obtaining regional data and data at the most accurate level of classification on the variables investigated.

3.5 Data collection

Pilot inquiry

A pilot inquiry was carried out in later summer 1990 in order to test the questionnaire forms and data collection procedures for the evaluation study. A sample of 80 real estates was collected from four municipalities (20 each from Pori, Merikarvia, Seinäjoki and Lappajärvi). The number of buildings in the sample was 106; dwellings 194; and persons 379. Some questions were improved and rephrased on the basis of the results.

Building inquiry

Data collection for the evaluation study was arranged in two stages. At the first stage data were collected on buildings, with a questionnaire posted in October 1990 to all owners of the buildings included in the sample. In this questionnaire details were inquired for the buildings as per the situation at October 15th, 1990. At the same time respondents were asked to confirm the existence of dwellings listed in the official register and to provide details on any dwellings missing from the register. In the case of recipients who failed to return the postal questionnaires, they were contacted by one of FinStat's interviewers. All interviewers recruited for the project received training for the job on a correspondence course. The interviewers collected the missing data during November and December 1990.

The schedule at this point was very tight: the dwellings that were to be included in the next stage of data collection in January 1991 were identified on the basis of responses to the building inquiry. The dwellings inquiry was posted to all those dwellings that in the building inquiry were reported occupied or unoccupied. This strategy was chosen in order to make the dwellings inquiry independent of the dwellings register.

Dwellings inquiry

The dwellings inquiry was posted in late January 1991 on the basis of the responses to the building inquiry. The inquiry actually included two different questionnaires: one concerning the dwelling itself and one concerning every person aged 15-74 years living in that dwelling (according to register data).

In the dwellings questionnaire, respondents were asked to give details on the people living in the dwellings concerned on December 31st, 1990: were they living together (common-law marriage), were they subtenants, and were they living in this place temporarily. As for the dwelling itself, a number of technical details were inquired: tenure status, the number of rooms and size in square metres, type of kitchen, and equipments. Domicile code and the names of all people living in the dwelling (according to register data) as well as their marital status were printed on the form in advance. Marital status was included to make it easier for the respondents to answer the question concerning 'living together'.

The second, personal questionnaire came with the name of the respondent printed on the front page. Each respondent was asked to give details on his or her economic activity (main type of activity, place of work, occupation) during the last seven days of the year, on methods of travel to and from work, and on activity during 1990.

The dwellings inquiry was addressed to the person who according to register data was the oldest 18-64 year-old resident in the

dwelling concerned. If the register indicated there were no residents in this age group, the questionnaire was addressed to the oldest person in the household. If according to the register the dwelling was not occupied, the dwellings inquiry was posted with the address only, and one personal questionnaire was included with no data filled in.

In cases where either questionnaire belonging to the dwellings inquiry was not returned during the month of February, a reminder was sent off in March. If there was still no reply, or if the data received were incomplete, the household concerned was contacted by an interviewer who took the necessary details (mainly by phone, but some personal visits were also made). The collection of missing data started in late April, and the last questionnaires were delivered to Statistics Finland in late June. The interviewers were given a half-day course for data collection in January 1991. Training took place in seven groups in connection with interviewer training for the household survey.

During data collection a press release was issued on the evaluation stydy. It was published in full by three newspapers; one carried a shorter version. The purpose of the article was to draw public attention to the project and in this way to motivate the respondents to take part.

A press conference was held on the register-based census in late 1990; at the same time the press was also informed about the evaluation study. This time the project received much better coverage in the media: Messrs. Pekka Myrskylä and Aarno Laihonen were interviewed on television and on the radio, and over one hundred newspapers carried stories on the project.

Census legislation in Finland

Both in the case of the official census and in the evaluation study all household-dwelling units included in the final sample are required by law to take part. This was a source of some irritation among the respondents; many phonecalls were received with people wondering why they had to reply while their neighbours didn't.

The laws say that all private individuals, estates, companies, cooperatives, associations, societies, foundations as well as all government, municipal or parish offices and all owners or tenants of real estates or part thereof are under obligation to provide the details that are needed on their building or real estate to satisfactorily complete the census.

Further, legislation from 1990 says that a evaluation study using a sample design shall be conducted to ascertain the quality and comparability of the register-based data produced in the census. The data for that evaluation shall be collected in accordance with the stipulations contained within census legislation. Under paragraph three it is required that all persons aged 15-74 years living in the households in the randomly sampled buildings and dwellings as well as all owners of buildings and occupants of office facilities provide the information set out in the law.

Response rate

Ninety-eight per cent of the building inquiries were returned. There were 45 refusals, 300 owners of buildings who could not be contacted, and 160 cases where the data on the building turned out to be of a wrong building.

In the case of the dwellings inquiry a separate note was made on whether the responses were obtained through the post or after a second call by an interviewer.

In a more detailed breakdown, this is what happened to the dwellings inquiries:

– response through the post	36 797	80 %
– response after second call (interviewer)	6 336	14 %
– refusal to take part	196	0 %
– failure to contact respondent	2 304	5 %
– data received on dwelling not correct	236	1 %
Total	45 869	100 %

And the corresponding figures for the personal inquiries were as follows:

– response through the post	58 717	81 %
– response after second call (interviewer)	10 635	15 %
– refusal to take part	525	1 %
– failure to contact respondent	2 941	4 %
Total	72 818	100 %

Non-response

Non-response remained at a comparatively low level in all three inquiries: the figure for the dwellings inquiry was 6 per cent, for the personal inquiry 5 per cent, and for the building inquiry only 2 per cent.

In the category of buildings the non-response was highest in other than residential buildings at 6 per cent. In blocks of flats the figure was 3 per cent compared with 1.5 per cent in detached and terraced houses.

Non-response of dwellings was also highest in the non-residential category, with the figure climbing to a high 18 per cent. Of the dwellings that belonged to residential buildings in the population census, 5 per cent were categorized under non-response in the evaluation study.

The following Table gives the breakdown of non-response in different categories by provinces:

Province	Buildings		Dwellings		Persons	
	no	%	no	%	no	%
Uusimaa	139	3,8	827	7,3	1 161	5,1
Turku ja Pori	78	2,0	324	4,7	348	2,5
Häme	43	1,5	297	4,4	358	2,6
Kymi	26	1,4	274	7,7	360	4,8
Mikkeli	26	2,3	71	3,8	92	2,3
Pohjois-Karjala	14	1,4	72	4,4	103	3,1
Kuopio	23	1,8	88	3,7	98	1,9
Keski-Suomi	25	1,9	142	6,6	172	3,6
Vaasa	50	1,9	308	7,6	406	4,6
Oulu	37	1,6	177	5,5	181	2,3
Lapland	25	2,0	107	6,3	125	3,4
Åland	7	3,5	49	21,7	61	13,3
Whole country	493	2,1	2 736	6,0	3 466	4,8

Non-response was lowest in owner-occupied dwellings at around 4 per cent, compared with 7 per cent in rented dwellings and 8 per cent in dwellings rented by employers. Responses were not obtained from one quarter of the unoccupied dwellings; the proportion was roughly the same in the case of dwellings where ownership was unknown.

For personal inquiries the non-response rates were highest among the unemployed, students as well as other people who were not in the employed labour force. In these three groups the rate of non-response was around 7-8 per cent. Among pensioners the figure was considerably lower at just over 2 per cent.

3.6 Processing the questionnaires

The processing of the questionnaires was started in January 1991 and was completed in March 1992.

During the stage of printing in preliminary data in the forms, all buildings and dwellings were consecutively numbered starting from one. These numbers were then used as a search key in the processing stage.

Information storage from the questionnaires was by means of an interactive UFO data management system. A template was provided for each building, dwelling and individual person, with relevant details filled in beforehand for buildings and dwelling as per register data. This had been done in order to facilitate information storage: in those cases where the questionnaire data were the same as those extracted from the register, no steps were required to store the data. The risk involved in this was that in some cases we may have been left with incorrect register data. In cases where data items were missing in the questionnaire, processing staff were instructed to delete the register data provided in the template. The objective throughout was to record and save the exact data that were given in the questionnaire forms so that the final analysis could go ahead without having to revert to the questionnaires.

3.7 Estimation

The sample data collected for the evaluation study were weighted so as to have the material represent the whole country. Each individual, dwelling and building included in the sample represented approximately 52 individuals, dwellings and buildings.

All materials were post-stratified in order to obtain more reliable estimates.

Three different types of weights were used in the estimation of personal data. One set were used in the estimation of data describing housing, where the material was stratified by provinces and age groups so that the right number of people were included in the evaluation study in each ten-year age group for each province. A second set of weights was used in the estimation of data describing occupation and socio-economic status; and a third set in the estimation of data on industry and place of work. This allowed us to compare data on occupations and industries at the most

accurate levels of classification. The weights used in estimation were so determined that the numbers concerning stratum variables were the same as the register numbers for the census. This ensured the best possible comparability of the raised figures with the data from the population census.

In the estimation of personal data, weights were used for individuals even though the sampling unit was the real estate. Given the sampling method employed it was safe to assume that the population of individuals was close enough to a simple random sample. The assumption was confirmed by a so-called DEFF test. Non-response in the personal data was taken into consideration in the weights.

Estimation of the data on buildings and dwellings was based on the unit of real estate, which made it somewhat harder to take into account the effects of non-response. The number of buildings and dwellings on real estates varied from case to case, as did the rate of non-response. On real esteates with large blocks of flats the range of cases was obviously wider particularly with the dwellings inquiry, with one respondent refusing to take part, someone else failing to answer all questions and yet someone else not contacted. It would have been more or less impossible (or at the very least extremely difficult) to correct the effects of non-response by means of weights. Therefore, in the case of the building and dwellings inquiries, non-response was replaced by register data, which meant that in individual cases of non-response there would be no differences between the register and questionnaire data; or in other terms, that it improved the results of the comparison to some extent. Another option would of course had been to interpret each case of non-response as missing data. However, the decision to substitute register data for missing data meant that in the majority of cases the data recorded would be correct, bringing us closer to the result obtained on the basis of questionnaire data than would have been the case with missing data.

In the estimation of building data the material was stratified in relation to three factors: location (municipality), year when built, and type of building. The municipalities were divided into four groups on the basis of building data correspondence between the census and the evaluation stydy. This was done because it was known that the quality and coverage of building data varied from one municipality to the next. One major factor with regard to data quality is the interest and activity of the local authorities to keep their registers up to date. Real estates were also divided into four groups on the basis of year of building or basic repairs. Finally, two main types of building were distinguished for real estates: those on which there were residential buildings only and those on which there was at least one office or industrial building.

The dwellings material was divided along four dimensions:

- by region (the country was divided into four regions);
- by size of dwellings on real estate;
- by type of house (dwellings on real estates where there were only blocks of flats and terraced houses and other dwellings); and
- by year of building.

3.8 Representation of data in this report

All figures given in this report are rounded to the nearest one hundred. This is to avoid giving the (false) impression that the numbers from the evaluation study are exact statistics; all figures from sampling studies always involve some degree of sampling variation. For reasons of consistency the figures from the census are also rounded to the nearest one hundred.

It follows from the above that the total numbers for rounded categories may differ from the rounded sums totals.

The estimates based on the sample material for the evaluation study are followed by each estimate's 95 per cent confidence interval. For instance, when the number of students according to the evaluation study is set at 362 000 +/- 5 000, this means there is a 95 per cent probability that the number lies within the range of 357 600 - 367 600.

In Tables presented for individual variables, the numbers from the census are first cross-tabulated with those from the evaluation study in different categories of the variable as raised sample figures. The following data are given for different categories:

A. *Census total (sample)*
The number of cases included in the census according to the sample material.

B. *Census total (population)*
The true number of cases included in the census. The figure differs from the raised sample number given under A, particularly in the case of building and dwellings data. This is explained by the level of accuracy of the division used in stratification: when it is the same as the classification of the variable, the numbers for A and B will be the same; otherwise they will slightly differ from one another.

C. *Evaluation study total*
Total number according to the evaluation study.

D. *Correctly classified*
Raised sample number classified in the category according to both data sets.

E. *Percentage of correctly classified*
Proportion of cases classified in the category according to both data sets out of sample cases classified in the category in the census.

F. *False inclusion*
Cases classified in the category in the census but classified in other categories in the evaluation study.

G. *False omission*
Cases classified in the category in the evaluation study but classified in other categories in the census.

H. *Gross error*
Sum total of cases of false inclusion and false omission.

I. *Net error*
Difference of numbers in the census and the evaluation stydy. If the net error is positive, that means the number indicated by the census is too high; if it is negative, the number indicated by the census is too low according to the evaluation study.

J. *Relative net error*
The proportion of net error of the number indicated by the census.

A dash (–) in any column indicates that no meaningful figure can be given for the case concerned.

4 Economic activity

The following dimensions are included in the analysis of economic activity: principal activity, place of work, industrial status, employer sector (for wage earners), industry, occupation and socio-economic status.

4.1 Main type of activity

The 1990 census had the following categories for main type of activity:

Labour force

Employed
Unemployed

Economically non-active population

Children (age 0–14 yrs)
Students
Pensioners
Conscripts
Other economically non-active groups

In earlier censuses people engaged in housekeeping were slotted in a separate category of their own. Now, in the absence of relevant register data, they were included under 'Other economically non-active groups'. In the evaluation study an item was included on housekeeping, which was accordingly classified as a separate category.

Several registers are examined in the determination of people's main type of activity. The following are the most important sources:

- central population register: demographic data (age, sex, citizenship, mother tongue)
- the Central Pension Security Institute's employee pension register: data on employment in private sector and pension insurances for the self-employed
- State Treasury pensions register: data on employment for wage earners working for the government
- municipal pensions register: data on employment for the municipal sector
- registers maintained by the tax authorities: data on incomes and employer
- registers of the Social Insurance Institution: data on pensions
- various student registers: data on students
- Ministry of Labour registers on job applicants: data on unemployment
- conscript register: data on conscripts.

Each individual's main type of activity is deduced from these registers. If data on a person are found in more than one register, his or her main type of activity will be determined in the following order:

- unemployed
- conscript
- employed
- student
- pensioner
- other.

For instance, a student who is insured under the national pensions scheme and who has reported taxable income, will be slotted in

the category of employed. If a person has more than one job, his or her main type of activity will be determined on the basis of highest incomes.

In the evaluation study the question concerning main type of activity read as follows:

1 Please tick off any and all items which describe your activity during the period between 25 Dec and 31 Dec 1990. Note that temporary absence from work because of holiday, sickness, etc. is regarded as gainful employment (items A, Band C). Please include any short-term employment, even if it lasted no more than one day.

A ☐ I worked for wages
B ☐ I was an entrepreneur or self-employed
C ☐ I worked in a family member's company without pay
D ☐ I was unemployed or laid off
E ☐ I was a pensioner
F ☐ I was a student or at school
G ☐ I was doing my military/civilian service
H ☐ I was at home doing housework
I ☐ I was doing something else, please specify:

1 Working for wages or gainful employment (items A, B and C) refers to any kind of work that generates income. The definition also includes work that is done without pay on a farm or in a company owned by a family member.

A wage earner is defined as anyone who works for someone else for wages or for some other form of compensation. Persons living on a grant or scholarship are also regarded as working for wages.

Entrepreneurs or self-employed people are defined as people who have their own company, who work on a farm they own or have rented, or who carry on a trade on their own account (such as dressmakers or writers).

An unemployed person is someone who has no job, who is currently looking for a job and who is available for a job, or who has been laid off without pay.

Pensioners are people who have retired and who are on an old age pension, employee pension, disability pension, unemployment, veteran's pension, etc. as well as people living on old-age benefits. People living on a dependant's pension shall tick off the last alternative (I).

Students are defined as people who are studying in an educational institution or who are currently in unpaid practical training related to their studies. In-service training, correspondence courses, and studies in civic or workers' colleges or similar are not to be included in this category.

The last category ("I did something else") applies to living on income from property, savings or a dependant's pension as well as to other activities for which not payment is made.

All respondents who ticked off alternative A, B or C, were classified as employed.

Where the respondent had ticked off more than one alternative, his or her main type of activity was decided in the following order:

employed
unemployed
pensioner
student
conscript
housekeeper
other

The dates for which main type of activity was queried the last seven days of the year were quite unfortunate as far as the questionnaire inquiry was concerned. This period started with Christmas Day and was followed by Boxing Day, two normal weekdays, then a weekend followed by New Year's Eve. For anyone working in a regular daily job, this was probably the least regular week of the whole year. Not surprisingly, then, large numbers ticked off the 'other' option in the questionnaire, explaining (in most cases) that they were on holiday. These cases were delegated to the interview team who contacted the respondents to get the relevant data on place of work.

The personal inquiry included in the evaluation study was only posted to people in the age group 15-74. Those aged 0-14 years are automatically slotted in their own group, and all people aged over 74 are classified as pensioners.

Table 1. Main type of activity in the population aged 15–74 years

Evaluation study	Population census					
	Employed	Unemployed	Students	Pensioners	Conscripts	Others
Employed	2 172 600	34 500	34 000	24 600	4 000	35 600
Unemployed	23 900	97 100	5 400	2 300	1 200	18 900
Students	57 000	3 100	282 400	2 000	1 400	16 700
Pensioners	35 400	1 800	2 000	717 800	100	9 100
Conscripts	1 100	600	200	100	21 200	800
Others	42 200	3 900	5 000	10 200	100	82 900
A. Census total (sample)	2 332 200	141 000	329 000	757 000	28 000	164 000
B. Census total (population)	2 332 300	141 000	329 100	756 900	28 000	163 900
C. Evaluation study total	2 305 700	148 800	362 600	766 200	24 000	144 500
	+/–7 400	+/–4 200	+/–5 000	+/–4 200	+/–1 300	+/–4 700
D. Correctly classified	2 172 600	97 100	282 400	717 800	21 200	82 900
E. Percentage of correctly classified	93,2	68,9	85,8	94,8	75,7	50,5
F. False inclusion	159 600	43 900	46 600	39 200	6 800	81 100
G. False omission	133 100	51 700	80 200	48 400	2 800	61 600
H. Gross error	292 700	95 600	126 800	87 600	9 600	142 700
I. Net error	26 600	–7 800	–33 500	–9 300	4 000	19 400
	+/–7 400	+/–4 200	+/–5 000	+/–4 200	+/–1 300	+/–4 700
J. Relative net error	1,1	–5,5	–10,2	–1,2	14,3	11,8
	+/–0,3	+/–3,0	+/–1,5	+/–0,6	+/–4,6	+/–2,9

Employed

Ninety-three per cent of those who were classified as employed in the census were slotted in the same category in the evaluation study.

The total figure for the employed in the census was 27 000 higher than in the evaluation stydy. Most of this difference is explained by the number of respondents who in the evaluation study were classified as students while in the census they were marked down as gainfully employed. In the evaluation study there were 57 000 students who according to register data were employed. By contrast, only 34 000 of those classified as students in the census were employed according to the evaluation study.

Other categories where the number of employed was set higher in the census relative to the evaluation study, were pensioners and other economically non-active groups. The differences was narrowed down by the groups of unemployed and conscripts. Amongst those counted as employed in the evaluation study, the census put the number of unemployed at 11 000 higher and the number of conscripts at 3 000 higher than opposite cases (i.e., counted as employed in the census but as unemployed or conscripts in the evaluation study).

One reason why someone reported to be gainfully employed in the evaluation study is classified as unemployed in the census could be that in the latter count, the category of unemployed was deduced first. If an individual was registered as an unemployed job applicant at the time of the census, he or she would have been classified as unemployed. On the other hand, one

reason why people classified as employed in the census could end up in the category of student or pensioner in the evaluation study might be that the person who spent most of his/her time studying or who raised a pension also had a job and was therefore earning taxable income and by the same token having insurance premiums paid. However, in the questionnaire these same people might have reported that they were students or pensioners. The census criteria say that a person shall be classified as employed if he or she is gainfully employed for at least one day during the period under study. In the case of the unemployed deductions from register data may lead to false conclusions; while in the case of students and pensioners questionnaire data lead more often to the false result.

Unemployed

Only just over two thirds of those classified as unemployed in the census were put in this same category in the evaluation study.

The census put the number of the unemployed at 8 000 less than the evaluation stydy. As was already observed earlier, people who were classified as gainfully employed in the evaluation study tended to end up more easily in the group of unemployed in the register inference than vice versa (i.e., employed in the census but unemployed in the evaluation stydy). This increased the number of unemployed in the census relative to the evaluation stydy. Another significant group was formed by those cases where a person was unemployed according to the evaluation study but classified in the category of other economically non-active according to the census. These cases numbered 19 000. Amongst those classified as unemployed in the census, only 4 000 were not in the labour force according to the evaluation stydy. This increased the number of unemployed in the evaluation study relative to the number of unemployed in the census.

In the census all people who were classified as unemployed at the time of the study were registered by the Ministry of Labour as job applicants; whereas in the case of the evaluation study the status of unemployed is based on self-report. People who are not entitled to unemployment benefit may nevertheless feel that they are effectively unemployed and tick off the respective alternative in the questionnaire, even though they will not register with labour exchange because "there's no chance of getting a job anyway".

Students

Eighty-six per cent of the students in the census fell into this category in the evaluation study as well.

The evaluation study put the number of students in the country at over 30 000 higher than the census. This difference was due in large part to the fact that in the register analysis, students always became classified as gainfully employed if and when they had a formal labour contract, even if that was only for a minor part-time job. This should in fact have been the case in the evaluation study was well, but in reality many respondents in a questionnaire study will prefer to mark themselves down as students.

Another major group that contributed to the differences here were those respondents who in the evaluation study were counted as students but who in the census were in the category of other economically non-active. These people numbered 17 000, three quarters of whom were in the age group 15–19 years. Most of the people are no doubt senior secondary high school students on whom no register data are available.

Pensioners

Ninety-five per cent of the pensioners in the census were also pensioners according to the evaluation study.

The number of pensioners according to the census was 9 000 less than according to the evaluation stydy. The main cause for this disparity in figures lies in the fact that the census placed 35 000 people defined by the evaluation study as pensioners under the category of gainfully employed. The number of opposite cases was 10 000 less.

One quarter of the people defined by the evaluation study as pensioners but by the census as gainfully employed, were engaged in forestry and agriculture; for 14 per cent the branch remained unknown. Half of these people were 60 or over, one third were in the age group 50–59 years, while the rest were younger.

Those who were engaged in agriculture could typically be farmers regarding themselves as pensioners. Their names might have occurred in both registers (i.e., farmers on own account and retired) at year-end 1990, but during 1990 their earnings were more than their pension, putting them in the category of gainfully employed in the register analysis.

Conscripts and conscientious objectors

Three out of four men classified as conscripts in the census came in the same category according to the evaluation study.

The number of conscripts according to the census was 4 000 higher than in the evaluation study. Amongst those defined as conscripts in the census, 4 000 were classified in the evaluation study as gainfully employed, 1 000 as unemployed and 1 500 as students; opposite cases numbered considerably less.

Amongst the men classified by the census as conscripts but not so by the evaluation study, 2 200 reported in the questionnaire that in addition to a conscript they had also been gainfully employed. For instance, if someone who was doing his military service had a job during weekend leaves, that person should have been classified as gainfully employed. In the register inference conscripts are categorized before the employed; in other words, if a person, at the time of the census, is registered at once as a conscript and as eligible for national pension, that person would be classified as a conscript. This means that some people who should be counted in the active labour force are in fact wrongly slotted in the category of conscripts.

Other economically non-active groups

Only half of the people who in the census were categorized in other economically non-active groups reported belonging to this category in the questionnaire survey, i.e. that they stayed at home to manage the household or were otherwise not gainfully employed. The vast majority of those placed in this category (92 per cent) described themselves as housekeepers.

In the other economically non-active groups (according to the census), one fifth were classified in the evaluation study as gainfully employed, while 10 per cent were unemployed and 10 per cent were students.

The situation in 1985

The differences observed between the results for the gainfully employed and for students in the census on the one hand and the evaluation study, on the other, were very similar to those that were found between the 1985 census and the register-based compa-

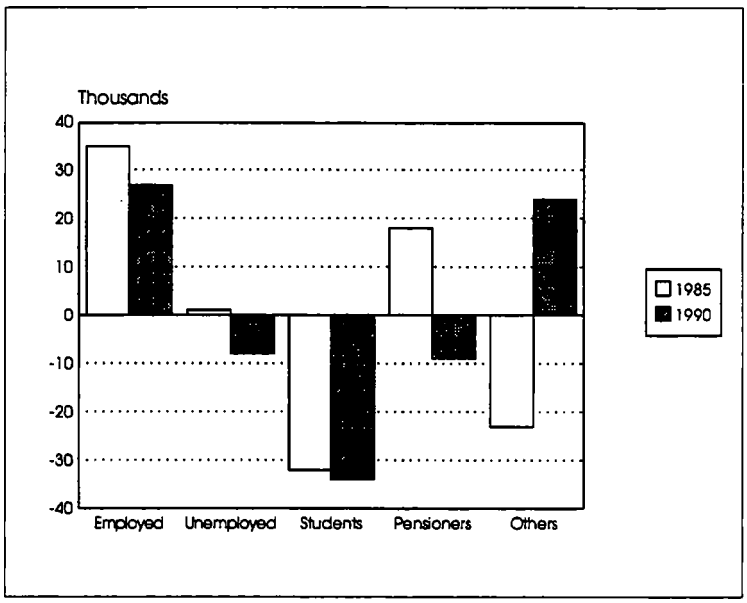


Figure 2.
Differences in main type of activity between 1985 comparative statistics and census and between 1990 census and evaluation study

rative statistics. The differences were not the same for the unemployed, pensioners and other economically non-active groups. In the questionnaire-based census of 1985, the number of pensioners was some 20 000 lower than according to the register-based statistics. On the other hand, the 1990 questionnaire-based evaluation study suggested that there were 10 000 more pensioners than the register-based census of the same year. In other economically non-active groups the situation was reversed: the 1985 questionnaire census indicated a lower number of other economically non-active people than the register data at that time, whereas in 1990 the register gave a higher figure than the questionnaire survey for other economically non-active groups.

4.2 Place of work

In the register-based census data on industry are inferred on the basis of place of work. In the processing of data concerning place of work, a back-up file is created to hold all business locations in the country. This file is based on Statistics Finland's own business register as well as register maintained by the relevant authorities. In practice these registers cover all places of business in the whole country. The coverage and quality of these registers were not tested in the evaluation study.

In the register inferences each gainfully employed person is ascribed an establishment at which he or she was engaged at the end of the year. The place of work data for all persons assigned to this establishment will be determined on this basis (including industry, location of place of work and employer sector).

All persons working for companies with just one establishment will be recorded as working at that location. In the case of

companies that have more than one establishment, Statistics Finland will inquire the details with regard to the employee's location at year-end. The establishment will be determined according to the company's statement.

An important difference compared with the traditional census is that in the register-based system, every wage earner will be marked down as an employee of one particular establishment. Earlier, people in mobile jobs formed their own category. In the 1985 census, for example, there were still separate categories for those in fixed workplaces and those in mobile jobs.

In municipal statistics a further distinction was made between those who were engaged in mobile jobs within the municipality and those in jobs involving movement across more than one municipality. In the register-based population census, people who have mobile jobs are counted as workers of the establishment from which their job is supervised.

The risk with compiling data on gainful employment on the basis of register data is that this method might well overstate the number of jobs in places with high concentrations of company headquarters or main establishments. Staff placement reports often have mobile employees marked down as working at company headquarters; the same applies to any staff who cannot be conveniently ascribed to a particular establishment. In addition, all companies with less than 10 employees are defined in the register-based census as having no more than one establishment. If, for example, Heinola booksellers have an outlet with six employees in the centre of Heinola and a branch office with three people in a neighbouring municipality, the register census would have all employees working in Heinola. This would bring three extra jobs to Heinola under the industry of books retailing; while three jobs would be missing from the neighbouring municipality.

In the evaluation study the respondents were asked to give the following details on their place of work:

In data storage we set out with the details for each person's place of work on the basis of the 1989 employment statistics. If according to the questionnaire data the respondent continued to work at the same establishment as in 1989, the existing data in the template were accepted as is, provided that the establishment concerned was still in operation at year-end 1990. Workplace codes were obtained in this way for 8 800 people.

If you were in gainful employment (items A, B and C above), please fill in the following items on your place of work as well as on how you travel to work:

2 Workplace or name of employer:

_____

3 Address of workplace:

_____

4 Location of workplace (municipality):

_____

5 Industry:

_____

2 Please state the exact name of your place of work. If your employer has more than one establishment, please indicate both the name of the employer and the name of the office or unit.

3 Please give the address of the place where you worked during the week concerned. If you had a mobile job but started every morning from the same place (e.g. a postman through a post office), give the address of this place. If, on the other hand, you had no fixed workplace (e.g. forest worker), give the name of the municipality where you worked.

5 Industry refers to the workplace's type of activity or main line of production. All people working at the same workplace are engaged in the industry, regardless of their occupations. Here are some examples:

- dental surgery
- children's daycare
- real estate maintenance
- sports good shops
- cleaning
- landscaping
- TV repairs
- accountant's office

In the case of those people who remained without an establishmentcode, names and addresses were entered to search (first automatically and then manually) for such a code from the establishmentfile. This file was the same that was used in the register-based census. Machine searches successfully produced an establishment for 5 600 people; a manual search was carried out for almost 30 000 people.

If it was impossible to slot a person on the basis of the questionnaire data into any given establishment included in the file, data were entered manually on industry, employer sector and location of place of work in the file for the evaluation study.

Codes of enterprises and establishments

The discussion that follows is concerned only with codes on enterprises and establishments for wage earners; self-employed groups very rarely had such codes at all.

A comparative analysis of codes on enterprices and establishments is relevant because data on industry, location of place of work and judicial form of employer and type of owner were deduced directly from establishment. A miscoded establishment would automatically result in deviations in these data items.

In cases where a person was marked down with a different establishment in the census and in the evaluation study, the location of his or her place of work and industry might still have been the same, especially where that person was coded for the same company's different establishment in different materials. For example, amongst those who according to the census were employed on the railway, 80 per cent were engaged in the same industry according to both materials, even though only one quarter of all wage earners in the census and evaluation study worked in the same establishment.

Two in three wage earners in both materials were occupied in the same establishment both in the census and in the evaluation stydy. Sixteen per cent worked at different establishments but for the sample employer and over two per cent worked for the same employer, but data on establishment was missing from at least one of the two data sets. Seven per cent worked for different employers, and data on employer was missing from one or the other data set in eight per cent of the cases.

Employer refers here to a private business company, local authority, federation of communes or government office or agency.

Within the private sector, over two thirds or 69 per cent worked at the same establishment according to both the census and evaluation stydy. Among state employees, 65 per cent worked at the same establishment; and the figure for wage earners in the municipal sector was 62 per cent.

Amongst wage earners engaged in the public sector (i.e. in the employ of central government or local authorities), about one quarter were working for the same employer but at different establishment. The figure in the private sector was around ten per cent. In the private sector there were again more missing codes than in the public sector, and the proportion of wage earners working for different employers was also higher.

The correspondence between different data sets on establishment was highest in the following industries:

Production of oil and coal products and nuclear fuel	95 %
Extraction of iron ores	94 %
Fishing industry and game husbandry	90 %
Rubber and plastics industry	85 %
Clothing, leather products and footwear industry	83 %
Public order and security	82 %
Insurance	82 %
Metal industry	81 %

The correspondence with the codes was lowest in the following industries:

Rail transport	26 %
Holding companies	42 %
Thermal energy production and distribution	46 %
National defence	47 %

According to the census the majority or about two thirds of the people engaged in rail transport worked for the same company but at different establishment. In the category of thermal energy production and distribution, half worked for the same company but in different establishment, while in holding companies one third of staff members were in the employ of some other company. In national defence, data on establishment codes were incomplete for almost one third of the respondents, and 15 per cent were in the employ of another company.

Location (municipality) of place of work

Amongst those who were in gainful employment in both data sets, 91 per cent reported the same location of place of work.

Looking at the number of jobs in individual municipalities, the census and the evaluation study gave roughly the same numbers for major towns and regional population centres. By contrast, the number of jobs recorded for rural municipalities around these centres was often higher in the census than was the case in the evaluation stydy. The explanation lies in the fact that in the production of register data for gainful employment, location of place of work will be determined on the basis of place of residence if no establishment data are obtained for persons working in companies with several establishments. This means that a proportion of jobs will be transferred to municipalities from which people commute in large numbers to the central municipality. However, the number of jobs recorded for the central municipality in the census did not remain below the level recorded in the evaluation study because there excess jobs tend to accumulate in these locations by virtue of the large number of headquarters.

Table 2. Location of place of work

Location (regional planning unit)	Same	Different	Missing from either or both data sets
Helsinki	92	7	1
Itä-Uusimaa	85	12	3
Länsi-Uusimaa	84	14	2
Läntinen Uusimaa	90	9	1
Varsinais-Suomi	89	10	1
Satakunta	92	7	1
Tampere	91	8	1
Kanta-Häme	90	9	1
Päijät-Häme	92	8	1
Kymenlaakso	91	8	1
Etelä-Karjala	90	8	1
Etelä-Savo	90	9	1
Pohjois-Karjala	91	7	1
Pohjois-Savo	91	8	1
Keski-Suomi	90	8	1
Vaasa Province	90	8	2
Pohjois-Pohjanmaa	93	7	1
Kainuu	92	6	1
Lapland	90	9	2
Åland	84	13	4
Whole country	91	8	1

4.3 Industrial status

A distinction is made in the active labour force between entrepreneurs and wage earners. Entrepreneurs are further divided into employers, self-employed and assisting family members working for the company of a family member without regular pay.

With the introduction of the register-based census method, data are no longer obtained on these distinctions. In the evaluation study a question was included to identify assisting family members, but even here no distinction was made between employers and self-employed.

According to the census the number of wage earners in the country was 25 000 higher than the figure yielded by the evaluation stydy. The number of entrepreneurs was approximately the same.

The difference in the sum totals recorded for wage earners was due to those who were classified as not gainfully employed in the evaluation study but as wage earners in the census, who numbered 130 000; the number of opposite cases was just short of 100 000.

Among those counted as wage earners in the census, 21 000 were defined in the evaluation study as unemployed; 54 000 as students, 27 000 as pensioners and 18 000 as running their own household. Among those counted as wage earners in the evaluation study, 30 000 were defined by the census as unemployed, 30 000 as students, and 23 000 as other economically non-active groups.

Amongst those classified in the census as entrepreneurs, the evaluation study defined 13 000 as housekeepers, 9 000 as pensioners and unemployed and 3 000 as students. The category of housekeepers consists probably for the most part of housewives on farms.

Table 3. Industrial status

Evaluation study	Census		
	Wage earner	Entrepreneur	Not employed
Wage earner	1 838 600	37 200	98 000
Entrepreneur	26 700	253 700	21 200
Assisting	2 900	13 400	13 800
Not employed	130 100	29 500	–
A. Census total (sample))	1 998 300	333 800	133 000
B. Census total (population)	1 998 300	333 800	133 000
C. Evaluation study total	1 973 800	331 700	159 600
	+/–6 200	+/–6 200	+/–5 500
D. Correctly classified	1 838 600	253 700	–
E. Percentage of correctly classified	92,0	76,0	0,0
F. False inclusion	159 700	80 100	133 000
G. False omission	135 200	78 000	159 600
H. Gross error	294 900	158 100	292 600
I. Net error	24 500	2 100	–26 600
	+/–6 200	+/–6 200	+/–5 500
J. Relative net error	1,2	0,6	–20,0
	+/–0,3	+/–1,9	+/–4,1

In the group classified by the evaluation study as entrepreneurs, 11 000 were pensioners according to the census and 7 000 other economically non-active groups and 2 000 unemployed. Of those defined in the evaluation study as assisting family members, over 5 000 were classified in the census as other economically non-active, 5 000 as pensioners and less than 3 000 as students.

Around 30 000 of the wage earners in the census were entrepreneurs in the evaluation stydy. Some of these people may be so-called owner-entrepreneurs, i.e. people who own the company in which they work, even though the company is registered as a public limited company and the entrepreneur works as a hired Managing Director. In this case the census will classify the person concerned as a wage earner, but in a questionnaire survey he will prefer to describe himself as an entrepreneur.

Approximately 37 000 of the entrepreneurs in the census were wage earners according to the evaluation stydy. If a wage earner was also engaged in private business, the register inference would be based on an evaluation of which of the two generated more income in 1990. In the evaluation study people have probably based their response on an evaluation of which activity they have thought to be the primary one at the time of the inquiry.

The evaluation study defined 30 000 of those classified as entrepreneurs in the census as not gainfully employed. On the other hand, 35 000 of those classified as not gainfully employed in the census were entrepreneurs according to the evaluation stydy.

Almost half or 45 per cent of the assisting family members and 10 per cent of the wage earners in the evaluation study were entrepreneurs in the census.

A slow and gradual retirement is probably far more common among entrepreneurs than among wage earners. This is why it is not always clear whether people should be classified as entrepreneurs who are in the process of retirement or as pensioners engaged in private business. In cases where there were register entries for both retirement and entrepreneurship, primary activity was determined on the basis of which of the two generated more income during 1990. This is why quite a few of those who retired in 1990 tended to be classified in the census as entrepreneurs. In the evaluation study this item was based on self-report.

Assisting family members

The total number of assisting family members according to the evaluation study was 30 000.

Sixty per cent of all assisting family members were women. Almost two thirds or 64 per cent were engaged in agriculture and forestry. Over half or 54 per cent of the women were aged between 40 and 59 years, whereas among men 46 per cent were under 30.

The highest concentration of assisting family members was found in the province of Vaasa.

Assisting family members consisted for the most part of young men engaged in agriculture and, on the other hand, of middle-aged women. The women were spouses of farmers, while the young men were sons who were waiting to take over.

The number of assisting family members recorded in the 1985 census was 90 000. Of these people four fifths were engaged in agriculture and forestry. In 1985, 80 per cent of all assisting family members were women.

4.4 Wage earners' employer sector

Among those who were classified as wage earners both in the census and in the evaluation study, 97 per cent were defined in both data sets as working for the same employer sector.

The census counted 25 000 wage earners more than the evaluation stydy. By employer sectors, wage earners in the private sector numbered 33 000 more in the census than in the evaluation stydy. The number of wage earners in the state's employ was virtually the same in both data sets. On the other hand, the number of municipal employees was almost 7 000 lower in the census than it was in the evaluation study.

The main reason why the census gave a higher number for wage earners in the private sector was that the evaluation study defined 108 000 of those classified by the census as working in the private sector as not gainfully employed. The number of opposite cases was 75 000. Accordingly, the reason why the census recorded a lower number of municipal employees than the evaluation study was that 44 000 of the municipal employees in the evaluation study were defined as not gainfully employed in the census, while only 35 000 of those who according to the census worked for municipal government were not gainfully employed according to the evaluation study.

Of those who were classified in the evaluation study as wage earners in the public sector, three quarters were defined in the census as entrepreneurs engaged in agriculture and forestry. It is increasingly common for people living on farms to take on paid jobs outside the farm as well. Typically, these will be jobs offered by the municipal authorities (cleaners, farmer's locums, etc.)

Table 4. Wage earners' employer sector

Evaluation study	Census			
	Private	State	Municipality	Non-wage earners
Private	1 074 400	13 300	8 400	75 400
State	11 100	296 300	3 700	14 800
Municipality	9 100	2 200	417 800	43 800
Non-wage earners	107 700	17 200	34 800	–
A. Census total (sample)	1 202 300	329 000	464 700	134 000
B. Census total (population)	1 210 600	326 300	466 400	135 200
C. Evaluation study total	1 171 500	325 900	472 900	159 700
	+/–9 200	+/–6 200	+/–6 500	+/–5 600
D. Correctly classified	1 074 400	296 300	417 800	–
E. Percentage of correctly classified	89,4	90,1	89,9	–
F. False inclusion	127 900	32 700	46 900	134 000
G. False omission	97 100	29 600	55 100	159 700
H. Gross error	225 000	62 300	102 000	293 700
I. Net error	39 100	400	–6 500	–24 500
	+/–9 200	+/–6 200	+/–6 500	+/–5 600
J. Relative net error	3,2	0,1	–1,4	–18,1
	+/–0	+/–1,9	+/–1,4	+/–4,1

4.5 Industry

Eighty per cent of the people who were gainfully employed in either data set were classified in the same industry (10 main lines of industry) in the census and the evaluation study; the figure for those who were gainfully employed in both data sets was 90 per cent. At the two-digit level the proportion of those categorized in the same class in both materials was 85 per cent and at the most accurate level of the industry classification 78 per cent. Among those gainfully employed in either material, the proportion of those categorized in the same class at the two-digit level was 75 per cent and at the most accurate level 69 per cent.

The proportions classified in the same category in the 1985 census and its evaluation study were at roughly the same level as in the 1990 count. In 1985, 91 per cent were classified in the same industry in the census and in the evaluation study (10-class categorization); at the two-digit level the proportion was 85 per cent.

Table 5. Main classes of industry (10 luokkaa)

Evaluation study	Census										
	Agriculture and forestry	Mining and quarrying	Industry	Energy management	Construction	Trade and commerce	Transportation	Financing	Public and personal services	Unknown	Not employed
Agriculture and forestry	147 700	100	1 600	100	1 000	1 100	1 400	900	1 500	3 900	22 500
Mining and quarrying	200	3 700	400	0	300	100	100	100	0	100	300
Industry	4 200	400	425 300	1 400	4 700	7 500	3 200	4 100	3 800	2 100	16 700
Energy management	300	100	1 800	20 700	800	100	100	600	500	300	1 200
Construction	1 900	400	4 700	400	138 900	3 200	1 900	3 700	2 500	4 300	12 200
Trade and commerce	1 900	100	13 600	100	3 200	314 800	3 100	6 100	6 400	3 400	18 500
Transportation	2 500	200	1 400	200	2 700	2 700	145 200	1 300	1 600	1 600	6 800
Financing	1 100	100	6 700	400	2 400	4 600	1 600	201 400	8 300	4 000	11 100
Public and personal services	12 200	100	3 700	400	3 400	4 400	1 700	10 600	565 400	17 000	40 000
Not employed	25 500	300	18 500	900	11 100	24 900	6 200	17 000	39 800	15 500	–
A. Census total (sample)	197 700	5 500	478 300	24 600	168 800	363 700	164 600	246 100	630 500	52 600	133 100
B. Census total (population)	197 600	5 100	478 500	24 500	168 900	363 700	164 600	246 000	630 600	52 700	133 100
C. Evaluation study total	181 800	5 200	473 500	26 500	174 200	371 100	166 100	241 600	658 900	6 800	159 600
	+/–3 200	+/–700	+/–4 000	+/–1 300	+/–3 300	+/–4 000	+/–2 600	+/–3 600	+/–4 400	+/–1 200	+/–5 500
D. Correctly classified	147 700	3 700	425 300	20 700	138 900	314 800	145 200	201 400	565 400	–	–
E. Percentage of correctly classified	74,7	67,3	88,9	84,1	82,3	86,6	88,2	81,8	89,7	–	–
F. False inclusion	50 000	1 800	53 000	3 900	29 900	48 900	19 400	44 700	65 100	52 600	133 100
G. False omission	34 100	1 500	48 200	5 800	35 300	56 300	20 900	40 200	93 500	6 800	159 600
H. Gross error	84 100	3 300	101 200	9 700	65 200	105 200	40 300	84 900	158 600	59 400	292 700
I. Net error	15 800	–100	5 000	–2 000	–5 300	–7 400	–1 500	4 400	–28 300	45 900	–26 500
	+/–3 200	+/–700	+/–4 000	+/–1 300	+/–3 300	+/–4 000	+/–2 600	+/–3 600	+/–4 400	+/–1 200	+/–5 500
J. Relative net error	8,0	–2,0	1,0	–8,2	–3,1	–2,0	–0,9	1,8	–4,5	87,1	–19,9
	+/–1,6	+/–13,7	+/–0,8	+/–5,3	+/–2,0	+/–1,1	+/–1,6	+/–1,5	+/–0,7	+/–2,3	+/–4,1

Table 6. Industry at two-digit level

Industry	Evaluation study	Census	Difference	Difference in per cent	Same classification (%)	Industry	Evaluation study	Census	Difference	Difference in per cent	Same classification (%)
At letter-symbol level	11 400	2 400 +/– 400	9 000	375,0	0	51	12 600	12 500 +/– 1 000	100	0,8	80
01	169 200	156 600 +/– 3 000	12 600	8,0	75	52	64 100	61 800 +/– 1 900	2 300	3,7	83
02	2 300	2 000 +/– 400	300	15,0	63	53	8 900	10 300 +/– 900	–1 400	–13,6	83
04	26 200	23 100 +/– 1 400	3 100	13,4	65	54	5 600	5 100 +/– 600	500	9,8	79
07	1 000	900 +/– 100	100	11,1	88	55	0	0 +/– 0	0	–	0
09	4 100	4 200 +/– 700	–100	–2,4	68	56	22 800	24 300 +/– 1 300	–1 500	–6,2	83
11	55 600	55 600 +/– 1 400	0	0,0	89	57	32 900	32 000 +/– 1 300	900	2,8	83
12	13 400	14 200 +/– 900	–800	–5,6	86	58	17 600	19 800 +/– 1 100	–2 200	–11,1	88
13	24 000	24 600 +/– 1 000	–600	–2,4	88	61	57 500	54 700 +/– 1 100	2 800	5,1	90
14	35 000	37 500 +/– 1 600	–2 500	–6,7	83	62	20 200	22 900 +/– 1 000	–2 700	–11,8	93
15	41 600	43 100 +/– 1 400	–1 500	–3,5	88	65	34 800	33 600 +/– 1 800	1 200	3,6	69
16	41 100	41 600 +/– 1 400	–500	–1,2	87	66	39 300	34 600 +/– 1 800	4 700	13,6	67
17	16 600	15 600 +/– 1 000	1 000	6,4	79	67	2 900	3 100 +/– 500	–200	–6,5	75
18	20 600	18 700 +/– 1 000	1 900	10,2	82	71	30 900	31 900 +/– 1 300	–1 000	–3,1	85
19	2 500	3 600 +/– 500	–1 100	–30,6	95	72	14 600	15 100 +/– 1 000	–500	–3,3	83
21	14 500	13 800 +/– 700	700	5,1	86	75	23 300	26 000 +/– 1300	–2 700	–10,4	84
22	23 300	23 700 +/– 1100	–400	–1,7	86	76	19 700	17 400 +/– 1300	2 300	13,2	66
23	17 000	17 600 +/– 900	–600	–3,4	88	77	2 700	2 400 +/– 700	300	12,5	38
24	36 800	37 000 +/– 1500	–200	–0,5	83	81	82 100	86 100 +/– 2700	–4 000	–4,6	76
25	58 800	55 300 +/– 1900	3500	6,3	79	82	29 400	28 900 +/– 900	500	1,7	90
26	41500	38 700 +/– 1400	2800	7,2	84	83	17 000	14 200 +/– 900	2 800	19,7	76
27	26 400	25 500 +/– 1100	900	3,5	85	85	132 800	141 100 +/– 2 800	–8 300	–5,9	85
29	9 700	7 300 +/– 900	2 400	32,9	61	86	11 600	14 100 +/– 1 000	–2 500	–17,7	88
31	14 400	17 300 +/– 1 100	–2 900	–16,8	85	87	146 600	152 500 +/– 2 800	–5 900	–3,9	85
32	6 800	5 600 +/– 700	1 200	21,4	70	88	116 700	130 800 +/– 2 700	–14 100	–10,8	87
33	0	100 +/– 100	–100	–	0	91	36 800	41 100 +/– 1 900	–4 300	–10,5	75
34	3 300	3 600 +/– 600	–300	–8,3	73	92	11 600	13 100 +/– 1 000	–1 500	–11,5	81
35	76 300	82 700 +/– 2 300	–6 400	–7,7	83	93	1 100	600 +/– 300	500	83,3	50
36	40 100	45 500 +/– 1 700	–5 400	–11,9	86	94	19 600	17 400 +/– 900	2 200	12,6	76
37	40 300	36 400 +/– 1 900	3 900	10,7	66	95	18 600	17 500 +/– 1 000	1 100	6,3	82
38	7 400	9 300 +/– 1 100	–1 900	–20,4	64	98	100	100 +/– 100	0	0,0	33
41	84 800	90 800 +/– 2 600	–6 000	–6,6	83	99	52 700	6 700 +/– 1 200	46 000	686,6	–
42	7 500	6 600 +/– 900	900	13,6	61						
43–44	155 700	156 900 +/– 2 900	–1 200	–0,8	80	Total	2 332 300	2 305 700+/– 7 400	26 600	1,2	75
45	50 600	52 000 +/– 1 700	–1 400	–2,7	85						
47	18 400	19 000 +/– 1 300	–600	–3,2	75						
48	46 600	45 600 +/– 1 900	1 000	2,2	74						

Forestry and agriculture

Three quarters of those classified in forestry and agriculture in the census were allocated to the same industry in the evaluation study.

The number engaged in forestry and agriculture in the census was 16 000 higher than in the evaluation stydy. Most of this difference was due to the 12 000 ascribed to the service sector in the evaluation study.

Of those engaged in agriculture and forestry in the census and in the service sector in the evaluation study, 3 300 were men and 8 900 women. A total of 3 100 were engaged in nursing and outpatient care, 2 300 in institutes of general education and vocational training, 1 100 in institutions for the care of the elderly, and 900 in children's day care. Over half of those engaged in schools and educational institutes were teachers; other major occupational groups included kitchen staff and cleaners. Amongst these cases there are probably large numbers of spouses of farmers with pension insurances for agricultural entrepreneurs and as well as working on the farm taking on extra jobs as cleaners, in children's day care, etc.

Within the category of workers in agriculture and forestry in the census, 25 500 were not gainfully employed according to the evaluation stydy. In this group 10 000 were housekeepers, 8 500 were retired, 4 000 were students and 2 000 were unemployed. Some of the spouses of farmers reported themselves as housekeepers in the evaluation study rather than as farmers. However, at least in part of the cases a more appropriate reply would have been, 'I worked in the company of a family member without pay'.

Of those classified as gainfully employed in agriculture and forestry in the evaluation study, 10 000 were defined in the census as pensioners, over 3 000 as unemployed, less than 3 000 as students and over 6 000 as other economically non-active groups. Four thousand of those who according to the evaluation study were engaged in agriculture and forestry were classified in the unknown category in the census.

Mining and quarrying

Both the census and the evaluation study gave the same numbers for those engaged in mining and quarrying. However, only two thirds or 67 per cent of those classified in mining and quarrying in the census were put in the same category in the evaluation stydy. This is explained by the fact that groups classified in different ways cancelled out each other. For example, 325 people who according to the census were engaged in mining and quarrying were engaged in construction according to the evaluation study; the number of opposite cases (construction in the census, mining and quarrying in the evaluation study) was 366. As a result, these inconsistencies did not cause differences at the aggregate level.

Manufacturing

The numbers for those engaged in manufacturing in the evaluation study and in the census were virtually the same. Of those defined as working in manufacturing in the census, 89 per cent were put in the same category in the evaluation study.

The evaluation study put 14 000 of those defined by the register data as engaged in manufacturing in the category of trade and commerce; the number of opposite cases was over 7 000.

At the two-digit level the number of people working in the production of machines and equipment was 3 500 higher in the census than it was in the evaluation stydy. Some of these people were classified in the evaluation study in other manufacturing categories or in the category of not gainfully

employed. The only other significant industry was the wholesale of machines and equipment, which involved 900 people.

The census put the number of people engaged in the manufacture of electrical products and instruments at 2 800 higher than the evaluation stydy. Most of this difference was due to 2 000 people being classified in the evaluation study as economically non-active.

In the category of other manufacturing the number recorded in the census was 2 400 higher than in the evaluation stydy. This difference was made up of a number of smaller disparities.

At the two-digit level the only industry where the census reported a smaller number of people than the evaluation study, was the manufacture of timber goods and wood products: according to the evaluation study the number of people engaged in this branch is 2 500 higher than is indicated by the census. Most of this difference was attributable to agriculture and forestry (1 400) and the production of equipment (900).

Energy and water management

The census put the number of people working in energy and water management at 2 000 less than the evaluation stydy. Eighty-four per cent of those classified in energy management in the census were categorized in the same class in the evaluation study.

Inconsistencies were on a very small scale. The higher number obtained in the evaluation study was due to the fact that it put slightly more people in all of the classes. No cross-movement within any class was significant.

At the two-digit level the census put the number of people engaged in energy management at almost 3 000 less than the evaluation study, according to which 1 300 of these people were engaged in the production and distribution of district heating and a further 1 300 in the combined production of pulp, paper and cardboard. Some of those working in energy management within manufacturing were apparently marked down in the establishment inquiry as engaged in other power station locations.

Construction

The census put the number of people working in construction at 5 000 less than the evaluation stydy. Eighty-two per cent of those classified in this category in the census were put in the same class in the evaluation study.

The main source of difference here was that the census was unable to identify any industry for 4 000 of those classified by the evaluation study in construction. One reason for this might be that jobs in this branch are often of a short-term nature and not all are covered by pension schemes, but the individual concerned will nevertheless be defined in the census as employed because of his incomes. Jobs with unregistered employers are also more common among builders than other groups; a typical example would be a builder hired by a private person to help with a new house. In this case no register data will be available on the employer sector. It is also possible that some of the moonlighting that goes on in the building sector (on which there obviously exist no registers) is captured in a postal questionnaire.

At the two-digit level the census put the number of people working in house construction and in installation and finishing at a much lower level than did the evaluation study: in the former category

there was a shortage of 6 400 and in the latter a shortage of 5 400 people. Of those classified as house builders in the evaluation study, 1 800 were in civil engineering according to the census. Accordingly the number of people engaged in civil engineering in the census was almost 4 000 higher than in the evaluation stydy. The census left 4 800 people at the branch level, of whom 2 200 were in house building and 1 700 in installation and finishing according to the evaluation study.

Wholesale and retailing, hotel and restaurants

The census put the number of people working in trade at 7 000 less than the evaluation stydy. The evaluation study put 87 per cent of those defined as trade workers in the census in this same category.

A total of 14 000 people classified by the evaluation study as working in wholesale and retailing were classified in the census as manufacturing workers. The number of opposite cases was just over 7 000. The census also put more people from the wholesale and retailing category in the evaluation study into financing and service industries than vice versa.

A total of 25 000 people who were classified in the census as engaged in wholesale and retailing were defined in the evaluation study as not gainfully employed. Over half of these people, or 14 500 were classified by the evaluation study as students; over 3 000 as housekeepers; less than 3 000 as unemployed; and 2 500 as retired. Students often had part-time jobs in trade.

Of those classified in wholesale and retailing by the evaluation study, 5 000 were defined as students in the population census; another 5 000 as not gainfully employed; less than 5 000 as unemployed; 2 500 as retired; and 600 as conscripts.

At the two-digit level the biggest difference occurred in wholesale, where the census put the total number at 6 000 higher than the evaluation stydy. Of those who according to the evaluation study were engaged in wholesale, 3 700 were classified in the census in retailing, where the biggest single categories were represented by department stores, ironmonger's and builder's supplies and other retailing, with 700 people in each category. The biggest of the other branches were the manufacture of machines and equipment (1 500 people), data processing services (900), other business services (700) and road transportation (500).

Transportation, storage and data communications

The number of people working in transportation was practically the same in the census and in the evaluation stydy. Eighty-eight per cent of the transport workers in the census were put in the same category in both materials.

The cases slotted in different categories more or less balanced each other out.

At the two-digit level there was some cross-movement between posts and telecommunications: almost 3 000 of those who according to the evaluation study were engaged in telecommunications were classified in the postal inquiry in the census. The number of opposite cases was over 1 000.

Overall the results of the census for this branch were highly consistent with the findings of the evaluation study.

Financing, insurance, real estate and business services

Eighty-two per cent of the people classified in the census in the branch of financing,

insurance, real estate and business services were slotted in this same category in the evaluation study as well. The estimate of the total number of jobs in this branch was 4 000 higher than the number indicated by the evaluation study.

Some of the people classified in the category of financing in the census were defined as service and trade workers in the population census; a few thousand were also slotted under industry and building and construction. The population census, on the other hand, put some of those defined by the evaluation study as engaged in financing under manufacturing and in the category of unknown.

However, the biggest difference of all occurred in the case of the economically non-active: 17 000 of those engaged in financing according to the census were not in the active labour force at all according to the evaluation stydy. Instead, 7 000 were students, 3 400 were retired, 3 200 ran their own household, and 2 400 were unemployed. In 1990 the economy was still going (reasonably) strong, and many students found part-time jobs through financing and business services.

Differences in the region of 1 000 – 2 000 persons occurred in several classes at the two-digit level. The census put the number of people engaged in public sanitation and laundry services at almost 5 000 higher than the evaluation stydy. This difference was due primarily to almost 5 000 people who were classified in this category in the census being defined as economically non-active in the evaluation study.

Public, social and personal services

The census put the number of people working in service jobs at almost 30 000 less than the evaluation study. However, this is a major branch and in percentage terms the figure amounts to just 4.5 per cent. Nine out of ten of those who according to the census were engaged in service industries were put in the same category in the evaluation study.

A total of 12 000 people who worked in service jobs in the evaluation study were placed in the category of agriculture and forestry in the population census, while 17 000 went into the category of unknown. The former group was already covered earlier in our discussion of agriculture and forestry. As regards the group of unknown in the population census, the biggest individual service categories in the evaluation study were institutes of general education and vocational training (4 500 people), nursing (2 800), public administration (1 300) and institutional care of the elderly (1 100).

In all classes at the two-digit level the number of gainfully employed people was lower in the census than it was in the evaluation stydy. The difference was greatest in social services at 14 000. Most of this difference was due to those outside the active labour force. A total of 13 000 people who according to the evaluation study were engaged in social services were defined in the census as not gainfully employed; the number of opposite cases was 6 500.

The biggest movements from the category of social service workers in the evaluation study were to cultivation and animal husbandry, totalling 2 700 people. The other transitions were mainly to other service jobs, the biggest of these being health care and social security administration (2 000), general nursing (1 500) and outpatient care in health centres (900). There was also some movement in the opposite direction, but these were generally on a smaller scale.

Another major difference at the two-digit level occurred in education, where the census had the number of employees at 8 300 less than the evaluation stydy. Of those engaged

in education according to the evaluation study, 2 500 were in general nursing according to the population census, 2 400 in cultivation and animal husbandry, 1 100 in education and culture administration, and 1 000 in real estate maintenance.

There were also some differences in public administration (with the number set at 4 000 less in the census) and in health care and nursing services (almost 6 000 less in the census). Of those classified in both categories in the evaluation study, large numbers were classified in the census in cultivation and animal husbandry; from public administration 1 700 and from health and nursing services 2 900. In addition, 1 200 people who were engaged in public administration according to the evaluation study were defined in the census as working in civil engineering; 1 200 in real estate maintenance; 1 200 in the maintenance of outdoor facilities; and 2 200 in institutes of general education. The explanation here may lie in the fact that in the register inference the person has been slotted into the category of municipal real estate maintenance, while the evaluation study has defined that same person as working at the municipal office. In this situation the census is probably more in the right than the evaluation study.

Industry unknown

In the census a total of over 50 000 people remained in the category of industry unknown. These will be cases where, for instance, it is inferred from their income that they are gainfully employed. There are also large numbers of entrepreneurs who cannot be allocated to any category on the basis of their pension data.

The evaluation study put 5 000 of those people classified as not employed into the category of retired; 4 000 in the category of students; less than 4 000 as running their own household; and 2 000 as unemployed. The category of unknown in construction was already discussed above, where it was noted that this class may include people working for unregistered employers. It is quite likely that people working for unregistered employers have remained in the unknown category in other industries as well: farm workers in agriculture, taxi drivers in transportation, sales assistants in retailing, and barbers in personal services

Table 7. Industry unknown in the census according to classification in evaluation study

Industry	No.	Per cent
Agriculture and forestry	3 900	7
Mining and quarrying	100	0
Manufacturing	2 100	4
Energy management	300	1
Construction	4 300	8
Trade and catering	3 400	7
Transportation	1 600	3
Financing and insurance	4 000	8
Public, social and personal services	17 000	32
Unknown	400	1
Not employed	15 500	30
Total	52 700	100

4.6 Occupation

In the register-based census, data on occupation were derived as follows: First, different sources were examined to obtain job descriptions and professional titles in plain language. Then, from these data the principal title was inferred for each individual, and these in turn were translated into occupational codes.

Plain-language job descriptions were obtained from the following sources:

Source	Total no. of people for whom title obtained from source
– tax register	1 350 000
– State Treasury employment register	200 000
– municipal pension insurance register	440 000
– agriculture census register	29 000
– Church employment register	17 000
– Ministry of Labour registers on job applicants	36 000
– central population register (people who had moved)	40 000
– Social Insurance Institution's employment register	5 000
– registers of the Confederation of Finnish Industries and the Confederation of Commerce Employers	100 000
– the 1985 census file	15 000

There remained quite considerable numbers for whom relevant data could not be obtained from any register on current occupation. In some cases (most notably for entrepreneurs) occupation had to be inferred on the basis of the industry in which they were active; these cases numbered 40 000.

The coding of plain-language job titles used an automatic coding system as far as possible. This system consisted of a file in which codes had been entered for different job titles in advance, and for each case the relevant code was searched automatically. In cases where no appropriate code was available in the file, the job was done manually.

In the evaluation study, occupation was queried with the following question:

6 Occupation in this workplace:

_____

6 Occupation must be an accurate job description of what you actually do on the job on a daily basis. Degrees are not the same thing as occupations. Write

- bank consultant (not MBA)
- head of department (not professor)
- welder (not labourer).

The chief difference between the census and the evaluation study here was the data source they used; the job titles obtained were processed in the same way in both data sets. In the evaluation study occupation was obtained from the same place of work as the data on the respondent's current workplace. In the register-based system there was always the possibility that the respondent's occupation was not from the workplace that had been inferred as his or her chief place of employment at year-end.

Of those people who were classified as gainfully employed both in the census and in the evaluation study, 86 per cent were placed in the same category at the level of main classes. At the two-digit level 78 per cent went into the same category and at the most accurate level of the occupational classification 71 per cent.

The data on occupation in the 1985 census showed a closer correspondence with the evaluation study in that year than was the case in 1990. In 1985, 91 per cent (main classes) and 84 per cent (two-digit level) were classified in the same occupational category in the census and in the evaluation study.

Coding method

Amongst the cases that were automatically coded in both data sets there was a greater number of those that were classified in the same category than amongst cases where manual classification was used in at least one of the data sets. In the category of automatic coding, the proportion of cases classified in the same category at the single-digit level was 91 per cent; at the two-digit level 85 per cent; and at the most accurate level of the classification 80 per cent. The corresponding figures for cases that were coded manually in both data sets were 70 per cent, 57 per cent and 42 per cent. In those cases where coding was done manually in one material but automatically in the other, the proportions of those classified in the same way were approximately the same as in cases that were manually coded in both materials.

The reason why a larger proportion of those cases that were automatically coded came in the same class was that automatic coding was based on a straightforward occupational title, whereas manual coding involved more ambiguous job descriptions and titles as well as inadequate data.

Industrial status

At the single-digit level 87 per cent of both wage earners and entrepreneurs were classified in the same category. At the two-digit level the figure for wage earners was 80 per cent and for entrepreneurs 71 per cent; and at the most accurate level of classification 73 and 68 per cent, respectively.

Among entrepreneurs, 95 per cent of those that were automatically coded in both materials were slotted in the same category; the figure for wage earners was 91 per cent. Clearly then there were no problems of coding when an entrepreneur had a title that could be automatically coded. However, register data on entrepreneurs was incomplete far more often than for wage earners: 84 per cent of wage earners were coded automatically in comparison with 79 per cent of entrepreneurs.

Place of work

Among those who worked for the same enterprise in both data sets, 88 per cent (one-digit level), 82 per cent (two-digit level) and 75 per cent (four-digit level) were classified in the same occupational category. Whether the person worked in the same or different establishment in the different data sets, was of no consequence with regard to occupational classification.

In the case of those who had incomplete codes for enterprise and/or establishment in one or the other material, 80 per cent (one-digit level), 67 per cent (two-digit level) and 62 per cent (four-digit level) were classified in the same categories. Among those working for different enterprises in the two materials, the figures were 78 per cent, 68 per cent and 60 per cent, respectively.

Enterprise and/or establishment codes were often incomplete in the case of entrepreneurs; for instance, the code was almost always missing for farmers, the biggest single entrepreneur group. It is quite clear that people who are given different enterprise codes in different data sets will also have different occupations more often than people who according to both materials worked for the same enterprise. Job changes often involve changes of occupation as well.

Wage earners' employer sector

Municipal employees were classified in the same occupational category in the register material and in the questionnaire material more often than other groups: at the one-digit level the figure was 92 per cent, at the two-digit level 88 per cent and at the four-digit level 82 per cent. The figures for state employees were 89 per cent, 83 per cent and 76 per cent; and for wage earners in the private sector 84 per cent, 76 per cent and 69 per cent.

For wage earners in the private sector these data were chiefly obtained from tax registers, in which data on occupation are based on self-report. In the public sector the data came from wage registers, where the details are provided by the employer. If the data on occupation for the private sector were to be obtained from annual taxation statements made by companies, that would no doubt serve to improve the quality of data on occupations.

Table 8. Main classes of occupations

EvaluationStudy	Census										
	0	1	2	3	4	5	6/7	8	9	Unknown	Not employed
0 Technical etc.	479 900	14 500	5 300	8 400	300	1 900	12 200	7 200	1 400	6 400	29 200
1 Administrative etc.	22 700	28 4100	15 100	2 500	200	5 300	7 900	4 900	400	4 300	10 500
2 Sales work	6 700	11 900	146 100	1 400	0	3 200	7 400	4 100	100	2 900	11 900
3 Agriculture and forestry	1 800	400	1 000	151 100	0	900	2 500	1 200	100	1 400	21 800
4 Mining and quarrying	100	0	100	100	1 700	100	1 000	0	0	0	300
5 Transportation	1 700	3 800	2 200	2 900	200	123 200	6 000	2 400	300	1 500	6 900
6/7 Manufacturing	10 100	4 500	7 800	9 600	800	7 500	456 200	7 500	600	6 800	31 400
8 Services	6 700	3 700	4 200	5 500	100	3 000	8 900	238 000	400	4 200	21 000
90 Military	200	100	100	100	0	100	0	700	7 900	0	0
Not employed	29 200	13 800	15 100	27 200	200	6 100	25 300	20 700	1 000	20 300	–
A. Census total (sample)	559 100	336 800	197 000	208 800	3 500	151 300	527 400	286 700	12 200	47 800	133 000
B. Census total (population)	559 200	337 000	197 100	209 000	3 600	151 400	528 200	287 100	12 200	47 900	134 600
C. Evaluation study total	566 700	357 900	195 700	182 200	3 400	151 100	542 800	295 700	9 200	3 700	158 900
	+/–5 000	+/–4 600	+/–4 000	+/–3 200	+/–700	+/–3 100	+/–4 900	+/–4 100	+/–900	+/–800	+/–5 600
D. Correctly classified	479 900	284 100	146 100	151 100	1 700	123 200	456 200	238 000	7 900	–	–
E. Percentage of correctly classified	85,8	84,4	74,2	72,4	48,6	81,4	86,5	83,0	64,8	–	–
F. False inclusion	79 200	52 700	50 900	57 700	1 800	28 100	71 200	48 700	4 300	47 800	133 000
G. False omission	86 800	73 800	49 600	31 100	1 700	27 900	86 600	57 700	1 300	3 700	158 900
H. Gross error	166 000	126 500	100 500	88 800	3 500	56 000	157 800	106 400	5 600	51 500	291 900
I. Net error	–7 500	–20 900	1 400	26 800	200	300	–14 600	–8 600	3 000	44 200	–24 300
	+/–5 000	+/–4 600	+/–4 000	+/–3 200	+/–700	+/–3 100	+/–4 900	+/–4 100	+/–900	+/–800	–
J. Relative net error	–1,3	–6,2	0,7	12,8	5,7	0,2	–2,8	–3,0	24,6	92,5	–
	+/–0,9	+/–1,4	+/–2,0	+/–1,5	+/–19,4	+/–2,0	+/–0,9	+/–1,4	+/–7,4	+/–1,7	–

Table 9. Occupation at two-digit level in 1990 census and evaluation study

Class	Census	Evaluation study	Difference	Difference %
00	48 500	46 400 +/– 2 100	2 100	5
01	93 300	95 300 +/– 2 900	–2 000	–2
02	27 000	25 700 +/– 1 600	1 300	5
03	115 900	117 700 +/– 2 700	–1 800	–2
04	20 500	20 400 +/– 1 200	100	0
05	107 600	104 300 +/– 2 500	3 300	3
06	7 600	6 300 +/– 800	1 300	21
07	7 900	7 300 +/– 800	600	8
08	25 000	29 200 +/– 1 800	–4 200	–14
09	105 700	113 500 +/– 3 300	–7 800	–7
10	16 000	17 000 +/– 1 300	–1 000	–6
11	59 200	79 700 +/– 3 000	–20 500	–26
12	25 800	30 600 +/– 1 900	–4 800	–16
13	60 100	64 100 +/– 2 500	–4 000	–6
14	6 800	7 600 +/– 1 000	–800	–11
15	169 000	158 600 +/– 3 900	10 400	7
20	27 100	26 600 +/– 1 800	500	2
21	11 500	11 700 +/– 1 400	–200	–2
22	21 900	21 100 +/– 1 800	800	4
23	136 600	136 100 +/– 3 900	500	0
30	164 800	105 100 +/– 3 400	59 700	57
31	25 100	57 900 +/– 3 100	–32 800	–57
32	0	100 +/– 100	–100	–100
33	2 900	2 100 +/– 500	800	38
34	15 900	16 400 +/– 1 400	–500	–3
40	1 100	1 200 +/– 500	–100	–8
41	900	600 +/– 300	300	50
42	300	400 +/– 300	–100	–25
49	1 300	1 000 +/– 500	300	30
50	3 000	3 000 +/– 600	0	0
51	2 600	2 400 +/– 500	200	8
52	700	800 +/– 200	–100	–13
53	3 200	3 000 +/– 300	200	7
54	80 000	80 400 +/– 2 400	–400	–0
55	7 800	6 800 +/– 800	1 000	15
56	6 000	6 100 +/– 900	–100	–2
57	18 100	18 100 +/– 1 300	0	0
58	29 000	29 300 +/– 1 800	–300	–1
59	800	1 200 +/– 400	–400	–33
60	6 600	7 800 +/– 900	–1 200	–15
61	23 400	23 300 +/– 1 500	100	0
62	4 000	4 200 +/– 700	–200	–5
63	8 300	8 200 +/– 1 100	100	1
64	6 400	6 600 +/– 800	–200	–3
65	129 100	129 300 +/– 3 400	–200	–0
66	57 000	56 300 +/– 2 200	700	1
67	63 400	66 600 +/– 2 700	–3 200	–5
68	14 800	17 100 +/– 1 400	–2 300	–13
69	38 200	41 300 +/– 2 400	–3 100	–8
70	19 800	19 900 +/– 1 300	–100	–1
71	3 400	3 100 +/– 700	300	10
72	22 600	22 300 +/– 1 500	300	1
73	19 500	18 500 +/– 1 300	1 000	5
74	300	100 +/– 100	200	200
75	21 200	19 200 +/– 1 600	2 000	10
76	11 800	16 000 +/– 1 500	–4 200	–26
77	42 000	43 300 +/– 2 300	–1 300	–3
78	27 700	28 400 +/– 1 900	–700	–2
79	8 800	10 900 +/– 1 500	–2 100	–19
80	26 900	26 000 +/– 1 400	900	3
81	96 200	100 700 +/– 2 700	–4 500	–4
82	30 800	31 800 +/– 2 000	–1 000	–3
83	100 400	104 100 +/– 3 200	–3 700	–4
84	16 600	15 700 +/– 1 000	900	6
85	3 900	4300 +/– 600	–400	–9
86	2 200	2 800 +/– 700	–600	–21
87	2 000	2 100 +/– 500	–100	–5
88	2 200	2 300 +/– 500	–100	–4
89	6 000	5 800 +/– 900	200	3
90	12 200	9 000 +/– 1 000	3 200	36
91	47 800	3 400 +/– 1 200	44 400	1 306
Total	2 332 300	2 305 500 +/– 8 800	26 800	1

Technical, physical science, social science, humanitic and artistic word

The census put the number of people engaged in technical etc. work at 7 000 less than the evaluation stydy. In both data sets 86 per cent of the cases were placed in the same category.

In the classes at the two-digit level, the biggest differences were found among those engaged in the arts (where the census put the number at 4 000 too low) and in teaching jobs (3 000 too many). The reason why the census failed to identify artists was that it left the people who according to the evaluation study were engaged in the arts entirely outside the active labour force. One explanation could be that there are no pension schemes for jobs in the arts and that artists have no taxable income, and accordingly the job leaves no traces in any register. Nonetheless artists will regard themselves as such and write that down in a questionnaire inquiry.

Administrative, managerial and clerical work

The census understated the number of people engaged in administrative, managerial and clerical jobs by over 20 000. Eighty-four per cent of those classified in this category by the census were placed in the same class in the evaluation study.

The biggest difference at the two-digit level occurred in the category of administrative work for business companies and organizations, where the number in the census was over 20 000 lower than in the evaluation stydy. This huge difference is explained by the fact that people with a technical training and occupying management positions were far more often classified in the census under class 0 (planning, management, research, supervision and performance jobs in technical fields) than was the case in the evaluation study, while sales management was placed under class 2 subgroups (wholesalers and retailers and trade agent jobs). This may be due to the person putting himself down as an engineer in his tax form and as a technical management in the evaluation study.

In the classes at the two-digit level, the census also understated the number of people working in accountancy, cashier jobs as well as in secretarial and typing jobs: the total number was 10 000 short of the figure given by the evaluation stydy. By contrast, the census put the number of those engaged in other accountancy and technical office work at 10 000 higher than the evaluation stydy. This might have been due to people having rather general descriptions of their occupation in the register (bank employee, secretary, etc.), while in the evaluation study they might have said they were a bookkeeper, payroll clerk, or cashier. So in the evaluation study the person would be classified under accountancy and cashier work or under secretarial and typing jobs, but in the census under the general category of clerical work (15).

Sales work

The census and the evaluation study gave approximately the same numbers for people working in sales jobs. However, only 74 per cent of those classified in this category in the census was placed in the same group in the evaluation stydy. The biggest differences came from those cases where people defined by the evaluation study as engaged in sales work were placed in the census under the category of administrative, managerial or clerical work or under economically non-active. The differences were almost equally big the other way round, i.e. cases where people were classified in the census under sales work but in the evaluation study outside the active labour force or in administrative, managerial and clerical work.

At the two-digit level there were no major differences in any class.

Agriculture and forestry, fishing

The census put the number engaged in agriculture and forestry at almost 30 000 higher than the evaluation stydy. The number indicated by the census is indeed very probably overstated as a result of the method of register inferences: that is, all those cases in the occupational position of entrepreneur with a pension insurance for agricultural producers were defined as farmers. This was because there was no detailed information available on the occupation of these entrepreneurs. Accordingly it is possible that among those classified as farmers or agricultural producers there are also people engaged in other types of business or people who in the evaluation study said they were not gainfully employed.

Seventy-two per cent of the cases were placed in the same category in agriculture and forestry. The biggest difference came from those cases where the census classified the person in agriculture but the evaluation study in the group of economically non-active.

Looking at the figures at the two-digit level, it is clear that it makes sense to put farmers and farm workers (classes 30 and 31) in the same category. This is because the census also counted assisting family members among farmers, whereas in the evaluation study they were defined as farm workers, as in previous inquiry-based population censuses.

Mining and quarrying, deep drilling and mineral processing

The number of people engaged in mining and quarrying and mineral processing was roughly the same in the census and the evaluation stydy. However, only half of the cases classified in the census in this category were placed in the same jobs in the evaluation stydy. The difference was primarily due to the fact that people were classified in one data set under manufacturing work and in the other under mining and quarrying, and vice versa. This, in turn, was due to the shortage of data available on these people, making both classifications equally legitimate. On the other hand, the main category of mining and quarrying is so small that the differences may be explained by sample variations as well.

Transportation

The number of people engaged in transportation was roughly the same in the census and the evaluation stydy. Eighty-one per cent of those placed in this category in the census went into the same class in the evaluation study.

At the two-digit level, too, the number of people was approximately the same in all classes both according to the census and the evaluation study.

Manufacturing work

The census put the number of people working in manufacturing jobs at 15 000 less than the evaluation stydy. Eighty-seven per cent were classified in the same category in both materials.

At the two-digit level the most significant difference was found in the group of packaging work, where the figure in the census was 4 000 lower than in the evaluation stydy. Most of this difference is explained by cases classified in the evaluation study under packaging work but in the census under other manufacturing jobs.

Other categories of manufacturing jobs where the figures remained below those

recorded in the evaluation study were textile, woodworking, painting and lacquering, and other building and construction jobs. In these categories the census put the numbers at one or two thousand too low, slotting them either in the economically non-active group or in other manufacturing jobs. The difference may be explained by the fact that people in building jobs tend to change jobs more frequently than others. At the time that they fill in their tax form, people will write down what they regard as they principal occupation at that particular time or accept the occupational title that has been printed in the form, even though it may no longer be fully accurate.

Service work

The census underestimated the number of people engaged in service work by almost 8 000. Eighty-three per cent of those classified in this category in the census were placed in the same group in the census as well. At the two-digit level there were no significant differences.

Military work

The number given by the census for people engaged in military work was 3 000 higher than indicated by the evaluation study, amounting to an excess of one quarter. The reason for this was that people marked themselves down as officers in their tax forms even though they were no longer working for the Army. In many cases people counted as officers in the census were classified as retired in the evaluation study.

The most problematic category as far as military occupations were concerned was that of lower warrant officers: the census put their number at 5 000 higher than the evaluation stydy. Part of the difference is explained by the fact that the number of officers and higher warrant officers in the evaluation study was 1 500 higher than in the census. Even though some of the lower warrant officers were incorrectly classified in the evaluation study in the class of higher warrant officers, there still remains an excess of 3 000 lower warrant officers in the census.

Occupation unknown

The occupation of some 50 000 people remained unknown in the census. The evaluation study put 43 per cent of these people outside the active labour force, 14 per cent in manufacturing occupations, 13 per cent in technical etc. work (main class 0), 9 per cent in administrative, managerial and clerical work, and 9 per cent also in service work.

4.7 Socio-economic status

In the population census, socio-economic status is in most cases determined on the basis of the individual's occupation (certain job titles are slotted under certain socio-economic status groups). In some cases industry and the juridical form of place of work will also influence the decision on socio-economic status. In a register-based census no distinction can be made among entrepreneurs between employers and self-employed.

In the evaluation study socio-economic status was defined on the same basis as in the census. However, the questionnaire did not contain a separate item on socio-economic status, but that was inferred (in most cases) from the person's occupation code.

Among those who at the level of main classes were in the active labour force in both data sets, 89 per cent were classified in the same category of socio-economic status; at the two-digit level the figure was 81 per cent.

According to the evaluation study, the number given by the census for agricultural producers or farmers was 25 000 too high. The reason for this was in the method of register inference, as described earlier on page 42. Over 12 per cent of those classified as farmers in the census were outside the active labour forcer according to the evaluation study, while 3 per cent were other entrepreneurs.

Table 10. Socio-economic status of the gainfully employed

Socio-economic status	Census	Evaluation study	Difference	Difference (%)
Entrepreneurs	320 700	325 700 +/– 5 800	–5 000	–2
Agricultural producers	161 400	136 300 +/– 2 900	25 200	18
Other entrepreneurs	159 300	189 400 +/– 5 600	–30 100	–16
Upper-level administrative, managerial or professional employees	342 200	350 700 +/– 4 600	–8 500	–2
Upper management	56 800	65 900 +/– 2 700	–9 100	–14
Employees in research and planning	89 500	85 200 +/– 2 900	4 300	5
Employees in education and training	83 900	81 700 +/– 1 800	2 200	3
Others	111 900	117 900 +/– 3 400	–6 000	–5
Lower-level administrative or clerical employees	786 600	777 500 +/– 6 400	9 100	1
Supervisors	155 600	151 100 +/– 4 000	4 500	3
Clerical and sales workers working independently	304 300	298 400 +/– 4 800	5 900	2
Clerical and sales workers in routine work	103 300	99 100 +/– 3 100	4 200	4
Others	223 400	228 900 +/– 3 900	–5 500	–2
Manual workers	835 000	841 800 +/– 6 500	–6 800	–1
Agriculture and forestry	41 200	36 000 +/– 2 100	5 200	14
Manufacturing	352 000	351 300 +/– 5 300	700	0
Other production	150 300	165 800 +/– 4 700	–15 400	–9
Distribution and services	291 400	288 800 +/– 5 100	2 700	1
Unknown	47 800	9 800 +/– 1 400	38 000	–
Active labour force total	2 332 300	2 305 500 +/– 8 800	26 800	1

On the other hand, the number of other entrepreneurs was 30 000 lower than in the evaluation stydy. The majority of the entrepreneurs in the evaluation study but no so in the census, had been left outside the active labour force, i.e. the method of register inference had failed to identify the activities of these people in private business. During the years of economic prosperity in the latter half of the 1980s small companies mushroomed all over the country, but by 1990 many of these were no longer generating any taxable income. Nevertheless respondents might have marked themselves down as entrepreneurs.

In the census the number of upper-level employees occupying management positions fell short of the figure recorded in the evaluation study by almost 10 000. This was due to the method of data collection: sometimes register data are so incomplete that people can be easily slotted in several different occupations, or the person may have reported a different job title in the register than in the questionnaire. This applies most particularly to managers. Amongst upper-level employees occupying management positions in the evaluation study, some 10 000 were other upper-level employees in the census and a further 10 000 lower-level employees.

The census put the number of farmers at 5 000 higher than the evaluation study.

Other production workers numbered 15 000 less in the census than in the evaluation stydy. This difference was chiefly due to the fact that part of the production workers in the evaluation study were classified in the census under manufacturing work, service and distribution work as well as in the group of economically non-active.

The breakdown in the evaluation study of those who in the census were slotted in the category of unknown socio-economic status was as follows:

Agricultural producers	1.6 %
Other entrepreneurs	11.5 %
Upper-level employees	6.3 %
Lower-level employees	15.6 %
Manual workers	22.0 %
Economically non-active	42.9 %

Almost half of the people whom the census was unable to place in any socio-economic group, were not part of the active labour force according to the evaluation study.

5 Housing

5.1 Comparison of housing data

The purpose of comparing the housing data from the two sources was to ascertain whether the person's official domicile was the same in the central population register and in the evaluation questionnaire. Other items of interest included temporary housing and subtenancy, on which no register data are available. Therefore, as far as subtenancy was concerned, no direct comparisons can be made; instead we will be looking at the profile of subtenants on the basis of the data collected in the evaluation study.

Domicile data were compared both at the level of individual respondents and at the level of household-dwelling units. The former means that we looked at whether people had the same domicile code in both data sets, i.e. at whether the person was resident in the same dwelling according to both materials. In the household-dwelling unit comparison the purpose was to establish whether the same persons formed a household-dwelling unit in the evaluation study and in the register data. Where differences were found in household-dwelling unit compositions, the reasons for those differences were explored.

The population for the 1990 census was formed by all people permanently resident in Finland on December 31st, 1990. This population was drawn from the files of the central population register. In that register each Finnish citizen has a domicile code, which is updated on the basis of notices of removal. Formerly data on domicile were updated on an annual basis in a comprehensive census registration. The last official registration was carried out on 1 January 1989; since then domicile has been determined exclusively on the basis of notices of removal. At the time of the census the notice came in four copies. The person concerned filled in the top sheet with all the relevant details; one copy remained with that person, one went to the representative of the owner of the building, one went to the post office (serving as a notice of change of address) and one went to the central population register.

The register entry on domicile has various administrative consequences (such as in taxation). In the census all people were allocated to their official place of domicile, and here domicile affected data on housing conditions, for example. If, for instance, residents of adjacent dwellings were misclassified with the domicile codes of a different dwelling, one dwelling would be registered as crowded and the other as uninhabited.

Domicile code

The domicile consists of a sequence of 23 characters; it specifies the dwelling in each register of buildings and dwellings. Each dwelling as well as each person has a domicile code with which persons can be linked up with dwellings.

People who live in the same dwelling make up a household, and those who are marked down in the register as living in the same dwelling have the same domicile codes.

The domicile codes breaks down into three main components as follows:

real estate code, 15 characters
- municipality code, 3 characters
- village or district code, 3 characters
- house or block code, 4 characters
- estate or farm code, 4 characters
- verification code, 1 character

building code, 3 characters
dwelling code, 5 characters
- dwelling number, 3 characters
- staircase number, 1 character
- dwelling division letter, 1 character

The latter code is very rare indeed; it is given to dwellings that have been split up and divided into two separate units. Similarly, the staircase number is only used in blocks of flats or similar, whereas detached and semi-detached houses will not have such a code.

In the evaluation study respondents were asked to list all people who were living in the dwelling concerned on December 31st, 1990. To facilitate this the names of all those who were supposed to live in the dwelling according to register data, were printed on the forms as they were sent out.

In the evaluation study domicile codes were copied from those census dwellings with which they were compared. If it transpired in the inquiry that there were more dwellings in a building than was indicated by the register data, that building was given the same code as the sample building but the dwelling code was changed for one which showed that dwellings had been added on the basis of the inquiry data.

5.2 Coverage of personal data

The material for the evaluation study included 56 persons who according to the register data were not permanently resident in the country on December 31st, 1990. This represented 0.06 per cent of the whole sample.

Analysis of the register data gave the following breakdown for these people:

– permanently abroad	11
– deceased	7
– born in 1991	2
– twice unknown in census registration	2
– incomplete personal identity code in inquiry data and failure to identify person in register	5
– not found in register at all	2
– registered as foreign national in register at year-end 1991	10
– registered as Finnish national in register at year-end 1991	17
Total	56

In the two latter groups there were some cases who had moved after December 31st, i.e. they had moved into Finland or within Finland during 1991. This applied in the case of seven foreigners and six Finns. It is possible that these people were in fact resident in Finland on December 31st, 1990, but the official date of moving was later.

All these 56 people were excluded in the evaluation study from the population permanently resident in Finland.

The evaluation study sheds no light at all on the excess coverage of the register-based data. That is, if a person who according to the census lived in a sample dwelling but not so according to the evaluation study on December 31st, 1990, then it is possible that

- the person had moved within Finland and now lived in a dwelling that was not in the sample of the evaluation study
- the person had moved abroad
- the person had died
- the person lived in a sample dwelling but was reluctant to indicate that in the evaluation survey.

The findings of this survey indicate that the central population register provides good coverage of the population.

5.3 Domicile of permanently resident population

The discussion that follows is restricted to the domicile of those people who were marked down as permanent residents both in the register data and in the inquiry material. This is because in the evaluation study, people were registered as residents of those dwellings in which they lived temporarily. In other words, people who in the inquiry have a temporary place of residence have no permanent domicile data. Below, the domicile codes of people with temporary addresses will be examined in connection with temporary housing.

Among those with permanent addresses in both data sets, 97 per cent lived in the same dwelling according to both the census and the evaluation stydy. The proportion of those living in the same building but in a different dwelling was 0.5 per cent, while the figure for those living in different buildings of the same real estate was 0.2 per cent. The number living in an entirely different real estate was 110 000 (2.2 per cent), of whom one fifth were classified as residents of different municipalities according to different data sets. In other words the evaluation study indicated that the register data had the domicile of a total of 22 000 persons wrong, which represents 0.4 per cent of the population who in 1990 had only a permanent domicile. In regional terms the domicile codes differed least in southern Finland.

Map 1 on page 50 describes the correspondence of domicile codes in different municipalities, which are divided in the map into four classes. We have marked with white those municipalities where all people in the sample with only a permanent domicile were marked down as residents of the same dwelling both in the register data and in the questionnaire material. The total number of these municipalities is 113, representing around one quarter of all. The remaining municipalities are divided into three groups of equal size.

Municipalities with low and high correspondence of register-based and questionnaire-based domicile codes were more or less evenly divided across the country.

Among those who according to the register data lived in detached houses, 97.1 per cent lived in the same dwelling in both data sets; 0.8 per cent lived in different dwellings in the same real estate; and 2.0 per cent in different real estates. The figure was slightly higher for those living in terraced houses, i.e. 97.4 per cent lived in the same dwelling. The highest correspondence was found for people who lived in blocks of flats: the codes were fully identical for 98.0 per cent; in addition, 0.3 per cent lived in the same building but in different dwellings. The poorest result was obtained for people living in non-residential buildings: only 77 per cent lived in the same dwelling according to both data sets, 5.2 per cent lived on the same real estate but in different dwellings, and 18.2 per cent on different real estates.

Errors in domicile data were most frequent in old buildings. Seventy-eight per cent of those living in buildings that had been built before 1920 lived in the same dwelling according to both data sets. On the other hand, only 2 per cent of those living in new buildings built since 1960, were in different dwellings.

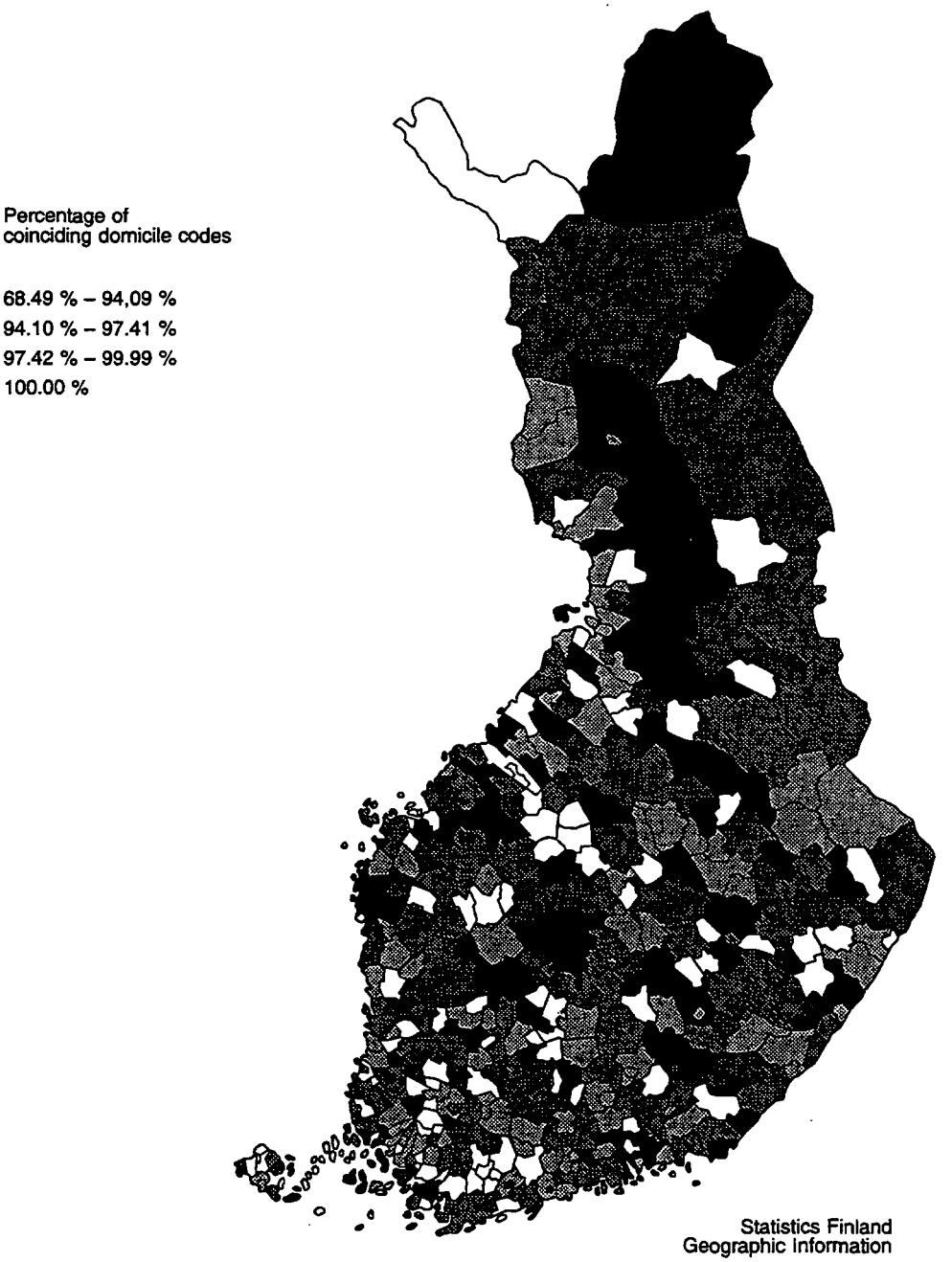
The quality of domicile data did not differ to any significant degree between people living in densely and sparsely populated areas. Of those who according to the census lived in densely populated areas, 97.7 per cent lived in the same dwelling according to both data sets; the figure for those living in sparsely populated areas was one percentage point lower.

Table 11. Correspondence of domicile codes

Location (regional planning unit)	Same real estate Same dwelling	Different dwelling	Different realstate
Helsinki	98,2	0,7	1,1
Itä-Uusimaa	94,7	1,7	3,6
Länsi-Uusimaa	98,1	0,0	1,9
Läntinen Uusimaa	96,3	0,9	2,8
Varsinais-Suomi	97,7	0,5	1,8
Satakunta	96,4	0,9	2,8
Tampere	96,7	1,1	2,2
Kanta-Häme	96,8	1,0	2,3
Päijät-Häme	98,5	0,4	1,1
Kymenlaakso	98,2	0,5	1,3
Etelä-Karjala	97,1	0,9	2,0
Etelä-Savo	95,7	0,9	3,4
Pohjois-Karjala	96,8	0,8	2,4
Pohjois-Savo	97,1	0,5	2,4
Keski-Suomi	96,2	0,8	3,0
Vaasa Province	95,9	0,8	3,3
Pohjois-Pohjanmaa	96,6	0,6	2,8
Kainuu	95,4	0,3	4,3
Lapland	95,7	0,7	3,6
Åland	97,5	1,0	1,5
Whole country	97,0	0,7	2,2

Map 1.

Correspondence of domicile data in census and evaluation study by municipalities



5.4 Household-dwelling units

According to the census there were at year-end 1990 a total of 2 036 700 household-dwelling units in Finland; this figure being based on data for permanent domicile. When data for temporary domicile are also taken into account, the number rises to 2 064 000. In the evaluation study household-dwelling units were so formed that those people who had both a permanent and a temporary address were allocated to that household-dwelling unit in which they lived temporarily. The total number of household-dwelling units was 2 090 400, i.e. 26 000 more than in the census. The evaluation study put the total number of resident population at 4 925 000, which is more or less the same as the figure in the census, i.e. 4 927 000.

The number of two-person household-dwelling units in the census was 30 000 lower than in the evaluation stydy. On the other hand, the number of large household-dwelling units with at least five members was 10 000 higher than the figure given by the evaluation study.

Table 12. Size of household-dwelling units (=number of people living in a dwelling)

Evaluation study	Census						
	0	1	2	3	4	5+	Not included in material
0	77 200	11 200	4 100	1 200	1 100	500	30 900
1	18 400	609 100	19 400	3 400	1 200	1 300	16 300
2	10 400	19 800	578 300	24 400	4 200	3 400	10 500
3	4 300	3 100	9 200	294 200	14 600	3 000	4 200
4	3 200	600	1 700	6 600	270 100	8 300	4 300
5+	2 500	200	200	500	2 000	134 900	2 200
Not included in material for evaluation study	31 200	12 200	7 700	3 600	3 900	1 200	–
A. Census total (sample)	147 200	656 200	620 600	333 900	297 100	152 600	68 400
B. Census total (population)	145 100	666 500	622 000	334 400	290 000	151 500	68 400
C Evaluation study total	127 100	669 200	651 200	332 800	294 900	142 500	60 100
	+/–4 900	+/–9 200	+/–9 700	+/–7 500	+/–7 000	+/–5 000	+/–3 400
D Correctly classified	77 200	609 100	578 300	294 200	270 100	134 900	–
E Percentage of correctly classified	52,4	92,8	93,2	88,1	90,9	88,4	–
F False inclusion	70 000	47 100	42 300	39 700	27 000	17 700	–
G. False omission	49 900	60 100	72 900	38 600	24 800	7 600	–
H Gross error	119 900	107 200	115 200	78 300	51 800	25 300	–
I Net error	18 000	–2 700	–29 200	1 600	–4 900	9 000	–
	+/–4 900	+/–9 200	+/–9 700	+/–7 500	+/–7 000	+/–5 000	–
J Relative net error	12,4	–0,4	–4,7	0,5	–1,7	5,9	–
	+/–3,4	+/–1,4	+/–1,6	+/–2,2	+/–2,4	+/–3,3	–

The differences in the number of household-dwelling units and in their breakdown by size groups may have been due to cases where

- a detached house was included in the census as one household-dwelling unit while in the evaluation study it was divided into two, with a young couple/subtenants/elderly people living upstairs marked down on the form as one household-dwelling unit and the owners living downstairs as another; or
- people moving into flat A had filed a notice of removal but people moving from flat A into flat B had not, in which case flat A would have two household-dwelling units and flat B nil.

Ninety-one per cent of all dwellings had exactly the same residents in the census and in the evaluation stydy. According to the evaluation study the residents of 50 000 dwellings lived in different dwellings than in the census but on the same real estate. These might have been cases where a new house had been built on the same plot and the people concerned had moved into that house, or where one real estate had been split up into two, in which case both real estates had been given a new code and therefore the household-dwelling units had different domicile codes in the register and questionnaire data.

The census put the number of residents in household-dwelling units at 122 000 higher than the evaluation stydy. In other words, these household-dwelling units had common residents according to both materials, but according to the register data there was still someone else in these household-dwelling units in addition.

The extra people recorded by the census were often young people. In almost 55 000 household-dwelling units the extra people of register household-dwelling units were aged under 30; in 15 000 cases they were under 20, and in 30 000 cases between 20 and 29 years. In many of these cases we are very probably looking at children who have moved from home without any notice of removal being filed.

Figure 3 shows the number of people in different age groups who according to the evaluation study were missing from dwellings but who according to register data were still there. Two in three of these people were aged 15–29 years, and over half in the age group 20–24 years.

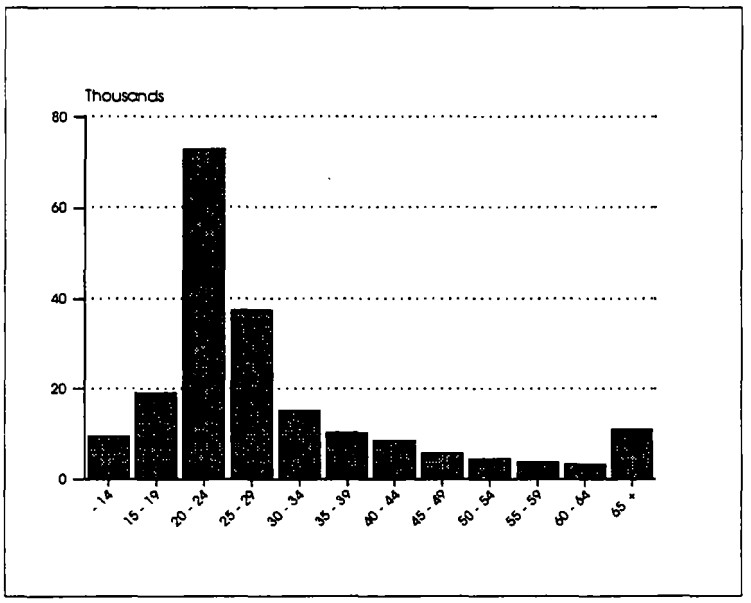


Figure 3.
***Persons living in dwelling* according to census but not according to evaluation study by age groups**

In those cases where the extra persons in the register were not in the age group 15–29 years, they were nonetheless often related to the people who lived in the household-dwelling unit according to the evaluation study as well. Typical cases of extra persons would be

- the family's grandparents
- the family's 'child' aged over 30
- a divorced spouse
- the family of the family's child

It is impossible to say on the basis of the material of the evaluation study where these extra people lived. That is, it is highly unlikely that the dwelling to which the extra person possibly had moved, would have been included in the sample in which case we would have known where that person lived.

There were 49 000 household-dwelling units in the census from which residents were missing according to the evaluation stydy. Both data sets had the same residents living in these dwellings, but according to the evaluation study there were additional people that were not accounted for in the census. Out of these cases 10 000 dwellings were such where all the extra persons identified lived in the dwelling temporarily. In household-dwelling units where the difference was due to a missing temporary resident from the register, the reason for the difference might have been that

- a person who on the questionnaire form was indicated as living in the household-dwelling unit actually lived temporarily somewhere else; or that
- the person had returned to his/her permanent residence, even though the register still indicated temporary living.

In a total of 5 000 household-dwelling units there were both shared residents and extra persons in both data sets.

5.5 Temporary residence

A temporary resident is a person who for whatever reasons (most typically in order to work or study) has moved out of his or her permanent place of residence for a certain period of time. Anyone moving out for a period longer than two weeks is required to file a temporary notice of removal.

Let us assume that a builder from Jämsä was working in Helsinki in 1990. From Monday to Friday he lived in a bedsit that his employer had rented, but during the weekends he travelled back home to his wife and child. He filed a notice of removal, saying that he would be living the whole year in Helsinki. This builder would have both a permanent and a temporary place on residence in the central population register. If we examine this case on the basis of the permanent place of residence, we would have the builder living in Jämsä and working in Helsinki. In terms of permanent residence his dwelling in Helsinki was empty, while the dwelling in Jämsä was occupied by three people: the builder, his wife and their child. From the vantage-point of temporary residence, the builder lived in Helsinki and was employed in Helsinki; the builder lived in the bedsit in Helsinki, while his wife and child lived in their flat in Jämsä.

The commonest reason for temporary residence is studying. This differs in nature from temporary residence because of work: people who move for job reasons normally return to their permanent place of residence after their assignment has ended. The student, on the other hand, will not necessarily move back to his or her domicile, which in most cases is the home of the student's parents;

the decision as to where one moves to live upon completion of one's studies depends essentially on where one manages to find a job.

Full-time studies do not constitute sufficient grounds for a change of permanent place of residence. For example, a student who comes from Kärsämäki and who is studying for a degree at the University of Tampere may be registered as a temporary resident of Tampere for as long as 10 years. The permanent place of residence remains Kärsämäki throughout, and Kärsämäki will also collect the taxes on any income that this student reports during this time. At national elections our student will vote for candidates from that constituency; and at local elections for representatives to the Kärsämäki town council.

When the sample for the evaluation study had been drawn, data on all people who according to the register lived in the dwelling concerned were printed on the housing forms. If the register indicated that the person had a temporary address, he or she was marked down as a resident of that dwelling which was given as temporary. The respondents were asked to check the list of residents and to update it according to the situation as at December 31st, 1990. The questionnaire returned was to list all the people living in the dwelling at year-end 1990.

The respondents were quite clearly confused to see that we were chiefly interested in temporary rather than permanent addresses. For instance, a father from Helsinki wondered why his daughter, who was studying and living in Turku, was not on the list of residents; had he not asked our advice he would have added his daughter's name to the list. On the other hand, an MP who was in the sample wondered why he had not been marked down in the list of residents of his home in his own constituency.

Out of the almost 100 000 people included in the sample, over 2 000 had both a temporary and permanent address according to register data. It was quite possible that these people were added to the list of residents even though they actually lived temporarily elsewhere. Therefore the interviewers checked the real place of residence of all those people who had both a temporary address and who had been added to the list of residents at their home. If the person did temporarily live elsewhere, that person was deleted from this list of residents.

The evaluation study put the total number of temporary residents at year-end 1990 at almost 90 000. According to register data the figure was quite considerably lower at 74 000.

The number of people classified as temporary residents in both data sets was 42 000. Of these people 83 per cent lived temporarily in the same dwelling according to both data sets. Nine per cent of the temporary residents lived in the same dwelling but in the different building, and one per cent on the same real estate. In 7 per cent of the cases the domicile codes put people on different real estates in different materials. In numerical terms these cases totalled 3 000, most of whom were marked down as temporary residents of different municipalities according to different materials.

A total of 47 000 people who according to the evaluation study were temporary residents, were not so according to the registers examined. One possible explanation is the failure of these people to file a notice of removal, or possibly to understand the question. 20 000 people reported living temporarily in a dwelling which according to register data was their permanent place of residence. One third of them said the reason for their temporary residence was that they were studying; one fifth that they had had to move because of their work; and almost half had some other reason or failed to give any reason. At least part of these people have pro-

bably misunderstood the question concerning temporary residence. If it is assumed that the majority of these people had misunderstood the idea of temporary residence, then the total numbers for temporary residents given by the census and the evaluation study actually came quite close to each other.

Of the people who according to register data were temporary residents, 35 000 were not so according to the evaluation stydy. These cases may be explained by people having moved out of their temporary dwelling, or by the reluctance of the respondent to say that the person concerned lives in that dwelling temporarily. When a person files a temporary notice of removal, he or she is required to give a date for when this ends. Even if that person returns to his or her permanent address before that date, the register will still have that person living at the temporary address as well.

In the evaluation study 70 per cent of temporary residents said they were not staying at their permanent address because they were studying; 13 per cent had moved because of their job, while 18 per cent gave some other or no reason. Other reasons for temporary residence included holidays and illness. According to the evaluation study there were a total of 57 000 dwellings in the country at year-end 1990 with only temporary residents.

Within the Helsinki regional planning district, the number of dwellings with only temporary residents was 7 600.

Table 13. Residential dwellings used for temporary residence only by provinces

Province	Number of dwellings with temporary residents only	Per cent of dwellings in the province
Uusimaa	8 300	1,4
Turku ja Pori	3 300	1,0
Häme	5 200	1,7
Kymi	6 500	4,3
Mikkeli	6 500	7,1
Pohjois-Karjala	7 100	9,2
Kuopio	2 300	2,1
Keski-Suomi	6 100	5,6
Vaasa	5 800	3,2
Oulu	3 900	2,2
Lapland	2 100	2,5
Total	57 100	2,6

5.6 Subtenancy

No register data are available on subtenancy. In the evaluation study the respondents were asked to identify all those living on a subtenancy basis in their dwelling at December 31st, 1990.

According to the evaluation study the total number of subtenants in the country was 18 800+/-2 100. In the Helsinki planning district alone the figure was 6 800, accounting for over one third of the total. Half of the subtenants lived in the eight biggest towns in the country.

Almost half of the subtenants lived in flats, 41 per cent lived in detached houses, 8 per

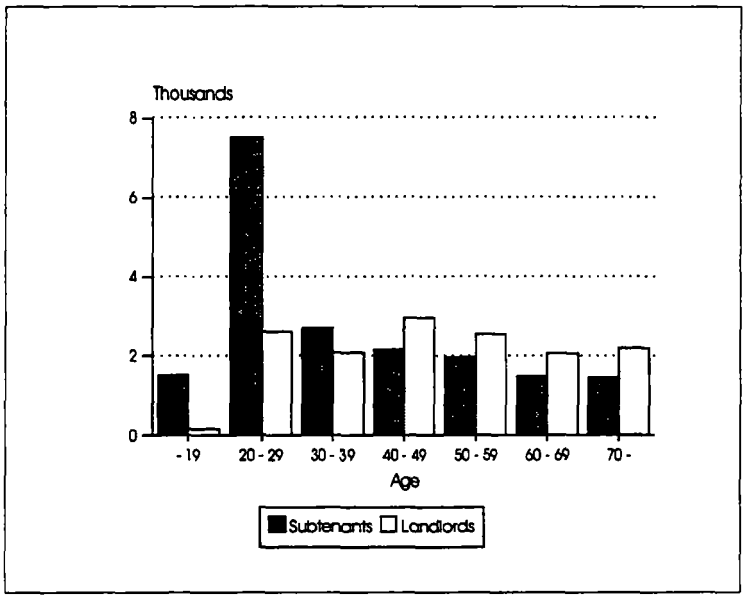


Figure 4.
Subtenants and landlords by age

cent in terraced houses and 4 per cent in other than residential buildings.

Over 40 per cent of the subtenants were in the age group 20–29 years. Men outnumbered women, accounting for 62 per cent of the total number.

Every other subtenant was gainfully employed. Eight per cent were unemployed, while pensioners, students, or other economically non-active groups accounted for 15 per cent each.

In the group of subtenants, 1 400 were also temporary residents.

The number of household-dwelling units reporting subtenants totalled 14 500. Most or 12 000 household-dwelling units with subtenants consisted of just the one member from the landlord's side.

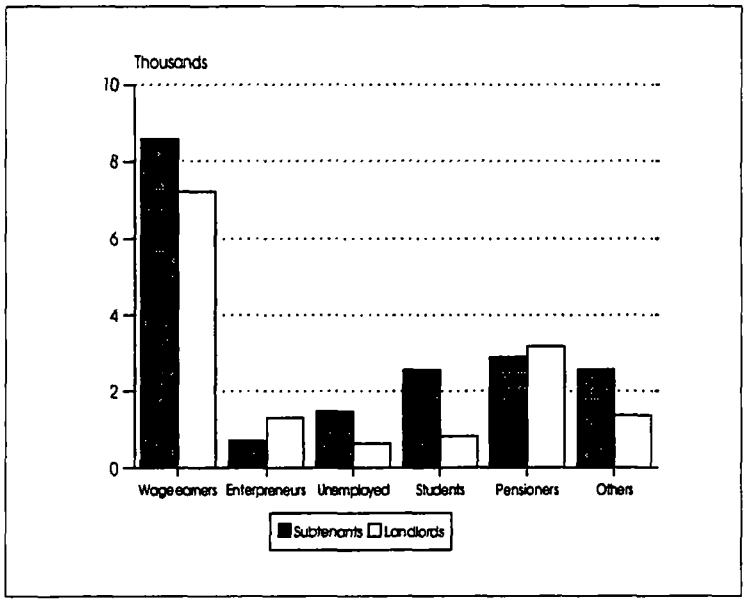


Figure 5.
Subtenants and landlords by main type of activity and occupational status

6 Dwellings

6.1 Comparison of data on dwellings

In this chapter we will be looking at the data collected in the census on dwellings and comparing that data with the corresponding data sets from the evaluation study. We begin by briefly discussing the coverage of the dwellings register and the existing stock of dwellings; and then proceed to examine specific data sets concerning tenure status, number of rooms, type of kitchen, floor area, and equipments (toilet, running hot water, shower or bathroom, sauna, balcony or terrace and electricity).

A dwelling is defined as a space

- which has one or more rooms
- which is intended for round-the-year use
- which has a minimum floor area of $7m^2$
- which has a kitchen or kitchenette
- which has a separate entrance from outdoors, from a staircase, from a porch or similar; if the entrance to the dwelling is through another dwelling, the two will be regarded as forming one dwelling.

The data on residential dwellings for the census were obtained from the building and dwellings file which is maintained by the central population register and which was created in connection with the 1980 census. The initial data for the register were collected in a questionnaire survey addressed to the occupants of the dwellings. Since then the register has been updated in connection with census registrations and by adding entries for new buildings. For the 1990 census, the population register centre carried out special inquiries to collect missing data.

Prior to compiling the census statistics, the data in the dwellings register were checked for logic and consistency, and dwellings that apparently did not belong there (such as those that had been unoccupied for long periods of time or that had very low standards of equipments) were removed from the files.

The dwellings data in the evaluation study were based on questionnaire data collected from occupants. The questionnaire was posted to a total of 45 869 dwellings. It was divided into two parts: the upper part concerned the residents of the dwelling; and the lower part the dwelling itself.

During data collection it became clear that especially in the case of real estates with detached houses, there was some confusion with cases of the 'upstairs of a detached house', both where there was an old building on the real estate that was no longer in residential use and where there was a new building that the people had moved into from their old house. In both of these cases the register may indicate that on the real estate there are two dwellings; one that is occupied and another that is not. Two dwellings questionnaires were sent to this real estate. The one that had the names of the residents filled in was more likely to be completed and returned; whereas the second one might well have remained unanswered. And then, when the reminder came in the post, the people concerned would wonder what this was all about; they had already replied to the questionnaire a month previously. If in these cases the repeat questionnaire was filled in, the respondents might have given the data on the same

dwelling that they did the first time round; and if they did not reply to it and an interviewer contacted them, even the interviewer might have been given the data for the first dwelling.

In these cases we would have two data sets but both concerning one and the same dwelling. In the processing of the questionnaire forms we found a total of 236 obvious cases of duplication. These duplicates were excluded from the analysis, while the original data were accepted for the dwelling to which the residents had been allocated according to register data.

The non-response number totalled 2 736, i.e. 6.0 per cent of the dwellings that received the questionnaire. The number of outright refusals was 196. The majority were not contacted; it was not very likely that we were going to get data on an unoccupied dwelling whose owner lived elsewhere in a different town and who only visited the dwelling more or less occasionally. The questionnaire might well have been thrown away without anyone ever even opening it, and it was also more or less impossible to try and get hold of the owner for an interview either. During the late spring and the summer we received several phonecalls from owners saying that they had only just received the questionnaire, as they hadn't been to the dwelling for a long time; and there must have been many similar cases who have hardly bothered to pay any attention.

6.2 Total number of dwellings

According to the census the total number of residential dwellings in Finland on December 31st, 1990, was 2 210 000; the figure given by the evaluation study was slightly higher at 2 218 000+/–5 000. Ninety-seven per cent of the dwellings classified as residential dwellings in the census were similarly classified in the evaluation study.

Excess dwellings in the census

There were 60 000 dwellings that the census counted as residential dwellings but that were not accepted as such by the evaluation study; these are described as excess dwellings.

According to the evaluation study, excess dwellings occurred most frequently in other than residential dwellings; the figure was 23 per cent. Almost half of the excess dwellings were in detached houses, one quarter in blocks of flats and 4 per cent in terraced houses. Of all the dwellings in the population census, 42 per cent were in detached houses, 43 per cent in blocks of flats, 12 per cent in terraced houses and 3 per cent in other buildings. According to the evaluation study one in five of the dwellings counted by the census in other than residential buildings were not part of the dwelling stock.

Almost one third of the excess dwellings were in sparsely populated areas, while the census put the proportion of dwellings outside densely populated areas at just 17 per cent. The proportion of excess dwellings in the sparsely populated areas of Northern Finland was particularly high: in the provinces of Oulu and Lapland about 60 per cent of the dwellings that the evaluation study did not count as part of the building stock, were located in sparsely populated areas. In the provinces of Kuopio and Mikkeli, the proportion of these cases was almost half.

Excess dwellings were very often located in old buildings. One quarter of them were in buildings built before 1920, while only 6 per cent of all dwellings in the census were this old. A total of 1 500 excess dwellings were in new buildings built since 1990. These were buildings that were not yet officially ready on December 31st, but which nonetheless had been moved into by that time.

Owner-occupied dwellings accounted for 16 500 of all excess dwellings, while the number for dwellings provided by the employer was 12 000. The number of excess dwellings that were not in permanent residential use was 27 500, or almost half of all excess dwellings.

According to the evaluation study 6 200 of the excess dwellings had been demolished; 5 500 were used as summer cottages; 4 500 were used as offices or other business premises; and 5 200 dwellings did not even exist. The latter category includes, for instance, upstairs rooms in detached houses which were regarded as separate dwellings at the time that the register was created but which in the evaluation inquiry were reported as forming part of the dwelling downstairs. The excess dwellings used as office facilities were illegal conversions.

The excess dwellings were exceptional even according to the census. According to the register 12 300 of them were unoccupied, 1 600 were used as business premises, 2 500 had been pulled down, and 1 000 were in disrepair. Business premises as well as the demolished and rundown dwellings were included in the census because the register indicated they were inhabited. These were obviously cases of false register data; either false tenure status data for the dwelling or false data for place of residence.

One fifth or a total of 12 000 excess dwellings were located in the province of Turku and Pori, which accounted for 15 per cent of all dwellings. In relative terms the provinces of Uusimaa and Kymi had fewer excess dwellings.

So on the basis of the material collected in the evaluation study, the census overstated the total number of dwellings in the country by 60 000. In a crude generalization, these were typically old detached houses located in sparsely populated areas and no longer in residential use.

Dwellings missing from the census

According to the evaluation study a total of 68 000 dwellings were missing from the census; these are here called missing dwellings.

According to the evaluation study 40 per cent of these dwellings were located in detached houses; 25 per cent in terraced houses; 16 per cent in blocks of flats; and 18 per cent in other buildings (or information was not available).

There is a very noticeable difference in the proportion of excess and missing dwellings occurring in terraced houses. It would appear that the terraced dwellings identified in the census were all correctly included, but according to the evaluation study there should have been almost 20 000 dwellings more. Out of the missing terraced dwellings, 13 000 were located in terraced houses in which there were more dwellings according to the evaluation study than according to the census. There were 5 000 terraced houses in which the evaluation study put the number of dwellings at one higher; 1 500 terraced houses where the number of dwellings was two higher; 1 000 terraced houses where it was three higher; and 400 terraced houses where according to the evaluation study there were 4–9 dwellings more than the number indicated by the census.

Out of the missing dwellings in detached houses, 13 000 were in houses which

according to the census had just one dwelling but according to the evaluation study two. These cases included upstairs dwellings in detached houses that the census counted as one dwelling but that in the evaluation study were reported as two separate dwellings. In these cases it is by no means always clear which interpretation is correct.

Missing dwellings were located in newer buildings than excess dwellings. Over one third of all missing dwellings had been built during the 1980s, and one quarter during the 1970s.

In terms of tenure status, 16 000 missing dwellings were owner-occupied; the same number were rented; and 3 000 were dwellings provided by employers to staff members. Almost half or over 30 000 of the missing dwellings were unoccupied according to the evaluation study.

According to register data one third of the missing dwellings were in permanent residential use; one third were unoccupied; and in 23 per cent of the cases the occupancy situation was unknown. Even though the register data indicated that a dwelling was in permanent residential use, no one lived in that dwelling at the time of the census, i.e. no permanent resident in Finland on December 31st, 1990, had the domicile code of this particular dwelling. The dwelling might have been removed from the census on grounds that the register data indicated it was inadequately equipped and unoccupied.

According to the evaluation study the number of missing dwellings in the census was highest in the province of Vaasa. A total of 12 000 or 17 per cent of all missing dwellings were located in this province, which accounted for 8 per cent of the total housing stock according to both the census and the evaluation stydy. The province of Turku and Pori also had the highest relative number of missing cases. Uusimaa and Häme had fewer cases of missing dwellings than other provinces.

One possible (partial) explanation for the numbers of excess and missing dwellings might lies in the inherent difficulty in matching the data sets of the census and the evaluation stydy. It is possible that some of the dwellings should be pairs, but that in the processing of data we were unable to identify them as the same dwellings.

6.3 Unoccupied dwellings

According to the census the total number of unoccupied dwellings in the country was 150 000; the figure given by the evaluation study was lower at 133 000+/–5 000.

Half of the dwellings that according to the census were unoccupied were classified in the same category in the evaluation study as well. Twenty-eight per cent were in residential use (21 per cent in permanent and 7 per cent in temporary use). Over one fifth or 31 000 dwellings were not in the housing stock at all according to the evaluation study: 5 000 had been demolished, 5 000 were used as summer cottages, over 4 000 dwellings did not exist in the first place (but were part of another dwelling, for example), and 4 000 were in office and business use.

The census agreed on 60 per cent of the cases that according to the census were unoccupied. Fifteen per cent were in residential use, over one per cent were in temporary residential use, and the rest were in permanent residential use. One in four of the dwellings that according to the evaluation study were unoccupied, did not

Table 14. Unoccupied dwellings by provinces

Province	Unoccupied dwellings			
	according to census		according to evaluation study	
	no.	%	no.	%
Uusimaa	30 800	21	31 100	24
Turku ja Pori and Åland	28 400	19	25 600	20
Häme	21 400	15	18 000	14
Kymi	10 000	7	9 200	7
Mikkeli	6 100	4	5 200	4
Pohjois-Karjala	5 400	4	4 300	3
Kuopio	6 900	5	5 600	4
Keski-Suomi	5 800	4	3 800	3
Vaasa	14 400	10	11 800	9
Oulu	11 500	8	7 600	6
Lapland	6 800	5	5 100	4
Total	147 500	100	127 300	100

belong to the existing housing stock according to the population census.

According to the evaluation study there were much fewer unoccupied dwellings in Central and Northern Finland than according to the census. One possible explanation is that as a result of people moving south (as well as out of the country), the dwellings in the buildings remaining unoccupied were still counted in the register as part of the housing stock. In the evaluation study we were informed that they no longer belonged there; perhaps they were in such poor repair that they simply were no longer suitable for round-the-year use.

6.4 Tenure status

Occupied residential dwellings are classified in the census on the basis of tenure status into the following four categories:
– owner-occupied dwelling
  - house owned by occupant
  - sharehold owned by occupant
– rented dwelling
– official or employer-provided dwelling
– other.
The latter category may include cases where the occupant of the dwelling is living there because he or she is family and therefore does not pay any rent.

Tenure status data are updated in the dwellings register in connection with notices of removal.

In the evaluation study tenure status was queried with the following question:

5 The occupant of the dwelling (see instructions)

A ☐ owns the building
B ☐ owns the sharehold
C ☐ rents the dwelling as a tenant
D ☐ lives in a dwelling owned or rented by employer
E ☐ occupies the dwelling on other grounds (e.g. family relationship, pays no rent, etc.)

5 The occupant of the dwelling is the resident who owns the dwelling, who lives in the dwelling as the principal tenant, or whose employer has provided the dwelling.

Item D refers to a rented dwelling that has been provided to the occupant by the employer.

Item E refers to a dwelling for which no rent is paid.

Ninety-one per cent of the dwellings that were counted as occupied in both data sets, were classified in the same group of tenure status.

The census put the number of dwellings in which tenure status was based on ownership at 15 000 too low according to the evaluation study.

Similarly, the results of the evaluation study indicated that the number of rented dwellings was far too low (15 000 less), as was the number in the category of other tenure status (12 000 less).

On the other hand, the number of dwellings in which the occupant held all the shares of the flat was overestimated in the census by 36 000. Out of the dwellings slotted in this category in the census, 28 000 were classified in the evaluation study as buildings owned by the occupant. Of these 15 000 dwellings were located in detached houses, 6 100 in terraced houses and 6 500 in blocks of flats. In other words the evaluation study indicated that 6 500 occupants of dwellings in blocks of flats said they owned the entire block. Semi-detached houses are often, in juridical terms, housing corporations, which means that ownership of shares is indeed the proper form of tenure status even though the residents might be inclined to say that they own the building. The number of such dwellings that were located in semi-detached houses was 3 000.

Table 15. Tenure status of dwellingse

Evaluation study	Census						
	Owns the building	Owns the sharehold	Employer-provided dwelling	Rented dwelling	Other tenure status	Unoccupied	Not included in material
Owns the building	728 200	27 500	700	3 700	4 000	11 400	10 800
Owns the sharehold	5 100	647 600	400	6 400	2 300	4 100	4 800
Employer-provided dwelling	1 800	5 000	36 800	25 900	1 000	3 100	2 900
Rented dwelling	8 300	29 100	19 400	396 200	6 500	17 100	15 500
Other tenure status	20 100	5 800	500	4600	22 200	2 100	3 300
Unoccupied	4 100	6 200	1 100	6 900	700	77 200	30 900
Not included in material	10 400	5 900	1 800	8 600	2 100	31 200	–
A. Census total (sample)	780 300	727 700	61 300	454 000	39 000	147 300	68 200
B. Census total (population)	770 600	706 300	69 100	476 800	46 800	140 000	68 200
C. Evaluation study total	786 300	670 700	76 500	492 100	58 600	127 100	60 000
	+/–6 800	+/–8 400	+/–3 900	+/–8 200	+/–3 300	+/–5 000	+/–3 400
D. Correctly classified	728 200	647 600	36 800	396 200	22 200	77 200	–
E. Percentage of correctly classified	93,3	89,0	60,0	87,3	56,9	52,4	–
F. False inclusion	52 100	80 100	24 500	57 800	16 800	70 100	60 000
G. False omission	58 100	23 100	39 700	95 900	36 400	56 400	68 200
H. Gross error	110 200	103 200	64 200	153 700	53 200	126 500	128 200
I. Net error	–15 700	35 600	–7 400	–15 300	–11 800	12 900	–
	+/–6 800	+/–8 400	+/–3 900	+/–8 200	+/–3 300	+/–5 000	–
J. Relative net error	–2,0	5,0	–10,7	–3,2	–25,2	4,6	–
	+/–0,9	+/–1,2	+/–5,6	+/–1,7	+/–7,1	+/–3,6	–

Of the dwellings where according to the census the occupant owned the sharehold, 29 000 were defined by the evaluation study as rented dwellings. The majority of these or 24 000 were in blocks of flats. The dwelling might of course earlier have been used by the shareholder, but then it may have been rented out without any notification given that the tenure status had changed.

One third of the 60 000 company-owned dwellings in the census were rented dwellings according to the evaluation study; on the other hand, 26 000 of the rented dwellings in the census were defined in the evaluation study as employer-provided dwellings. When an employer rents a dwelling on the open market for a staff member, the owner of the dwelling will not necessarily file any notification of the change in tenure status, and the employee who is moving in may well indicate in the notice that this is a rented dwelling.

6.5 Floor space

Floor space is defined as the area comprised by the dwelling as measured from the inside walls. The measure does not include balcony, porch, unheated hall space or similar, boiler room, cellar, garage or unheated storage room; on the other hand it does include kitchen or kitchenette, utility room, walking cupboard and sauna (when within the dwelling itself).

Some of the respondents in the evaluation study replied to the question concerning floor space by giving more or less rough estimates (such as 'around 200 square metres'); these cases numbered 520.

Comparison of floor space

Table 16 gives the breakdown of floor spaces and compares the register data with that collected in the evaluation study. The following classification is used:

Class (square metres)	Typical dwelling
– 29	small studios
30 – 49	large studios and small 2-bedroom flats
50 – 69	large 2-bedroom flats
70 – 89	3 bedrooms and kitchen
90 – 139	3–4 bedrooms and kitchen
140 –	4 bedrooms or more and kitchen

The data from the evaluation study indicated somewhat larger dwelling sizes than the register data for the census. Around 5-10 per cent of the dwellings slotted in each class in the census were upgraded in the evaluation study to a higher category.

Out of the dwellings classified in the census in the category of under 30m^2, the evaluation study put 10 000 in the next biggest category and 3 000 in the 50–79m^2 category. The floor space of over 2 000 dwellings was at least 80m^2 according to the evaluation study, while some came in the category of over 140m^2. In the case of these dwellings the data from the evaluation study are quite obviously not from the same dwelling that was its counterpart in the census.

Table 16. Breakdown of dwellings by floor space

Evaluation study	Census							
	–29	30 – 49	50 – 69	70 – 89	90 – 139	140 +	Unknown	Not included in material
– 29	88 800	7 100	1 600	500	200	100	300	8 800
30 – 49	9 800	381 500	14 400	3 300	1 900	400	1 200	14 900
50 – 69	3 000	25 800	503 800	19 700	6 100	400	600	17 000
70 – 89	800	7 200	28 500	355 300	25 500	1 700	700	9 200
90 – 139	1 200	5 700	13 200	41 200	436 600	20 300	600	11 400
140 +	300	900	1 900	4 900	39 900	91 500	400	3 900
Not included in material	7 400	17 100	12 600	8 100	8 700	2 700	3 600	–
A. Census total (sample)	111 300	445 300	576 000	433 000	518 900	117 100	7 400	68 200
B. Census total (population)	127 200	433 800	562 700	431 700	524 500	113 600	16 200	68 200
C. Evaluation study total	107 400	427 400	576 400	428 900	530 200	143 700	3 700	60 200
	+/–4 400	+/–8 000	+/–9 000	+/–8 300	+/–7 500	+/–4 800	+/–900	+/–3 400
D. Correctly classified	88 800	381 500	503 800	355 300	436 600	91 500	–	–
E. Percentage of correctly classified	79,8	85,7	87,5	82,1	84,1	78,1	–	–
F. False inclusion	22 500	63 800	72 200	77 700	82 300	25 600	–	60 200
G. False omission	18 600	45 900	72 600	73 600	93 600	52200	–	68200
H. Gross error	41 100	109 700	144 800	151 300	175 900	77 800	–	128 400
I. Net error	19 800	6 400	–13 700	2 800	–5 700	–30 100	12 500	–
	+/–4 400	+/–8 000	+/–9 000	+/–8 300	+/–7 500	+/–4 800	+/–900	–
J. Relative net error	15,6	1,5	–2,4	0,6	–1,1	–26,5	77,2	–
	+/–0,0	+/–1,8	+/–1,6	+/–1,9	+/–1,4	+/–4,2	+/–5,6	–

Out of the total of 117 000 dwellings measuring at least 140m^2 in the census, 20 000 were in the size category of 90–139m^2 according to the evaluation stydy. Accordingly 40 000 of the dwellings placed in the second biggest category in the census were at least 140m^2 according to the evaluation study. It is possible that in detached houses, for instance, space has been converted into residential use that was not allocated for such purposes in the building permit. On the other hand people who are not quite sure about the size of their house are probably more likely to round the figure upwards rather than downwards.

Differences in floor space

The floor spaces of dwellings in detached houses often differed from each other in the census and in the evaluation stydy. The figures matched exactly in just one third of the cases. The difference measured a few (max. six) square metres in 22 per cent of the cases and more (i.e. seven or more) in 28 per cent of the cases. In 61 per cent of the cases where the floor areas did not match for dwellings in detached houses, the figure was higher in the evaluation study than in the census.

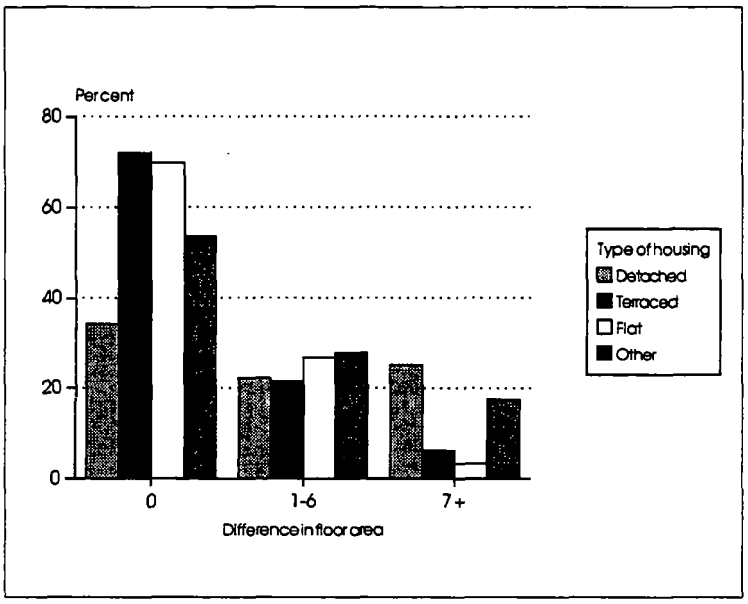


Figure 6.
Differences in floor space by type of housing

In terraced houses and flats the figures for floor space came much closer to each other in the two data sets than in other types of housing. In terraced houses, the figures were exactly the same in 72 per cent of the cases. For one in five dwellings the figures differed only by a few square metres. In most (86 %) of the cases the floor area of terraced dwellings was smaller in the census than in the evaluation study.

In the category of flats the exact same figure was obtained in 70 per cent of the cases, while a difference of a few square metres occurred in 27 per cent. In contrast to the situation in terraced and detached houses, the floor area of flats was more often larger in the census than the figure given in the evaluation study.

Differences in floor space occurred more commonly in large dwellings than they did in small dwellings. In the category of dwellings larger than 140m^2, the figures matched in both data sets in no more than 29 per cent of ther cases. In over half of the dwellings the difference between the two figures was in excess of seven square metres. The biggest differences were in the region of 200m^2. No doubt in some of these cases we must have been comparing the data of the wrong dwellings. In the biggest dwellings the difference was normally in favour of the census, i.e. the figure reported was usually higher in the census than in the evaluation. In all other categories the opposite was true; here there were more dwellings in which the floor space recorded in the census was smaller than that obtained in the evaluation study.

In small dwellings there were less disparities. In the category of dwellings under 70m^2, the figures were exactly the same in over 60 per cent of the cases, and the differences were marginal in the case of one quarter of the dwellings.

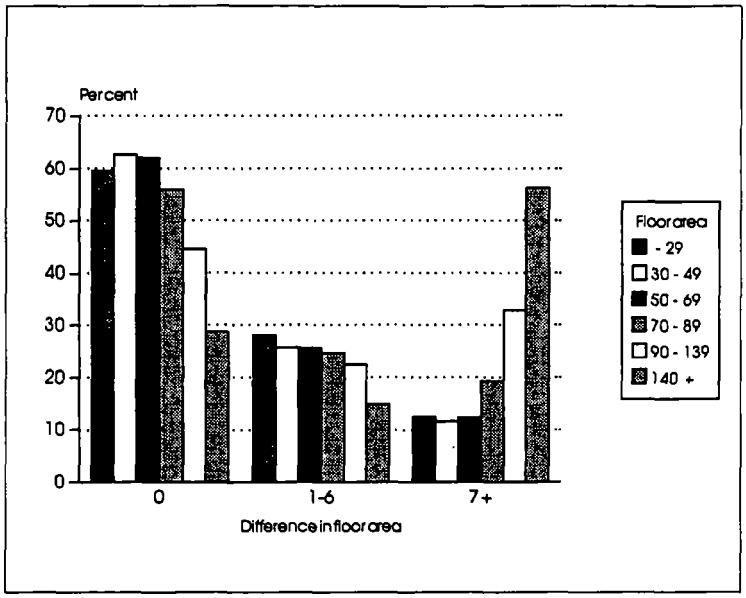


Figure 7.
Differences in floor space by size of dwellings

6.6 Type of kitchen

The census divided dwellings into three categories according to type of kitchen, which are as follows:

- kitchen, i.e. a room with a window and measuring at least $7m^2$, specifically intended for cooking;
- kitchenette, i.e. a space fitted as a kitchen but measuring less than $7m^2$;
- cooking area, i.e. a space intended for cooking purposes and mainly marked off by walls but directly adjacent (with no fixed doors) to other living space; spaces fitted with kitchen equipment but not separated in any way from other living space are also classified in this category .

Of the dwellings in both materials, 92 per cent were classified in the same type of kitchen.

According to the census four in five dwellings had a kitchen. The evaluation study gave the same result.

The evaluation study classified 26 000 kitchens as kitchenettes and 31 000 as cooking areas.

On the other hand, 50 000 kitchenettes in the census were reported as kitchens in the evaluation stydy. And further, 36 000 kitchenettes in the census were downgraded to cooking areas in the evaluation study. There are quite obviously large numbers who in a questionnaire survey prefer to interpret kitchenettes as kitchens. It is also possible that kitchenettes have later been expanded and converted into kitchens.

Less than half of the 37 000 dwellings that according to the census had a cooking area were defined in the same way in the evaluation stydy. The space was defined as a kitchen in 11 000 cases and as a kitchenette in 6 000 cases.

There were 16 000 dwellings in the census for which kitchen type remained unknown. According to the evaluation study 5 000 of these dwellings had a kitchen, 500 a kitchenette and over 2 000 a cooking area. The rest remained unknown, or the dwellings concerned were missing from the evaluation study.

Asking people what type of kitchen they have is no simple and straightforward matter but involves various problems in a questionnaire survey; in extreme cases one respondent will interpret a kitchenette as a cooking area, while someone else will call it a kitchen.

Table 17. Type of kitchen

Evaluation study	Census				
	Kitchen	Kitchenette	Cooking area	No cooking facilities	Not included in material
Kitchen	1 658 300	50 100	10 900	5 100	47 700
Kitchenette	26 300	302 000	6 100	500	11 800
Cooking area	31 100	36 000	17 600	2 200	4 900
Not included in material	40 500	11 700	2 600	5 300	–
A. Census total (sample)	1 756 200	399 800	37 200	13 100	68 200
B. Census total (population)	1 748 900	393 600	41 000	26 100	68 200
C. Evaluation study total	1 772 100	346 700	91 800	7 100	60 100
	+/–8 800	+/–7 200	+/–4 200	+/–1 000	+/–3 400
D. Correctly classified	1 658 300	302 000	17 600	–	–
E. Percentage of correctly classified	94,4	75,5	47,3	–	–
F. False inclusion	97 900	97 800	19 600	–	60 100
G. False omission	113 800	44 700	74 200	–	68 200
H. Gross error	211 700	142 500	93 800	–	128 300
I. Net error	–23 200	46 900	–50 800	19 000	–
	+/–8 800	+/–7 200	+/–4 200	+/–1 000	–
J. Relative net error	–1,3	11,9	–123,9	72,8	–
	+/–0,5	+/–1,8	+/–10,2	+/–3,8	–

6.7 Number of rooms

A room is defined as a space with a window and with a minimum floor area of $7m^2$ and a mean height of at least 2 metres. A walking cupboard, porch, or similar is not counted as a room.

In the evaluation study the following question was included to measure the number of rooms:

8 The dwelling has I_I_I rooms excluding the kitchen.

8 Count in the number of rooms all rooms intended for living purposes except the kitchen or kitchenette. A room is defined as a space with a window and with a minimum floor area of $7m^2$ and a mean height of at least 2 metres. A walking cupboard, porch, or similar is not counted as a room.

It is possible that in spite of the underlining some respondents have counted their kitchen in the number of rooms they have; in these cases the figure recorded by the evaluation study is one too high.

According to the census and the evaluation study the number of rooms in dwellings tended to be off by one, in one direction or the other. In the case of dwellings that according to the census had 1–5 rooms, the figure in the evaluation study was more often one higher than one lower. In dwellings with more than five rooms the situation was the opposite; it was more common for the evaluation study to report one room less than the census.

In small dwellings the number of rooms was more often the same in the census and the evaluation study than in the case of bigger dwellings. Eighty-seven per cent of the single-bedroom studios in the census were classified in the same category in the evaluation study as well. By contrast, only half of the dwellings with seven rooms were counted as having the same number of rooms in the evaluation study.

It is possible that walls between rooms had come down, reducing the number of rooms; or that new walls had been erected to increase the number of rooms. In those cases where no permits were applied for the job, the register data would not be up to date.

Table 18. Number of rooms in dwelling (including kitchen)

Evaluation study	Census									
	1	2	3	4	5	6	7	8 +	Unknown	Not included in material
1	211 500	26 100	31 500	24 200	21 500	9 000	2 400	1 400	600	12 800
2	18 600	225 400	26 900	3 000	1 100	300	100	0	1 100	13 800
3	1 800	31 800	428 300	26 700	7 500	1 000	300	300	600	15 900
4	1 100	5 400	29 300	370 500	35 100	4 600	800	100	300	9 900
5	1 100	2 300	11 600	35 400	270 300	26 100	2 800	800	300	7 000
6	300	1 300	3 000	8 900	38 900	105 700	8 500	1 600	200	3 700
7	0	400	900	2 100	6 200	18 000	20 600	3 200	100	1 200
8 +	0	200	600	1 300	3 200	4 000	6 100	12 700	100	1 000
Not included in material	8 300	15 500	12 900	9 100	5 700	3 200	800	600	3 900	–
A. Census total (sample)	242 700	308 400	545 000	481 200	389 500	171 900	42 400	20 700	7 200	68 300
B. Census total (population)	241 900	311 100	534 800	486 300	387 300	169 500	63 100	12 500	3 000	68 300
C. Evaluation study total	341 000	290 300	514 200	457 100	357 700	172 100	52 700	29 200	3 400	60 000
	+/–7 500	+/–6 900	+/–8 800	+/–8 300	+/–7 100	+/–5 100	+/–3 100	+/–2 300	+/–800	+/–3 400
D. Correctly classified	211 500	225 400	428 300	370 500	270 300	105 700	20 600	12 700	–	–
E. Percentage of correctly classified	87,1	73,1	78,6	77,0	69,4	61,5	48,6	61,4	–	–
F. False inclusion	31 200	83 000	116 700	110 700	119 200	66 200	21 800	8 000	–	68 300
G. False omission	129 500	64 900	85 900	86 600	87 400	66 400	32 100	16 500	–	60 000
H. Gross error	160 700	147 900	202 600	197 300	206 600	132 600	53 900	24 500	–	128 300
I. Net error	–99 100	20 800	20 600	29 200	29 600	–2 600	10 400	–16 700	–400	–
	+/–7 500	+/–6 900	+/–8 800	+/–8 300	+/–7 100	+/–5 100	+/–3 100	+/–2 300	+/–800	–
J. Relative net error	–40,8	6,7	3,8	6,1	7,6	–1,5	24,5	–80,7	–5,6	–
	+/–3,1	+/–2,2	+/–1,6	+/–1,7	+/–1,8	+/–3,0	+/–4,9	+/–18,4	+/–26,7	–

6.8 Equipments

In the evaluation study respondents were asked whether they had in their dwellings the following equipments:
- toilet
- hot water
- shower or bathroom
- sauna
- balcony or terrace
- electricity

Separate instructions for sauna narrowed down the question to concern such units that were actually within the dwelling, not saunas that were in a separate building or shared by several households.

Respondents were asked to tick off all equipments they had in their dwelling. This question design implied that whenever there was a tick in the appropriate box, it was clear that the respondents were saying that they had this particular equipment. However, when the tick was not there it was impossible to say whether the dwelling did not have the equipment or whether the respondent had not given the information. In other words the questionnaire form should have had two boxes against each equipment; one for yes and one for no. In this case we would have been able to identify those cases where the information was not available.

If there were no ticks in any of the boxes against equipments, this dwelling was counted among partial non-response as far as equipments were concerned.

Electricity

According to the census 2.2 million dwellings in Finland had electricity; the figure given by the evaluation study was over 100 000 less.

A total of 130 000 dwellings which according to the census had electricity were defined as being without electricity in the evaluation stydy. Of these 52 000 were in detached houses, 16 000 in terraced houses and 58 000 in flats. So the result in the evaluation study was that 58 000 flats did not have electricity. Of these, 4 500 were unoccupied. Almost half of these dwellings in detached houses were located in sparsely populated areas.

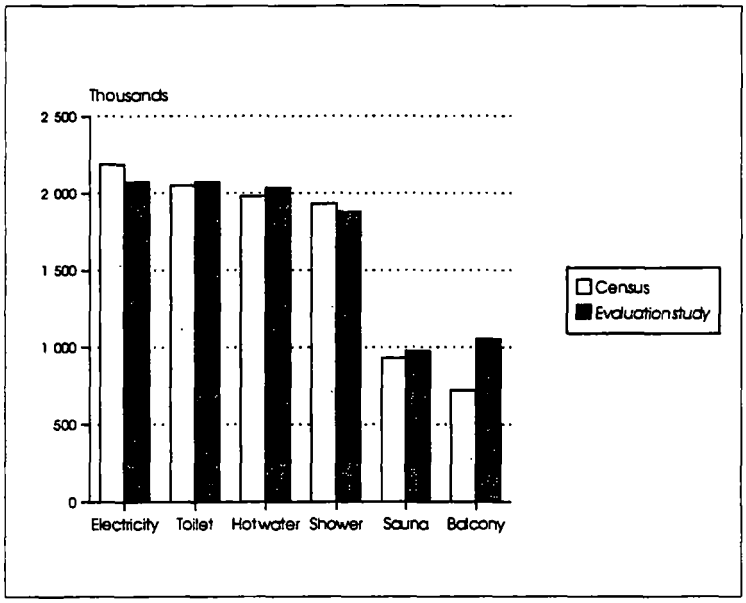


Figure 8.
Equipments in residential dwellings

Almost all or 95 per cent of the dwellings which according to the census had electricity but according to the evaluation study did not, were located in buildings were there was electricity. Altogether 6 500 of the dwellings were unoccupied.

One can really only guess why people failed to mark electricity among the equipments of their dwelling; here is a list of some possible reasons:

- electricity was last on the list of equipments
- the respondent was not sure what electricity as an equipment means and therefore considered it best not to answer at all
- no electricity was currently supplied to an unoccupied dwelling
- the electricity board had cut off the electricity because of failure to pay the electricity bill.

Toilet

This was the single item where the data on facilities were most congruous between the two data sets: in the dwellings included in both surveys 98 per cent had a toilet according to both the census and the evaluation study.

According to the evaluation study the number of dwellings with a toilet was 27 000 higher than the number given by the census, but this is just over one per cent of the total number of dwellings in the census.

Out of the dwellings which according to the census had a toilet, 38 000 did not according to the evaluation stydy. Two thirds of these dwellings were in flats.

On the other hand, 36 000 of the dwellings that according to the census did not have a toilet did according to the evaluation stydy. Nine out of ten of these dwellings were located in detached or semi-detached houses. Either people do not consider it necessary to apply for a building permit when they build a toilet in their house, or they might have marked down outhouses as toilets.

Hot water

The number of dwellings with hot water was 50 000 higher in the evaluation study than in the census.

Out of the dwellings which according to the census had hot water, 55 000 did not according to the evaluation stydy. Of these dwellings 16 500 were located in detached houses, 4 500 in terraced houses and 32 500 in flats. So the lack of electricity is not the only curious feature of Finnish flats; there are also over 30 000 flats with no hot water.

On the other hand there were 76 000 dwellings which according to the evaluation study did have hot water but according to the census not. Most of these dwellings were located in separate detached houses. The installation of an immersion heater in a detached house is not necessarily considered to require a building permit, and therefore the relevant data will not have been entered in the registers either.

Shower

The number of dwellings with a shower was 53 000 lower in the evaluation study than the figure indicated by the census.

Of the dwellings which according to the census had a shower or bathroom, 82 000 did not have any washing facilities. Of the dwellings which according to the census had no washing facilities, 122 000 has a shower or bathroom according to the evaluation study.

The lower number of dwellings with washing facilities in the evaluation study may be explained by sample variation. That is, the estimated number of register dwellings with a shower or bathroom was 40 000 lower than the estimated number of dwellings with washing facilities in the questionnaire data for the evaluation stydy. However, the register data for the census put the number of dwellings with washing facilities at 100 000 higher than had been the case if the information had been estimated from register dwellings in the sample material.

Sauna

The census put the number of dwellings with their own sauna at 932 000; the figure indicated by the evaluation study was 46 000 higher.

Of the dwellings that according to the census had a sauna, 50 000 did not according to the evaluation study; and the number of opposite cases where dwellings did not have a sauna in the census but did in the evaluation study, was 77 000. Of these 50 000 were in detached houses. No doubt large numbers of detached houses have had saunas built without applying for the appropriate permits. It is also possible that in some of these cases the sauna was actually in a separate building, which means it is no longer regarded as belonging to the dwelling.

A total of 18 000 of the dwellings which according to the census did not have a sauna but that did according to the evaluation study, were located in flats. These will typically be cases where people have converted a large walking cupboard into tiny little sauna without permission.

Balcony or terrace

According to the evaluation study the number of dwellings with a balcony or terrace was 330 000 higher than the figure given by the census.

The balcony/terrace item was not queried in the 1980 census when the dwellings register was initially created. Entries on balcony/terrace have been added to the register on buildings built since 1980 on the basis of project notices; for buildings dating back to pre-1980, the detail has been entered in the register on the basis of building inspections that are carried out at fixed intervals.

There were a total of 380 000 dwellings which according to the evaluation study had a balcony but not according to the census. Of these dwellings 154 000 were in detached houses, 48 000 in terraced houses, 176 000 in flats and 6 000 in other buildings.

One third of the dwellings in detached houses which according to the evaluation study had a balcony or terrace but not so according to the population census, were built during the 1980s. In the corresponding category of flats, half were in blocks built during the 1970s. Almost all terraced houses were built during the 1970s and 1980s.

In regional terms the breakdown of dwellings with balconies was more or less same as the breakdown of all dwellings in both the census and the evaluation study.

Some of the differences in reported balconies may be due to errors in the evaluation study. False interpretations may have occurred in the following cases:

- verandah in detached house
- patio in terraced house
- French balcony in flat
- shared balcony in staircase.

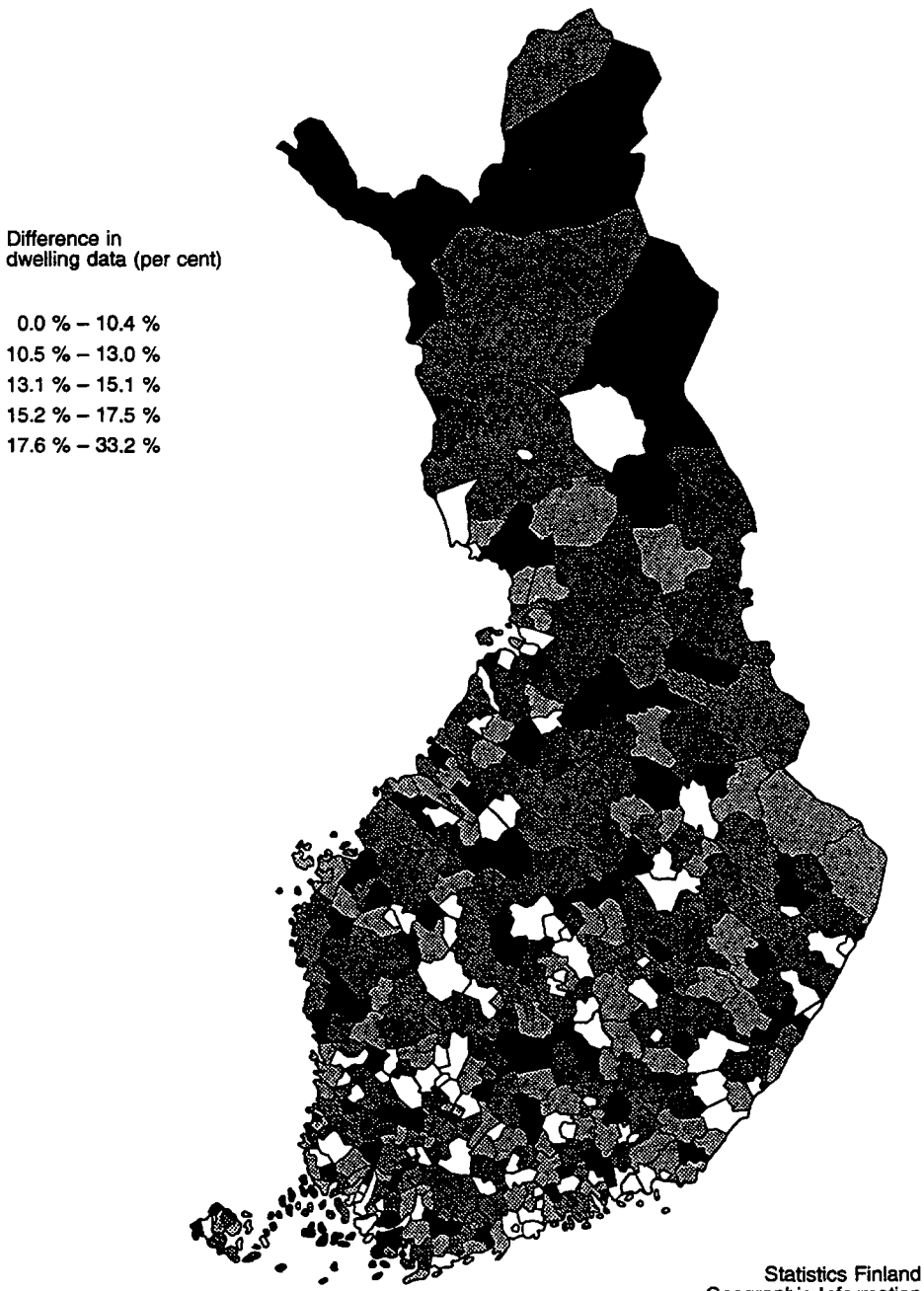
6.9 Differences in dwellings data by municipalities

Map 2 describes the differences in dwellings data between the census and the evaluation study in individual municipalities. The municipalities have been divided into five equally large groups in terms of the level of differences. The white fifth represents those municipalities where the dwellings data of the census and the evaluation study differed from each other least; in the black municipalities the data differed most.

Major towns are often in the top one fifth; the white towns include Helsinki, Vantaa, Espoo, Kauniainen, Tampere, Turku, Oulu, Lahti, Kuopio, Jyväskylä, Kotka, Hämeenlinna and Joensuu.

Map 2.

Differences in dwellings data between census and evaluation study by municipalities



7 Buildings

7.1 Comparison of data on buildings

The data on buildings for the census are obtained from the buildings register maintained by the central population register. The buildings register is updated on a continuous basis according to project notices filed with the central population register as well as inspections that are carried out at fixed intervals. For the 1990 census the central population register conducted a special inquiry to collect data on buildings with key data missing from the files; the number of these buildings totalled over 30 000.

The building data collected in the census are not fully congruous with those in the central population register files. In compiling the data for the census, obvious register errors were corrected; for instance, all buildings with electric heating must have electricity.

In the evaluation study buildings data were inquired on a separate form which was posted to the owners of the sample buildings in October 1990. The data were requested for the situation as at October 15th, 1990, i.e. a couple of months earlier than the register data for the census. The reason why the date was brought forward was that we wanted to send off the dwellings inquiries in January; and they could not be posted until the buildings data were in. The ten-week difference between the two points of measurement hardly affects the comparability of the data in the census and the evaluation study, although it is of course possible that some buildings which were completed towards the end of 1990 are missing from the evaluation study.

The building form for the evaluation study was mailed to a total of 23 053 owners. A form was sent out for every building on the sample real estate except the following:

- holiday residences, i.e. summer cottages
- buildings used for agriculture, forestry and fishing industry purposes (e.g. barns, stables, fish farm buildings)
- sauna buildings
- outbuildings (e.g. sheds, granaries, storage buildings)
- Army, border guard, coastguard unspecified buildings
- zoo buildings and stables
- bomb shelters.

Of the buildings receiving the questionnaire, the numbers not included in the analysis were as follows:

summer cottages	405
in disrepair and uninhabitable	326
demolished	181
under construction	63
part of some other building	49
Total	1 024

Responses were not received from 333 buildings. In addition, it became clear during the processing of the questionnaires that 160 of them clearly gave details on a different building than was intended. In other words no more than 493 buildings or just 2 per cent of the buildings receiving the questionnaire were counted as non-response.

7.2 Total number of buildings

According to the census the total number of buildings in Finland on December 31st, 1990, was 1 162 400; the figure indicated by the evaluation study was 20 000 less, 1 143 500.

Excess buildings in the population census

According to the evaluation study there were 50 000 excess buildings in the population census.

Half of these excess buildings were located in sparsely populated areas, while the proportion in the census was one third.

The excess buildings were quite evenly spread out across the country, although in eastern and northern Finland their share of the buildings in the census was somewhat higher than in southern Finland.

According to the census two in three of the excess buildings were detached houses. Seven thousand were traffic and transportation buildings, 2 000 were shop buildings, 1 400 other industrial production buildings, and 1 400 accommodation buildings. The latter should have been included in the figures of the evaluation study as well; it is possible that they were marked down as summer cottages and that they were therefore excluded.

According to the evaluation study one in four of the excess buildings were summer cottages, one in four also were in disrepair or demolished buildings, over 2 000 were under construction and less than 2 000 were part of some other building. Some of the buildings that were under construction at the time of the questionnaire in October were no doubt completed during 1990. On the other hand, if people had already moved into a building that was under construction in late 1990, that would have been included in the population census.

A total of 20 000 or 40 per cent of the excess buildings in the census were not included in the evaluation material at all. According to register data half of these buildings were other than residential buildings, while most of the residential buildings were detached or semi-detached houses. A high 22 per cent of these buildings were located in the provinces of Oulu and Lapland, which accounted for 15 per cent of the entire housing stock.

According to register data one quarter of the excess buildings were built prior to 1920. Another one quarter had been built after 1979. One tenth of the buildings dated from the 1920s and 1930s, while the 1940s, 1950s, 1960s and 1970s accounted for roughly 10 per cent each.

Of the census buildings built before 1920, 14 per cent were excess buildings; the proportion of excess buildings of those built in the 1920s and 30s, the 1940s and 1950s was 10 per cent. Of the buildings built in the 1950s and later, excess buildings accounted for 2–3 per cent.

In short then, large numbers of the excess buildings were rundown detached houses, garages, disused shops in remote villages and miscellaneous industrial buildings.

Buildings missing from census

According to the evaluation study the number of buildings indicated by the census fell short of the true figure by 30 000. These buildings are here called missing buildings.

In regional terms these buildings were quite evenly spread across the country; their breakdown by provinces was very similar to the breakdown of all buildings.

Half of the missing buildings were residential buildings, the majority of which were detached houses; less than 1 000 were terraced houses, while there were hardly any flats. A substantial proportion of other than residential buildings were storage buildings. According to the evaluation study, the census was short of almost 10 000 storage buildings, 1 800 traffic and transportation buildings, 1 400 shop buildings and accommodation buildings, and over 1 000 industrial buildings.

According to the evaluation study over half of the missing buildings had been built or renovated during the 1970s and 1980s.

The register data on occupancy situation gave the following breakdown:

Occupancy situation according to register	no.	%
Residential use	2 400	8
Office use	2 400	8
Summer cottage	3 300	11
Unoccupied	6 400	21
Demolished	3 000	10
Other (shed, sauna, etc.)	8 400	28
N/A	4 400	15
Total	30 200	100

With the exception of the no information cases, these buildings were included in the initial register but were removed from the buildings file created for the census as unoccupied or as having inadequate facilities.

So around 10 000 of the missing buildings were storage buildings, most of which (according to the occupancy data) were used as sheds, saunas, etc. and were therefore excluded from the census. There is no doubt good reason to question whether these buildings should be included in the building stock in the first place. If these cases are excluded from the material of the evaluation study, then the difference between the sum totals of the census and the evaluation study increases to 30 000 buildings.

7.3 Intended use

In the census buildings are classified according to their principal intended use (that being determined on the basis of floor area). If the building is unoccupied, intended use is determined on the basis of the purpose it was originally built for.

Register data on intended use are derived from notices of building projects.

The quality of data on intended use was very high indeed in the census. Of the buildings included in both data sets, 98.5 per cent were classified in the same category of intended use.

At the two-digit level 97.4 per cent of the buildings in both materials were placed in the same category.

Table 19. Intended use of buildings

Evaluation study	Census										
	Detached house	Terraced house	Flat	Shop, accommodation, restaurant	Nursing and caring	Office and administration	Assembly and meeting	Teaching and education	Industrial	Other buildings	Not included in material
Detached house	887 700	400	600	400	100	200	100	100	600	1 000	14 200
Terraced house	1 200	53 000	400	0	200	100	0	0	0	100	900
Flat	0	200	43 300	200	0	100	100	100	100	100	400
Shop, accommodation, restaurant	400	0	0	24 300	0	400	0	0	0	200	1 400
Nursing and caring	100	100	100	0	4 500	100	100	0	0	0	100
Office and administration	300	0	100	200	0	7 300	0	0	300	200	300
Assembly and meeting	200	0	0	0	0	100	7 500	0	100	0	300
Teaching and education	100	0	0	0	100	100	0	7 500	200	0	200
Industrial	500	0	0	0	0	200	0	0	25 400	700	1 200
Other buildings	2 400	0	100	600	0	300	100	0	1 000	37 100	11 300
Not included in material	33 000	600	400	3 300	0	500	500	300	1 700	8 700	–
A. Census total (sample)	925 900	54 300	45 000	29 000	4 900	9 400	8 400	8 000	29 400	48 100	30 300
B. Census total (population)	907 600	52 500	44 700	33 100	5 800	9 900	10 200	8 500	29 100	53 500	30 300
C. Evaluation study total	905 400	55 900	44 600	26 700	5 100	8 700	8 200	8 200	26 800	52 900	49 000
	+/–5 500	+/–3 400	+/–3 000	+/–2 300	+/–1 000	+/–1 300	+/–1 200	+/–1 300	+/–2 300	+/–3 000	+/–2 800
D. Correctly classified	887 700	53 000	43 300	24 300	4 500	7 300	7 500	7 500	25 400	37 100	–
E. Percentage of correctly classified	95,9	97,6	96,2	83,8	91,8	77,7	89,3	93,8	86,4	77,1	–
F. False inclusion	38 200	1 300	1 700	4 700	400	2 100	900	500	4 000	11 000	49 000
G. False omission	17 700	2 900	1 300	2 400	600	1 400	700	700	1 400	15 800	30 300
H. Gross error	55 900	4 200	3 000	7 100	1 000	3 500	1 600	1 200	5 400	26 800	79 300
I. Net error	2 200	–3 400	100	6 400	700	1 200	2 000	300	2 300	600	–18 700
	+/–5 500	+/–3 400	+/–3 000	+/–2 300	+/–1 000	+/–1 300	+/–1 200	+/–1 300	+/–2 300	+/–3 000	–
J. Relative net error	0,2	–6,5	0,2	19,3	12,1	12,1	19,6	3,5	7,9	1,1	–
	+/–0,6	+/–6,5	+/–6,7	+/–6,9	+/–17,2	+/–13,1	+/–11,8	+/–15,3	+/–7,9	+/–5,6	–

The category with the lowest congruence scores was other industrial buildings, where 87 per cent were classified in the same category. A few hundred of the buildings placed in the category in the census were detached houses, office and administration buildings, energy production buildings and storage buildings.

7.4 Year of construction or basic repairs

Year of construction refers in the census to the year during which the building was completed. If a basic repairs has been carried out on the building (on a scale comparable to building a new house), then the year of construction refers to the year when the basic repairs was carried out.

In the evaluation questionnaire form the year of construction was printed in advance; the respondent was asked to acknowledge that the year was right, or to correct it if it was not. The question was formulated as follows:

1. According to the register the building was completed in 19__

Is this correct?

☐ Yes
☐ No, the building was completed in 19__

5. The building has been renovated

☐ Yes, in 19__
☐ No

Table 20. Year of construction

Evaluation study	Census								
	–1920	1921–39	1940–49	1950–59	1960–69	1970–79	1980–90	1991–	Not included in material
–1920	34 000	1 300	700	1 500	1 200	1 800	3 900	300	3 000
1921–39	1 800	38 000	600	200	100	200	1 700	100	2 700
1940–49	1 300	400	51 200	700	100	300	1 800	100	1 900
1950–59	4 500	2 300	1 600	110 900	1 000	500	3 600	400	2 900
1960–69	5 200	5 000	4 200	2 600	115 400	1 600	5 200	500	2 400
1970–79	9 400	8 700	11 100	14 500	5 400	190 000	12 400	1 200	4 400
1980–90	15 400	15 100	20 900	37 000	24 700	20 000	316 800	1 700	13 000
Not included in material	11 900	5 600	5 800	5 500	3 700	4 700	11 400	600	–
A. Census total (sample)	83 500	76 400	96 100	172 900	151 600	219 100	356 800	4 900	30 300
B. Census total (population)	95 600	88 800	97 100	177 900	138 400	198 300	343 500	–	30 300
C. Evaluation study total	47 700	45 400	57 800	127 700	142 100	257 100	464 600	900	49 200
	+/–2 300	+/–2 700	+/–2 900	+/–3 800	+/–5 100	+/–6 400	+/–7 500	+/–400	+/–2 800
D. Correctly classified	34 000	38 000	51 200	110 900	115 400	190 000	316 800	–	–
E. Percentage of correctly classified	40,7	49,7	53,3	64,1	76,1	86,7	88,8	–	–
F. False inclusion	49 500	38 400	44 900	62 000	36 200	29 100	40 000	4 900	49 200
G. False omission	13 700	7 400	6 600	16 800	26 700	67 100	147 800	900	30 300
H. Gross error	63 200	45 800	51 500	78 800	62 900	96 200	187 800	5 800	79 500
I. Net error	47 900	43 400	39 300	50 200	–3 700	–58 800	–121 100	–900	–
	+/–2 300	+/–2 700	+/–2 900	+/–3 800	+/–5 100	+/–6 400	+/–7 500	+/–400	–
J. Relative net error	50,1	48,9	40,5	28,2	–2,7	–29,7	–35,3	0,0	–
	+/–2,4	+/–3,0	+/–3,0	+/–2,1	+/–3,7	+/–3,2	+/–2,2	+/–0,0	–

The data on year of construction or basiv repairs must be approached with extreme caution in the evaluation study; in fact they are hardly applicable for the original purpose at all. In spite of the instructions, the respondents have interpreted basic repairs to mean far smaller projects than the complete rebuilding that was intended in the question.

Three in four buildings were built during the same decade according to both the census and the evaluation study.

Of the buildings that according to register data had been built prior to 1920, one in five had according to the evaluation study been built during the 1980s; one in ten during the 1970s; and one in ten also during the 1950s and 1960s. Fifteen per cent did not belong to the existing building stock at all.

One in five of the buildings that had been built prior to 1960 had been built (or actually renovated) during the 1980s. It became clear during the telephone inquiries that were carried out in connection with the questionnaire survey that while some people considered pulling down the walls as basic repairs, others thought that repainting was enough to count as a basic repairs project.

7.5 Floorage

In the census the floorage of a building is defined as the combined floor space of all stories in that building. It includes the floor surfaces of all rooms that are used for living or working purposes in the building. For example, in a two-storied detached house with residential rooms and attic space upstairs, only the floor space of the rooms will be counted in the floorage. In the basement, only those spaces are included in the figure that fall under the principal use of the building.

Eighty-three per cent of the buildings included in both data sets had exactly the same floorage.

Data on floorage were more accurate in residential buildings than in other buildings. In the category of other buildings 72 per cent had the same floorage in the census and in the evaluation stydy. In detached houses the figure was 85 per cent, in terraced houses 83 per cent, and in flats 80 per cent.

According to the evaluation study, the census understated the size of terraced houses; 13 per cent of the terraced houses in the census material were bigger than the floorage given by the census. The difference was almost always at least 10 square metres. Detached houses and flats were slightly bigger than the floorage indicated by the census. In other than residential buildings the census gave higher figures for floorage slightly more often than the evaluation study.

A difference of at least $50m^2$ in the figures of the census and the evaluation study was found in 5 per cent of all buildings. In detached houses differences of at least $50m^2$ occurred far less often than in other buildings. In flats the proportion of major differences was 13 per cent, in terraced houses and in other than residential buildings around 10 per cent.

In the analysis of data on floorage, it needs to be borne in mind that the register data for buildings built after 1980 are based on notices by builders, whereas for those built prior to 1980 the data are based on regular inspections by the authorities. Floorage was not queried in the 1980 census because of

difficulties anticipated in replying to the question. In earlier censuses as well as in the pilot inquiries for the 1980 census, it has become clear that it is very difficult to obtain reliable data on floorage by means of postal questionnaires. Unless the respondent happens to know the exact figure, the estimate may vary wildly. The same problem was encountered in the data collection for the evaluation study; it is very difficult to say exactly how reliable the data on floorage really are.

Table 21. Floorage of building

Evaluation study	Census							
	– 59	60 – 99	100–149	150–199	200–499	500+	Unknown material	Not included in material
– 59	104 400	3 500	1 400	200	200	100	12 400	8 400
60 – 99	7 700	219 100	9 100	1 700	600	200	2 200	6 100
100 – 149	2 500	12 000	321 200	10 200	2 400	200	2 100	4 300
150 – 199	500	2 000	8 500	159 100	4 000	0	1 100	2 500
200 – 499	500	900	3 000	3 100	119 700	1 700	1 600	4 800
500 +	0	300	100	300	2 600	88 700	1 400	4 200
Not included in material	14 800	10 100	7 400	3 500	3 500	2 300	7 500	–
A. Census total (sample)	130 400	247 900	350 700	178 100	133 000	93 200	28 300	30 200
B. Census total (population)	140 700	251 700	326 100	171 800	138 600	91 900	41 600	30 300
C. Evaluation study total	130 600	246 700	354 900	177 700	135 300	97 600	600	49 100
	+/– 4 700	+/– 6 100	+/– 7 100	+/– 5 600	+/– 5 000	+/– 4 200	+/–200	+/–2 800
D. Correctly classified	104 400	219 100	321 200	159 100	119 700	88 700	–	–
E. *Percentage of* correctly classified	74,2	87,0	98,5	92,6	86,4	96,5	–	–
F. False inclusion	26 000	28 800	29 500	19 000	13 300	4 500	28 300	49 100
G. False omission	26 200	27 600	33 700	18 600	15 600	8 900	600	30 300
H. Gross error	52 200	56 400	63 200	37 600	28 900	13400	28900	79400
I. Net error	10 100	5 000	–28 800	–5 900	3 300	–5 700	41 000	–18 800
	+/– 4 700	+/– 6 100	+/– 7 100	+/– 5 600	+/– 5 000	+/– 4 200	+/–200	+/–2 800
J. Relative net error	7,2	2,0	–8,8	–3,4	2,4	–6,2	–	–
	+/–3,3	+/–2,4	+/–2,2	+/–3,3	+/–3,6	+/–4,6	–	–

7.6 Number of storeys

The number of storeys in a building is determined on the basis of space that is above ground level and that is used for living or working purposes (or that is otherwise consistent with the building's intended use). If the number of storeys varies across different parts of the building, the number of storeys is determined on the basis of the highest figure.

The evaluation questionnaire did not include a separate item on the number of storeys in detached houses.

According to the evaluation study the number of storeys given by the census was often one too low.

Of the buildings that were classified in the census as having three storeys, over one tenth had two or four storeys according to the evaluation stydy. Over one in ten were buildings with 1-2 dwellings, which were not even asked to provide data on the number of storeys.

In the category of buildings with at least four storeys, the figure given by the evaluation study hardly ever differed by more than one from the number indicated by the census. However, a difference of one storey was very common indeed. One third of the buildings classified in the census as having four storeys had three or five storeys according to the evaluation stydy. In higher

Table 22. Number of storeys

Evaluation study	Census					
	1–2	3	4	5 +	Unknown	Not included in material
1–2	1 045 100	4 100	100	100	14 400	26 900
3	1 900	17 100	2 200	0	0	400
4	100	1 500	5 600	300	0	0
5 +	0	100	500	10 300	0	0
Not included in material	39 900	400	100	0	8 700	–
A. *Census total* (sample)	1 087 000	23 200	8 500	10 700	23 100	30 300
B. Census total (population)	1 070 500	22 700	7 900	11 600	49 600	30 300
C. *Evaluation study total*	1 090 700	21 600	7 500	10 900	0	49 100
	+/–4 800	+/–2 100	+/–1 300	+/–1 600	+/–0	+/–2 800
D. Correctly classified	1 045 100	17 100	5 600	10 300	–	–
E. Percentage of correctly classified	96,1	73,7	65,9	96,3	–	–
F. False inclusion	41 900	6 100	2 900	400	23 100	49 100
G. False omission	45 600	4 500	1 900	600	0	30 300
H. Gross error	87 500	10 600	4 800	1 000	23 100	79 400
I. Net error	–20 200	1 100	400	700	49 600	–
	+/–4 800	+/–2 100	+/–1 300	+/–1 600	–	–
J. Relative net error	–1,9	4,8	5,1	6,0	–	–
	+/–0,4	+/–9,3	+/–16,5	+/–13,8	–	–

buildings, too, differences of one storey occurred in about one fifth of the cases.

The difference of one storey is probably due in many cases to differences of interpretation. Consider, for example, a building with three residential storeys plus one basement above ground level, in which one quarter is taken up by a shop and the rest by the residents' storage facilities. If the residents were asked how many storeys there are in their house, there would no doubt be both threes and fours in the replies. In certain type of terrain one might also find a house with three staircases and each having a different number of storeys, with the highest at the same level.

If a difference of one storey is regarded as acceptable, then the quality of data on number of storeys in the census was very high.

7.7 Heating system

Five main categories of heating systems are distinguished in the population census:

- warter central heating
- air central heating
- electric heating
- stove heating
- no fixed heating installation

The two methods of central heating are based on circulating water and circulating air, whereas electric heating is based on the use of electric radiators installed in the dwelling.

Of the buildings included in both data sets, 83 per cent were classified in the same category of principal heating system.

The evaluation study and the census gave the same number of buildings with central heating. On the other hand, the number of buildings heated with electricity was almost 50 000 too low in the census; whereas the census overstated the number of buildings heated with a stove by 70 000.

Of the buildings fitted with water central heating, 5 per cent had electric heating according to the evaluation study.

In the case of central heating with air, the evaluation study put 15 per cent in the category of central heating with water and 9 per cent in the category of electrical heating.

Nine out of ten buildings in the census with electric heating had the same heating system according to the evaluation study as well.

One in five of the buildings that according to the census were heated with a solid-fuel stove or heater had electric heating according to the evaluation study. Almost all of these buildings were detached houses. Over 20 000 were located in densely populated areas and less than 20 000 in sparsely populated areas. When a detached house is fitted with electric radiators, the owners will not necessarily apply for the relevant permission; therefore according to the registers the house will remain in the category of stove-heated.

Of the buildings which according to the register had no fixed heating installation, 40 per cent were classified in the same category in the evaluation stydy. One in four of these buildings did not belong to the building stock according to the evaluation study, one in five were heated with direct electric heating, and one in ten had central heating.

Table 23. Heating syste

Evaluation study	Census						
	Central heating (water)	Central heating (air)	Electric heating	Stove or heater	No fixed heating appliance	Unknown	Not included in material
Central heating (water)	532 400	3 800	10 200	11 500	1 000	2 100	7 700
Central heating (air)	7 200	17 400	2 900	400	100	0	700
Electric heating	28 600	2 300	262 600	43 400	2 000	1 800	7 000
Stove or heater	7 100	500	12 200	133 600	400	900	7 200
No fixed heating appliance	18 500	300	2 700	1 800	3 800	1 200	7 600
Not included in material	12 500	800	8 600	19 300	2 300	5 700	–
A. Census total (sample)	606 300	25 100	299 200	210 000	9 600	11 700	30 200
B. Census total (population)	571 500	23 700	301 700	231 100	9 500	24 900	30 200
C. Evaluation study total	568 700	28 700	347 700	161 900	35 900	600	49 200
	+/–7 600	+/–2 500	+/–7 200	+/–4 800	+/–2 600	+/–300	+/–2 800
D. Correctly classified	532 400	17 400	262 600	133 600	3 800	–	–
E. Percentage of correctly classified	87,8	69,3	87,8	63,6	39,6	–	–
F. False inclusion	73 900	7 700	36 600	76 400	5 800	11 700	49 200
G. False omission	36 300	11 300	85 100	28 300	32 100	600	30 200
H. Gross error	110 200	19 000	121 700	104 700	37 900	12 300	79 400
I. Net error	2 800	–5 000	–46 000	69 200	–26 400	24 300	–19 000
	+/–7 600	+/–2 500	+/–7 200	+/–4 800	+/–2 600	+/–300	–
J. Relative net error	0,5	–21,1	–15,2	29,9	–277,9	97,6	–
	+/–1,3	+/–10,5	+/–2,4	+/–2,1	+/–27,4	+/–1,2	–

7.8 Heating fuel

Heating fuel is defined as the main source of energy that is used for heating the building. The following fuels are distinguished:

- oil and gas
- wood and peat
- district heating
- electricity
- coal
- other

In the buildings that were included in both data sets, 82 per cent were classified in the same category of heating fuel.

According to the evaluation study, the census underestimated the number of buildings heated with oil and electricity. By contrast, the number of buildings heated with wood was too high. This was due to the fact that the detached houses which according to the evaluation study had electric heating but according to the census stove heating, also differed from each other in terms of heating fuel. According to the evaluation study they were heated by electricity, but according to the census by wood.

Buildings heated with oil, district heating and electricity differed least between the census and the evaluation study: nine out of ten buildings classified in these categories in the census were placed in the same class in the evaluation study as well.

Table 24. Heating fuel

Evaluation study	Census						
	Oil and gas	Wood and peat	District heating	Electricity	Coal	Other, unknown	Not included in material
Oil and gas	282 800	26 900	5 200	7 700	2 700	4 700	4 700
Wood and peat	10 400	210 100	1 300	20 700	1 700	2 900	9 600
District heating	9 500	1 200	96 800	1 700	200	1 400	2 000
Electricity	13 800	52 100	1 600	316 500	2 500	9 000	8 000
Coal	200	300	300	100	2 400	100	100
Other, unknown	700	800	0	1 100	0	24 100	5 800
Not included in material	6 200	20 600	1 800	9 700	300	10 400	–
A. Census total (sample)	323 600	312 000	107 000	357 500	9 800	52 600	30 200
B. Census total (population)	306 800	321 300	105 600	357 700	8 800	62 200	30 200
C. Evaluation study total	334 700	256 700	112 800	403 500	3 500	32 500	49 000
	+/–7 000	+/–6 100	+/–4 600	+/–7 500	+/–800	+/–2 500	+/–2 800
D. Correctly classified	282 800	210 100	96 800	316 500	2 400	24 100	–
E. Percentage of correctly classified	87,4	67,3	90,5	88,5	24,5	45,8	–
F. False inclusion	40 800	101 900	10 200	41 000	7 400	28 500	49 000
G. False omission	51 900	46 600	16 000	87 000	1 100	8 400	30 200
H. Gross error	92 700	148 500	26 200	128 000	8 500	36 900	79 200
I. Net error	–27 900	64 600	–7 200	–45 800	5 300	29 700	–18 800
	+/–7 000	+/–6 100	+/–4 600	+/–7 500	+/–800	+/–2 500	–
J. Relative net error	–9,1	20,1	–6,8	–12,8	60,2	47,7	–
	+/–2,3	+/–1,9	+/–4,4	+/–2,1	+/–9,1	+/–4,0	–

There were greater differences in other fuel categories. Of the buildings that according to the census were heated with wood or peat, 17 per cent were heated by electricity according to the evaluation study, and one in ten were heated by oil or gas. The difference is exactly the same as was observed earlier in the case of heating system.

The differences were greatest of all in the case of buildings heated with coal: only one in four buildings that according to the census were heated with coal came in the same category in the evaluation study. One quarter were heated with electricity, 28 per cent with oil or gas, and 17 per cent with wood or peat.

In the census material heating system was unknown for over 50 000 buildings. Of these 17 per cent were heated with electricity according to the evaluation study, while one in ten was heated with oil or gas. One fifth of the buildings were missing from the material for the evaluation study.

7.9 Building material

In the census building material is defined as the material which is used to make the building's support structures. If, for instance, a detached house has brick walls but the actual support structures are made of wood, then this is defined as a wooden house rather than a brick house.

The following building materials are distinguished:
- concrete
- brick
- steel
- wood
- other

Of the buildings that were included in both data sets, 89 per cent were classified in the same category of building material.

According to the evaluation study, the census understated the number of concrete buildings and overstated the number of wooden buildings.

Ninety-three per cent of the wooden buildings in the census were placed in the same category in the evaluation stydy. In the category of concrete buildings the congruence percentage was 82, in steel buildings 67 and in brick buildings only 60. Of the buildings defined by the census as wooden but by the evaluation study as brick buildings, the error was more probably in the evaluation study than in the census. Some of the people who lived in a building with brick walls but wooden structures believe they live in a brick house; and others want make to make believe they live in a brick house.

Of the buildings defined by the census as wooden houses, 24 000 were concrete houses according to the evaluation stydy. Accordingly over one in ten of the almost 100 000 concrete houses in the census were wooden houses according to the evaluation study.

Table 25. Building material

Evaluation study	Census					
	Concrete	Brick	Steel	Wood	Other, unknown	Not included in material
Concrete	74 000	13 500	500	23 600	2 500	3 300
Brick	7 400	42 100	100	13 500	600	1 200
Steel	800	100	5 900	1 700	1 900	1 900
Wood	1 900	15 200	1 300	886 700	7 800	23 300
Other, unknown	800	300	300	800	1 100	500
Not included in material	2 200	1 600	1 100	36 900	7 300	–
A. Census total (sample)	87 100	72 800	9 200	963 200	21 200	30 200
B. Census total (population)	90 000	70 000	8 800	956 600	37 000	30 200
C. Evaluation study total	117 400	64 900	12 300	936 200	3 800	49 100
	+/–400	+/–3 600	+/–1 700	+/–6 300	+/–900	+/–2 800
D. Correctly classified	74 000	42 100	5 900	886 700	1 100	–
E. Percentage of correctly classified	82,2	60,1	67,0	92,7	3,0	–
F. False inclusion	13 100	30 700	3 300	76 500	20 100	49 100
G. False omission	43 400	22 800	6 400	49 500	2 700	30 200
H. Gross error	56 500	53 500	9 700	126 000	22 800	79 300
I. Net error	–27 400	5 100	–3 500	20 400	33 200	–
	+/–400	+/–3 600	+/–1 700	+/–6 300	+/–900	–
J. Relative net error	–30,4	7,3	–39,8	2,1	89,7	–
	+/–0,4	+/–5,1	+/–19,3	+/–0,7	+/–2,4	–

7.10 Number of dwellings

In the population census, a dwelling is defined as any dwelling which has its own entry from outdoors or through a staircase. If a dwellings is entered through another dwelling, the two spaces are counted as one dwellings.

In the evaluation study the number of dwellings was queried by asking owners of detached houses how many dwellings there were in the building. In the case of buildings with at least three dwellings, a list of dwellings was prepared and filled in the form, indicating the occupants of the dwellings and their principal use as at October 15th, 1990. The following set alternatives were used:

- dwelling in permanent use
- dwelling in temporary use
- unoccupied dwelling
- business premise.

There was often a difference of one in the number of dwellings indicated by the census and the evaluation study for buildings.

Table 26. Number of dwellings in the building

Evaluation study	Census										
	0	1	2	3–5	6–9	10–19	20–29	30–49	50+		Not included in material
0	99 800	9 900	600	300	100	100	0	0	0	4 700	19 800
1	3 200	820 000	3 200	600	100	0	0	0	0	5 400	8 700
2	200	21 500	38 500	1 100	0	0	0	0	0	200	600
3–5	100	1 300	2 900	38 000	500	0	0	0	0	200	400
6–9	0	100	100	2 700	20 200	300	0	0	0	0	500
10–19	100	0	0	100	700	15 300	0	0	0	0	200
20–29	0	0	0	0	100	200	9 800	200	0	0	0
30–49	0	0	0	0	0	0	200	7 700	100	0	0
50+	0	0	0	0	0	100	0	100	2 500	0	0
Not included in material	18 000	27 700	1 500	300	100	400	100	0	0	1000	–
A. Census total (sample)	121 400	880 500	46 800	43 100	21 800	16 400	10 100	8 000	2 600	11 500	30 200
B. Census total (population)	146 800	867 500	49 100	43 000	20 100	15 200	9 900	8 200	2 700	0	30 200
C. Evaluation study total	135 300	841 200	62 100	43 400	23 900	16 400	10 300	8 000	2 700	100	49 000
	+/–3 900	+/–6 400	+/–3 500	+/–3 000	+/–2 300	+/–1 900	+/–1 500	+/–1 300	+/–700	+/– 100	+/–2 800
D. Correctly classified	99 800	820 000	38 500	38 000	20 200	15 300	9 800	7 700	2 500	–	–
E. Percentage of correctly classified	82,2	93,1	82,3	88,2	92,7	93,3	97,0	96,3	96,2	–	–
F. False inclusion	21 600	60 500	8 300	5 100	1 600	1 100	300	300	100	11 500	49 000
G. False omission	35 500	21 200	23 600	5 400	3 700	1 100	500	300	200	100	30 200
H. Gross error	57 100	81 700	31 900	10 500	5 300	2200	800	600	300	11 600	79 200
I. Net error	11 500	26 300	–13 000	–400	–3 800	–1 200	–400	200	0	–100	–18 800
	+/–3 900	+/–6 400	+/–3 500	+/–3 000	+/–2 300	+/–1 900	+/–1 500	+/–1 300	+/–700	+/– 100	–
J. Relative net error	7,8	3,0	–26,5	–0,9	–18,9	–7,9	–4,0	2,4	0,0	–	–
	+/–2,7	+/–0,7	+/–7,1	+/–7,0	+/–11,4	+/–12,5	+/–15,2	+/–15,9	+/–25,9	–	–

The number of dwellings was exactly the same in 93 per cent of the buildings. In 50 000 buildings the number of dwellings was higher in the evaluation study than in the census; of these 30 000 were detached houses, 10 000 were terraced houses, 3 500 were flats and 8 000 other than residential buildings. The buildings were evenly divided across different provinces.

In the census there were 20 000 buildings with more dwellings than the figure indicated by the evaluation stydy. Over half of the buildings were detached houses, over 4 000 other than residential buildings, and less than 4 000 flats; terraced houses numbered less than 1 000.

In the category of detached houses, over 10 000 had two dwellings in the census but one in the evaluation study, and in 20 000 buildings the situation was reversed. These are often cases where the upstairs of a detached house is interpreted by one person as a separate dwelling and by someone else as part of the dwelling downstairs.

7.11 Number of business premises

All dwellings that are used primarily (in terms of floor area) for office or business purposes are counted as business premises. One business premise is constituted by the facilities used by one occupant in any given building.

The number of buildings with business primises was put by the census at 97 000; the figure given by the evaluation study was marginally higher at 102 000.

Of the buildings included in both data sets, the number of business premises in buildings was exactly the same in 96 per cent of the cases. The high percentage of congruent classifications is explained by the fact that in most buildings there were no business premises at all. Looking at the buildings which had business premises according to one or the other data set, the number dropped to 55 per cent.

Three out of four buildings that according to the census had one business premise, were also classified as single-office buildings in the evaluation stydy. In the case of buildings that according to the census had at least ten business premises, it was only very rarely that the evaluation study gave the same number; in most cases the number of business premises was higher in the evaluation study.

Table 27. Number of business premises in building

Evaluation study	Census					
	0	1	2	3 – 5	6+	Not included in material
0	1 004 800	8 700	700	200	0	27 400
1	15 900	49 100	1 700	500	0	2 200
2	1 600	6 500	6 800	200	0	200
3 – 5	500	2 100	3 100	4 800	100	400
6 +	200	200	300	1 500	3 800	0
Not included in material	42 200	5 300	900	400	200	–
A. Census total (sample)	1 065 200	71 900	13 500	7 600	4 100	30 200
B. Census total (population)	1 062 200	74 600	12 500	8 600	4 600	30 200
C. Evaluation study total	1 041 800	69 400	15 300	11 000	6 000	49 000
	+/–5 000	+/–3 600	+/–1 800	+/–1 500	+/–1 100	+/–2 800
D. Correctly classified	1 004 800	49 100	6 800	4 800	3 800	–
E. Percentage of correctly classified	94,3	68,3	50,4	63,2	92,7	–
F. False inclusion	60 400	22 800	6 700	2 800	300	49 000
G. False omission	37 000	20 300	8 500	6 200	2 200	30 200
H. Gross error	97 400	43 100	15 200	9 000	2 500	79 200
I. Net error	23 400	2 500	–1 800	–3 400	–1 900	–18 800
	+/–5 000	+/–3 600	+/–1 800	+/–1 500	+/–1 100	–
J. Relative net error	2,2	3,5	–13,3	–44,7	–46,3	–
	+/–0,5	+/–4,8	+/–14,4	+/–17,4	+/–23,9	–

7.12 Ownership

Ownership category was queried in the questionnaire for the 1980 population census, from which it was entered into the buildings register.

In the evaluation study we asked who owned the building at the time of the inquiry. The reply was coded on the basis of the following classification of different types of owners:

- private (person)
- sharehold administration company
- freehold administration company
- private company
- public company
- public commercial enterprise
- bank or insurance company
- municipality or federation of communes
- state
- religious community, foundation, party, etc.
- other

According to the evaluation study the data on type of owner in the register are of a high quality: of the buildings that were in both data sets, 94 per cent were classified in the same category of owner type.

Table 28. Type of ownership

Evaluation study	Census											
	Private	Sharehold administration company	Freehold administration company	Private company	Public company	Public commercial enterprise	Bank or insurance company	Municipality or federation of communes	State	Religious community, foundation etc.	Other, unknown	Not included in material
Private	862 500	3 900	500	2 700	0	0	100	400	100	100	24 500	17 600
Sharehold administration company	1 900	88 500	500	900	0	0	0	500	100	100	3 300	1 100
Freehold administration company	900	400	14 000	400	100	100	300	0	0	100	700	600
Private company	2 600	400	1 500	36 000	200	0	100	800	0	200	2 500	5 800
Public company	0	0	100	100	3 200	100	0	0	0	0	500	300
Public commercial enterprise	0	0	0	0	0	800	0	100	0	0	300	100
Bank or insurance company	100	100	100	100	0	0	1900	0	0	0	100	100
Municipality or federation of communes	700	500	1000	500	100	100	0	27 000	100	200	2 500	1 800
State	100	0	0	0	200	0	0	300	5 500	0	200	900
Religious community, foundation, party, etc.	200	100	300	100	0	0	0	200	0	10 800	1300	1 100
Not included in material	34 000	2 500	700	4 300	600	100	200	1 800	500	600	3700	–
A. Census total (sample)	903 000	96 400	18 700	45 100	4 400	1 200	2 600	31 100	6 300	12 100	39 600	30 300
B. Census total (population)	899 300	89 800	20 800	46 700	5 400	1 800	3 300	35 200	7 700	15 100	37 300	30 300
C. Evaluation study total	912 400 +/–6 200	96 900 +/–4 300	17 600 +/–1 900	50 100 +/–3 000	4 300 +/–900	1 300 +/–600	2 500 +/–700	34 500 +/–2 600	7 200 +/–1 200	14 100 +/–1 700	2 800 +/–800	49 000 +/–2 800
D. Correctly classified	862 500	88 500	14 000	36 000	3 200	800	1 900	27 000	5 500	10 800	–	–
E. Percentage of correctly classified	95,5	91,8	74,9	79,8	72,7	66,7	73,1	86,8	87,3	89,3	–	–
F. False inclusion	40 500	7 900	4 700	9 100	1 200	400	700	4 100	800	1 300	39 600	49 000
G. False omission	49 900	8 400	3 600	14 100	1 100	500	600	7 500	1 700	3 300	2 800	30 300
H. Gross error	90 400	16 300	8 300	23 200	2 300	900	1 300	11 600	2 500	4 600	42 400	79 300
I. Net error	–13 100 +/–6 200	–7 100 +/–4 300	3 200 +/–1 900	–3 400 +/–3 000	1 100 +/–900	500 +/–600	800 +/–700	700 +/–2 600	500 +/–1 200	1 000 +/–1 700	34 500 +/–800	– –
J. Relative net error	–1,5 +/–0,7	–7,9 +/–4,8	15,4 +/–9,1	–7,3 +/–6,4	20,4 +/–16,7	27,8 +/–33,3	24,2 +/–21,2	2,0 +/–7,4	6,5 +/–15,6	6,6 +/–11,3	92,5 +/–2,1	– –

7.13 Equipments

Respondents in the evaluation study were asked whether the buildings had the following facilities and equipment:

- electricity
- sewage
- piped water
- hot water
- lift
- gas
- sauna (in this building)
- sauna in separate building
- swimming pool (in this building)
- refrigerated cellar (in this building)
- laundry room (in this building)
- civil defence shelter (in this building).

The questions on lift, gas, swimming pool, refrigerated cellar, laundry room and civil defence shelter were only asked in buildings that had at least three dwellings. The item concerning sauna in a separate building was only asked in buildings with 1–2 dwellings.

Respondents were also asked to indicate if they did not have the equipment mentioned.

Electricity

The total number of buildings with electricity was more or less the same in both data sets at around 1 130 000. Of the buildings that according to the register data had electricity, 10 000 were actually without it according to the evaluation stydy. The number of buildings which according to the census did not have electricity but did so according to the evaluation study, was almost the same.

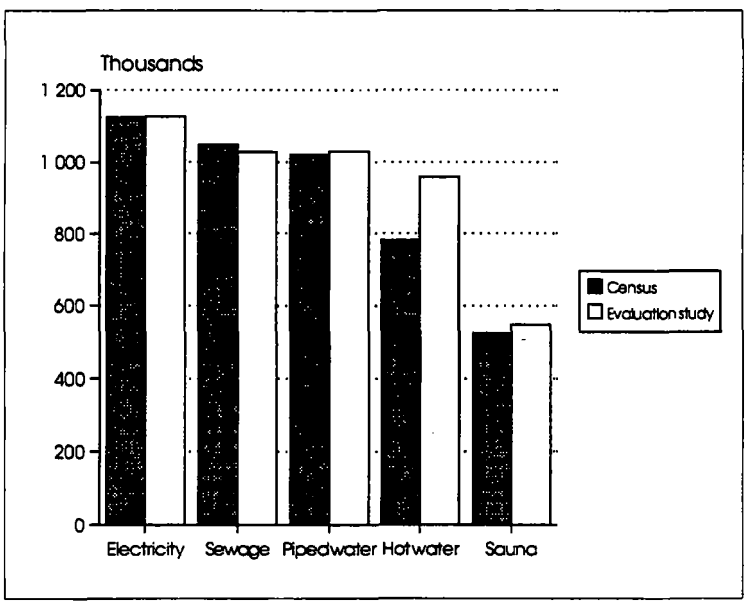


Figure 9.
Facilities in buildings

Sewage

The census overstated the number of buildings with sewers; according to the evaluation study almost 50 000 buildings that were counted as having a sewer in the census did not in fact have one. The majority of these, i.e. 54 per cent were other than residential buildings (17 000 garages for motor vehicles and 4 000 industrial buildings), while the rest were detached houses. One fifth of the buildings were located in Northern Finland, which accounted for 15 per cent of the building stock. Fifty-six per cent of the buildings were located in densely populated areas.

Piped water

According to the evaluation study the figure given by the census for the number of buildings with a water pipe was 10 000 short of the true figure.

One quarter of the buildings which according to the census did not have running water did according to the evaluation stydy. One fifth of the buildings did not belong to the building stock according to the evaluation study.

The results of the evaluation study indicated that 34 000 of the buildings which according to the census had running water were actually without a water pipe.

Almost half of the missing buildings, i.e. those that according to the evaluation study should have been in the census material, did not have running water according to the evaluation study.

Hot water

The findings of the evaluation study indicated that the census underestimated the number of buildings with hot water by 180 000.

Over 150 000 buildings that did not have hot water according to the census did according to the evaluation study. The difference in the sum total here is that 34 000 of the buildings which according to the census did not have hot water did not belong to the building stock in the first place according to the evaluation study, whereas only 17 000 of those buildings that according to the evaluation study did not have hot water were not part of the building stock according to the census.

Of the buildings that according to the census did not have hot water but that according to the evaluation study did, almost nine in ten were detached houses, while less than one in ten were other than residential buildings.

One explanation for the difference here lies in the fact that people do not normally apply for building permits to install immersion heaters in their detached houses, which again means that there will be no relevant entries in the register.

Lift

The total number of buildings with a lift was the same according to both data sets. Nonetheless one fifth of the houses that according to the census had a lift did not according to the evaluation stydy. On the other hand, of the buildings that according to the census did not have a lift, almost 3 000 did according to the evaluation study.

Communal sauna

In buildings with at least three dwellings, respondents were asked whether they had a sauna that they shared in the building. In the case of detached houses, the corresponding

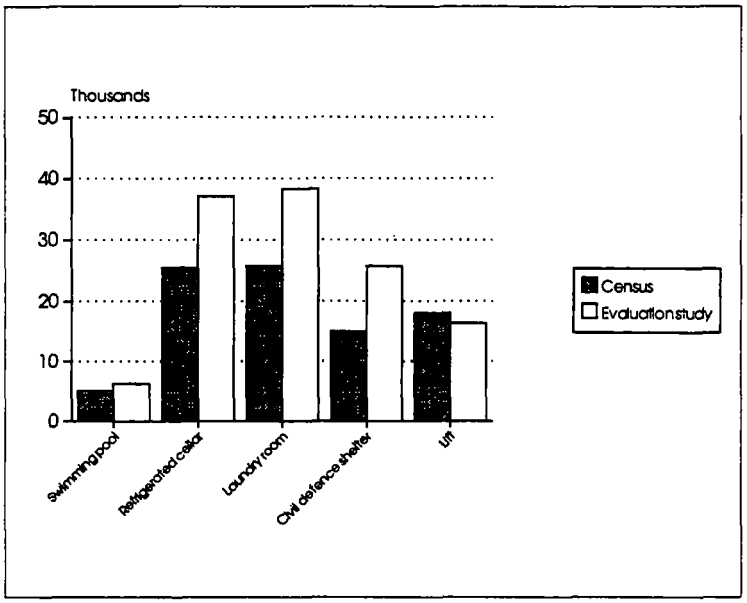


Figure 10
Facilities in buildings

question was whether there was a sauna in the building.

The census understated the number of buildings with a sauna; according to the evaluation study almost every other building had a sauna, while the figure given by the census was that 45 per cent of the buildings in the building stock had a sauna. According to the evaluation study 21 000 of the buildings that according to the census did not have a sauna did.

Swimming pool

According to the census there were 5 000 buildings with a swimming pool; the figure given by the evaluation study was 1 000 higher. However, the total numbers here are so low that the difference may be due to sampling variation.

Refrigerated cellar, laundry room and civil defence shelter

The question concerning refrigerated cellar, laundry room and civil defence shelter was not included in the forms for detached houses. The items were not included at all in the 1980 population census; the register data for buildings built after 1980 have been obtained from notices on building projects and for other buildings from regular inspections carried out by the central population register.

On the basis of the evaluation study it seemed that the census understated the number of all three equipments. The number of cellars was 10 000 and the number of bomb shelters 13 000 short of the true figure.

Of those buildings where the equipment concerned was missing from the census,

about three in four had been built prior to 1981. This concerned all three equipments.

Of the buildings that according to the evaluation study had a refrigerated cellar but according to the census did not, 60 per cent were blocks of flats, one quarter were terraced houses and one in ten were other than residential buildings.

Of the buildings which according to the evaluation study did not have a laundry room even though it should have, 60 per cent were blocks of flats, one fifth were terraced houses and 16 per cent were other than residential dwellings.

In these comparisons, too, it must be remembered that the evaluation study may itself contain errors. For example, in a postal questionnaire it is possible that someone defines a bicycle shed as a civil defence shelter, or a normal cellar as a refrigerated one. However, the difference in the equipments are so considerable that it seems clear the numbers missing from the register are counted in thousands.

7.14 Connections to municipal networks

Questions concerning connections to the electrical, sewer and piped water networks were included for all buildings; in addition, there was a separate question concerning possible links to the natural gas network for other than detached houses. Respondents were also asked to indicate if they were not linked up to the respective networks.

Electrical network

According to the evaluation study the number of buildings connected to the electricity mains network was 16 000 higher than the figure given by the census.

Of the buildings that were falsely counted by the census as connected to the electricity network, 60 per cent were detached houses, most of which were located in sparsely populated areas. The rest were other than residential buildings.

Sewege network

The census underestimated the number of buildings connected to the sewege network. The number of buildings that the census falsely deduced as being connected to the network system was even higher than the number of buildings which were falsely deduced as having a sewer. A total of 105 000 buildings that according to the census were connected to the sewege network were not so according to the evaluation study.

On the other hand, the evaluation study indicated that 45 000 buildings were in fact connected to the sewege network even though the register data suggested they were not. This means that the total number of buildings connected to the sewege network was about 50 000 higher in the evaluation study than in the census.

Over three quarters of the buildings that were falsely deduced as being connected to the sewege network were detached houses in population centres. Over one in ten were detached houses in sparsely populated areas, and one in ten were other than residential buildings. Almost one quarter of the buildings were located in the province of Vaasa. In relative terms the number of these buildings was lowest in the southernmost province of Uusimaa.

Three quarters or 75 per cent of the buildings falsely deduced as being connected to the sewage network in the census were detached houses; other than residential buildings accounted for one third. In relative terms the highest concentration of these buildings was found in the province of Uusimaa, and they were located more often in sparsely populated areas that the buildings falsely deduced as being connected to the sewege network.

It seems likely that the evaluation study also tended to overestimate rather than underestimate the number of buildings connected to the sewege network. The owner of a detached house may reply that the building is linked up to the network even though in reality there is only the building's own sewer system. This further increases the difference between the number of buildings that according to the two data sets are connected to the sewege network.

Piped water network

The census understated the number of buildings connected to the piped water network by 20 000. One in ten of the buildings connected to the piped water network according to the census was not so according to the evaluation stydy. A couple of per cent of the buildings did not belong to the building stock.

Of the buildings that according to the census were not connected to the piped water network, one fifth were in fact connected according to the evaluation study, while 8 per cent did not belong to the building stock. Half of the buildings that were falsely deduced in the census as not being connected to the piped water network were detached houses located in sparsely populated areas. One third were detached houses in population centres and the rest other than residential dwellings.

It seems likely that some of the respondents in the evaluation study have confused running water and being connected to the piped water network, the risk being particularly obvious in detached houses in rural areas. The quality of these data is thus quite satisfactory in the census.

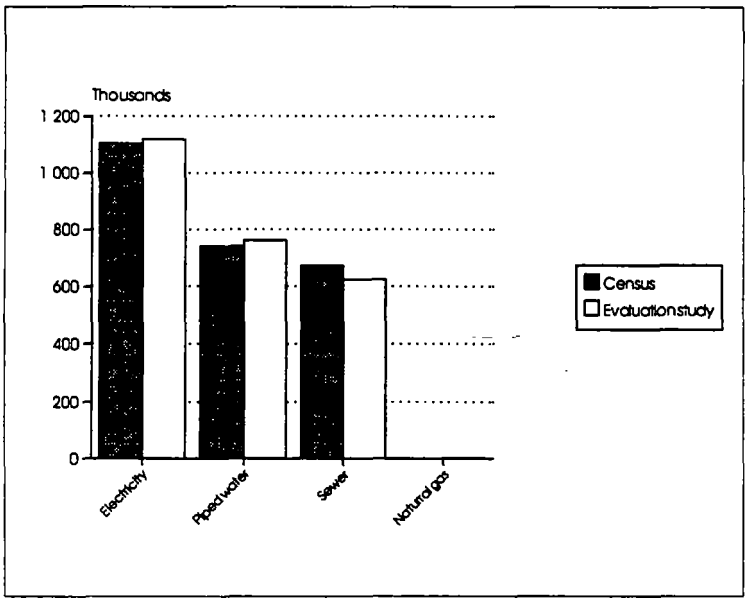


Figure 11.
Connections to municipal networks

Natural gas network

All buildings that according to the census were connected to the natural gas network were also linked up according to the evaluation study although the observations in the sample material number no more than a few dozen, which in raised terms means something like 500. In addition, there were almost 3 000 buildings that according to the evaluation study were connected to the natural gas network. These were quite apparently cases where the respondents misunderstood the question; many of them came from places where natural gas quite simply is not available.

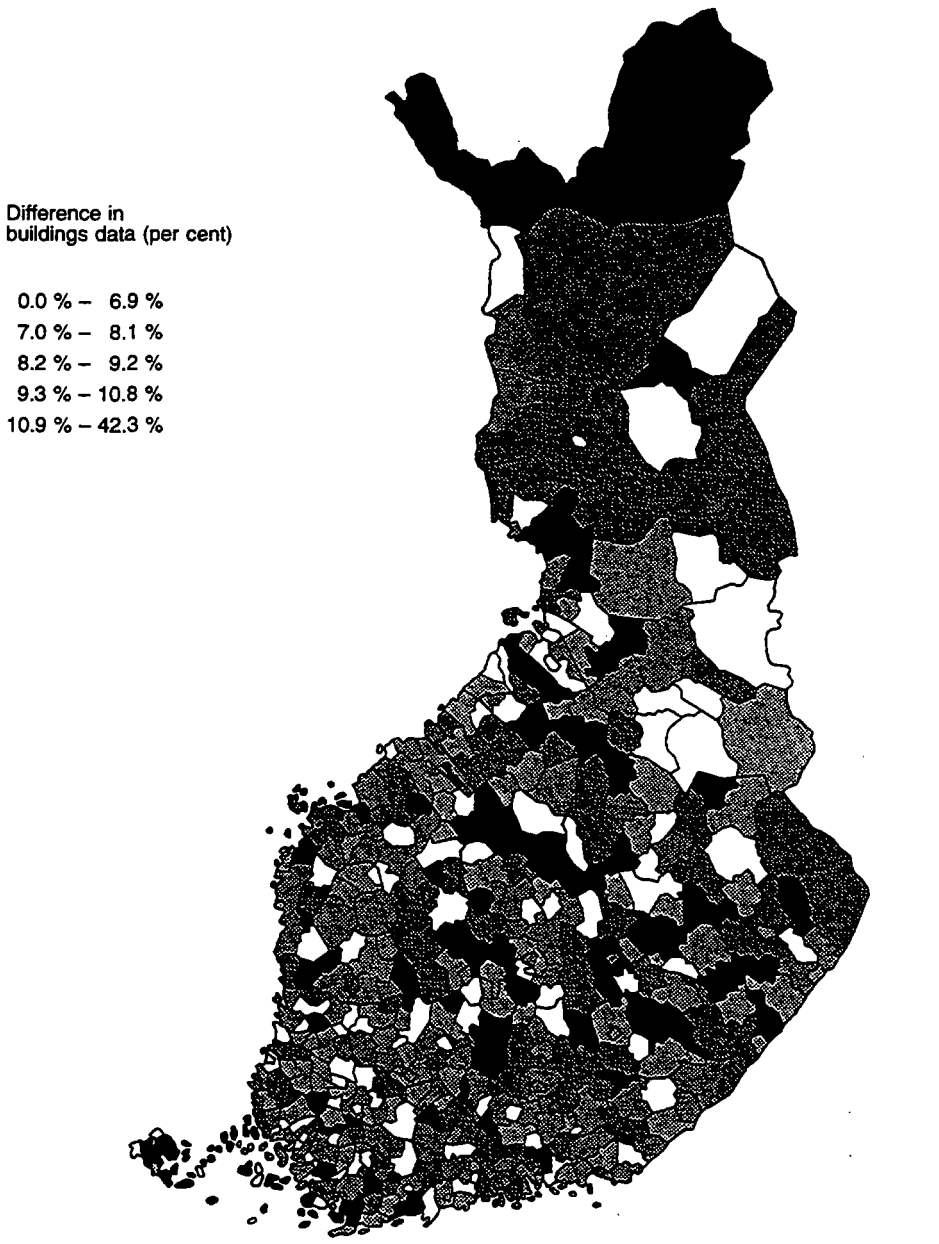
7.15 Building data by municipalities

Map 3 describes the differences in buildings data between the census and the evaluation study in individual municipalities. The municipalities have been divided into five equally large groups in terms of the level of differences. The white fifth represents those municipalities where the building data of the census and the evaluation study differed from each other least; in the black municipalities the data differed most.

In regional terms both those municipalities with a high congruence between the data sets and those with a low congruence were quite evenly spread across the country.

Map 3.

Differences in buildings data between census and evaluation study by municipalities



Statistics Finland
Geographic Information

8 Summary

Finland is the second country in the world to have made a successful changeover to an exclusively register-based population census system. The parallel surveys of 1980 and 1985 already demonstrated that register data can be used to produce perfectly acceptable population census statistics. The evaluation study confirmed this finding and provided suggestions for further improvement of census data.

Economic activity

The census yielded a larger number of employed people than did the evaluation study. This was to be expected, for the questionnaire understated the number of those meeting the census definition of an employed person: register data cover even the shortest spell of registered employment, whereas the census question on principal activity easily elicits an answer that disregards short spells of employment. Correspondingly, the questionnaire survey yielded a larger number of students than did the register-based census: students with short spells of employment were treated as employed in register inference, but as students in the questionnaire survey unless they had noted on the form that they had been both employed and students.

Register data may give a person several activities for the period under study. One of these is then inferred to be his or her principal activity, which means that the person's other activities will be excluded from the statistics. This is as it should be in census statistics, at least for the time being. The time may come, however, when a person cannot be allocated to a single category: the same person may be a student, a consultant in business for himself, or someone on the payroll of a company who periodically reports for work in the office.

The register-based census credited companies' main establishments with too many workplaces, thus overstating the number of workplaces in cities with a heavy concentration of such establishments. The evaluation study showed, however, that whatever extra workplaces these cities gained through companies' main establishments they lost through cases in which the person's workplace was unknown and was therefore allocated to his or her municipality of residence. This brought the register-based census in line with the questionnaire-based census as far as the number of workplaces in the major cities are concerned, but the surrounding municipalities gained a number of extra workplaces.

The questionnaire-based census classified those with a mobile job into a separate category, whereas the register system assigned every employee to some fixed establishment. In the register system, too, those working at home or elsewhere outside fixed establishments should perhaps be separated from fixed establishments, with those working at home given home as their place of work and with those performing a mobile job classified into a separate category. The degree of mobility can be determined from such data as occupation and place of work. Forest workers are a good example of workers with a mobile job, and so are cleaners and building caretakers. In register inference, cleaners working for a cleaning company are allocated to the company's office from which their work is managed, whereas municipal cleaners are usually assigned to the administrative office of the respective municipality, as are municipal houseworkers and holiday substitutes in agriculture.

For years, the claim has been made that distance work is on the increase, i.e. that increasing numbers of people work at home, except for an occasional visit to the workplace to attend a meeting, for instance. If and when distance work becomes more common, the establishments on the questionnaire by which companies provide information on the workplaces of their employees should perhaps include 'home' as well. This would help ensure that 'workplace' really designates the place in which the work is performed.

As far as occupational data are concerned, the problem with register-based censuses is that a person's occupational data do not always relate to the same employment contract as his or her workplace data. In addition, a person's occupational data derived from his or her tax return may indicate an educational qualification instead or may relate to a previous occupation. The situation would improve considerably if annual corporate tax returns were to include occupational data as well. This would ensure that occupation and workplace data would relate to the same employment contract. In addition, the quality of occupational titles would probably improve.

The register-based census yielded an excess of farmers on own account. A large proportion of the people whom the census and the evaluation study classified in different industry, occupation and socio-economic groups were associated with agriculture. One problem lies in the difficulty of distinguishing between retired farmers and farmers still engaged in farming on a full-time basis. Another problem lies in the difficulty of distinguishing between service-sector employees and farmers on own account. A farmer's wife who in addition to her work on the farm holds a job in the service sector is a good example. Which activity should be regarded as her principal activity?

Correspondingly, agricultural occupations were common among people in different categories. Earlier, unpaid family workers in agriculture were classified as agricultural workers. In register inference, they are classified as farmers if covered by farmers' pension insurance. Otherwise they are classified as not in the labour force.

Residence

The census data on the domicile of the resident population were of a reasonably high quality. In 97 per cent of the cases, the register-based census allocated a person to the same dwelling as did the evaluation study. In 91 per cent of the cases, the register-based census allocated exactly the same people to a household-dwelling unit as did the evaluation study.

Register data understated the number of temporary residents, putting it at 74,000. The evaluation study gave their number as 90,000. Because a proportion of the respondents to the evaluation study had obviously made a mistake by stating that they were temporary residents, the real number of temporary residents was probably about 80,000.

Register data may retain the parental home as the domicile of young people long after these have moved out. Two out of three occupants of a dwelling included in the census but not in the evaluation study were 15 to 29 years of age.

Dwellings

The census figures for the number of dwellings are probably very close to the correct figures. It is sometimes difficult to determine whether an unoccupied single-family house still belongs in the dwelling stock or whether it should be removed from it as uninhabitable. According to the evaluation study, the register data understated the number of attached (terraced) houses by about 10,000.

The census data on the characteristics of dwellings are of a high quality as measured against the evaluation study. The biggest differences between the census and the

evaluation study relate to the number of dwellings equipped with a balcony and served with electricity, respectively. The evaluation study puts the figure for dwellings with a balcony or terrace much higher, and the figure for dwellings with electricity much lower, than does the census. Whether a single-family house has a balcony or terrace is admittedly a moot point at times, but there is little doubt that at least a proportion of the 170,000 flats in multistorey blocks which the evaluation study reports as equipped with a balcony are in fact so equipped, although the information is missing from the census data.

In the checks performed on dwellings, the inference is made that all dwellings located in buildings with electricity are served with electricity. Apparently this is not always the case, at least not according to the evaluation study. On the other hand, the evaluation study's low figure for dwellings with electricity may be due to an inadequate item in the questionnaire which only allowed a statement that the dwelling is served with electricity, with no provision made for reporting that the dwelling lacked electricity.

Buildings

According to the evaluation study, the census data overstate the number of buildings slightly. Although the data obtained from the Central Population Register are checked to screen out buildings that do not belong in the building stock, the data on the stock retain a few thousand single-family houses that have been demolished or are too rundown to be inhabitable.

The overall quality of the census data is satisfactory as regards the characteristics of attached (terraced) houses and blocks of flats. The limitations of the data on detached houses, and on dwellings located in non-residential buildings in particular, are far more numerous.

Electricity as the heat source and direct electric heating as the heating system are covered inadequately by the census data on buildings. The census classified about 50,000 buildings as heated with wood-fuelled stoves, while the evaluation study classified them as relying on direct electric heating with electricity as the heat source.

The census data understate the level of equipment of detached single-family houses. This applies specially to the number of buildings with hot water and, to a lesser degree, to the number of buildings with a flush toilet and a sauna.

The computer checks on register data may have an excessively generalising effect in some cases. For instance, not all buildings on the same premises need be connected to a sewer system.

Appendices

STATISTICS FINLAND **FORM 1: PERSONAL DATA** **STATUTORY CONFIDENTIAL**

POPULATION AND HOUSING CENSUS 1990
SAMPLE SURVEY

This questionnaire is concerned with economic activity by individual persons. It shall be completed for all people born between 1 January 1916 and 31 December 1975 and living in the dwelling on 31 December 1990. A form is enclosed for each person born between the dates given and living in the dwelling according to the population register. The form contains certain data items which have been completed in advance.
If any person whose name is indicated on the form did not live in the dwelling on 31 December 1990, that form does not need to be returned. If someone who was born between 1 January 1916 and 31 December 1975 was living in the dwelling on 31 December 1990 but no form is included for that person, the relevant data for that person can be provided on a form for a person who did not live in the dwelling on 31 December 1990. For further details, contact Statistics Finland, tel. (90) 1734 3565 and 1734 3600.

The questions on this page concern
YOUR ACTIVITY 25 Dec - 31 Dec 1990:
(Tuesday - Monday)

1 Please tick off any and all items which describe your activity during the period between 25 Dec and 31 Dec 1990. Note that temporary absence from work because of holiday, sickness, etc. is regarded as gainful employment (items A, B and C). Please include any short-term employment, even if it lasted no more than one day.

A ☐ I worked for wages
B ☐ I was an entrepreneur or self-employed
C ☐ I worked in a family member's company without pay
D ☐ I was unemployed or laid off
E ☐ I was a pensioner
F ☐ I was a student or at school
G ☐ I was doing my military/civilian service
H ☐ I was at home doing housework
I ☐ I was doing something else, please specify:_____

If you were in gainful employment (items A, B and C above), please fill in the following items on your place of work as well as on how you travel to work:

2 Workplace or name of employer:

_____

3 Address of workplace:

_____

4 Location of workplace (municipality):

_____

5 Industry:

_____

6 Occupation in this workplace:

_____

7 I usually travel to work by (select one alternative only):

A ☐ bus or tram
B ☐ train or underground
C ☐ car (driver)
D ☐ car (passenger)
E ☐ motorbike
F ☐ moped/scooter
G ☐ foot or bike
H ☐ I work where I live
I ☐ other, please specify: _____

8 Please state the distance (in full kilometres) between your home and the place of work indicated above:

d|_|_|_| km

PLEASE TURN OVER; THERE ARE MORE QUESTIONS OVERLEAF!

INSTRUCTIONS

1 Working for wages or gainful employment (items A, B and C) refers to any kind of work that generates income. The definition also includes work that is done without pay on a farm or in a company owned by a family member.

A wage earner is defined as anyone who works for someone else for wages or for some other form of compensation. Persons living on a grant or scholarship are also regarded as working for wages.

Entrepreneurs or self-employed people are defined as people who have their own company, who work on a farm they own or have rented, or who carry on a trade on their own account (such as dressmakers or writers).

An unemployed person is someone who has no job, who is currently looking for a job and who is available for a job, or who has been laid off without pay.

Pensioners are people who have retired and who are on an old age pension, employee pension, disability pension, unemployment, veteran's pension, etc. as well as people living on old-age benefits. People living on a dependant's pension shall tick off the last alternative (I).

Students are defined as people who are studying in an educational institution or who are currently in unpaid practical training related to their studies. In-service training, correspondence courses, and studies in civic or workers' colleges or similar are not to be included in this category.

The last category ("I did something else") applies to living on income from property, savings or a dependant's pension as well as to other activities for which not payment is made.

2 Please state the exact name of your place of work. If your employer has more than one establishment, please indicate both the name of the employer and the name of the office or unit.

3 Please give the address of the place where you worked during the week concerned. If you had a mobile job but started every morning from the same place (e.g. a postman through a post office), give the address of this place. If, on the other hand, you had no fixed workplace (e.g. forest worker), give the name of the municipality where you worked.

5 Industry refers to the workplace's type of activity or main line of production. All people working at the same workplace are engaged in the same industry, regardless of their occupations. Here are some examples:
– dental surgery – cleaning
– children's daycare – landscaping
– real estate maintenance – TV repairs
– sports good shops – accountant's office

6 Occupation must be an accurate job description of what you actually do on the job on a daily basis. Degrees are not the same thing as occupations. Write
– bank consultant (not MBA)
– head of department (not professor)
– welder (not labourer).

7 If you are temporarily living away from home because of your studies, your job, or for some other reason, please give the distance between your temporary residence and your workplace. Select only one alternative for method of travel to and from work; if you use more than one mode of transport, tick off the one that represents the longest distance.

The questions on this page concern

YOUR ACTIVITY DURING 1990

9 Please tick off all items which describe your activity during 1990.

A ☐ I worked for wages
B ☐ I was an entrepreneur or self-employed
C ☐ I worked in a family member's company without pay
D ☐ I was unemployed or laid off
E ☐ I was a pensioner
F ☐ I was a student or at school
G ☐ I was doing my military/civilian service
H ☐ I was at home doing housework
I I was doing something else, please specify: _____

10 Please indicate how many months you spent in full-time or part-time employment during 1990; how many months you were unemployed; and how many months you did something else during 1990.

____ months full-time employment

____ months part-time employment, 20-29 hours per week

____ months part-time employment, 1-19 hours per week

____ months unemployed or laid off

____ months on pension, student or something else

INSTRUCTIONS:

9 In this item we want to know about everything you did during 1990. Please tick off any and all items that describe your activity during 1990. The same instructions referring to question 1 (activity between 25 Dec and 31 Dec 1990) apply to these alternatives (A-I).

10 Here we want you to indicate the number of months you were engaged in different types of activity during 1990.

Time spent in employment is defined as follows:
– working for wages or other compensation
– working in own company, on own farm or self-employed
– working in a family member's company or farm without pay
– temporary absence from work because of holiday, sickness, maternity leave, etc.
– short-time or temporary wage employment.

A part-time job is one involving no more than 30 hours a week or 120 hours a month. If your working hours vary from week to week, indicate average working hours (not counting overtime). The question concerns main occupation only.

PLEASE RETURN THIS FORM TOGETHER WITH FORM 2 FOR DWELLING DATA BY 15 FEBRUARY 1991 TO THIS ADDRESS: STATISTICS FINLAND, POPULATION AND HOUSING CENSUS 1990, P.O.BOX 770, 00101 HELSINKI

THANK YOU!

STATISTICS FINLAND **FORM 2: DATA ON DWELLING** **STATUTORY CONFIDENTIAL**

POPULATION AND HOUSING CENSUS 1990
SAMPLE SURVEY

Statistics Finland is a government office charged with the responsibility to compile statistics on various aspects of life in society. On December 31st, 1990, Statistics Finland is conducting a statutory population and housing census. All residents of the dwellings that have been randomly sampled for this evaluation study of the census, are required by law to provide the information requested in the forms herein about the dwelling concerned and its residents. The data shall be provided for the situation as at December 31st, 1990. The names printed on the form have been drawn from the Central Population Register. Before filling in the form please read the instructions overleaf. The numbers that are circled refer to the numbers in the instructions.
Enquiries: (90) 1734 3567, 1734 3589, 1734 3563, 1734 3565 and 1734 3600.

This questionnaire form concerns the whole dwelling; anyone living at the address indicated may open the envelope, regardless of whom it is addressed to. If the person to whom this letter is addressed has moved, the letter must not be forwarded to that person's new address.

1 List of all persons living in the dwelling:

Please state the names of all persons not mentioned above and the relevant data for new residents living in the dwelling on 31 Dec 1990:

Identity code	Surname	Given names
|_|_|_|_|_|_|_|_|_|_|		
|_|_|_|_|_|_|_|_|_|_|		
|_|_|_|_|_|_|_|_|_|_|		
|_|_|_|_|_|_|_|_|_|_|		

☐ There were no permanent or temporary residents in the dwelling on 31 Dec 1990.

2 Does this person currently live in the dwelling (see instructions)

Marital status	together with partner	as subtenant	temporarily
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Reason for temporary residence (e.g. studies, (co-habiting) work, etc.)

_____

_____

_____

Does the person currently live in the dwelling (see instructions, points 2-4)

Marital status	together with partner	as subtenant	perma-nently	temporarily
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Reason for temporary residence (e.g. studies, (co-habiting) work, etc.)

_____

_____

_____

5 The occupant of the dwelling (see instructions)

A ☐ owns the building
B ☐ owns the sharehold
C ☐ rents the dwelling as a tenant
D ☐ lives in a dwelling owned or rented by employer
E ☐ occupies the dwelling on other grounds (e.g. family relationship, pays no rent, etc.)

6 Floor are of the dwelling|_|_|_| m^2.

7 The dwelling has a

A ☐ kitchen
B ☐ kitchenette
C ☐ cooking facilities

8 The dwelling has |_|_| rooms excluding the kitchen.

9 The dwelling has

A ☐ toilet
B ☐ hot water
C ☐ shower or bathroom
D ☐ integrated sauna
E ☐ balcony or terrace
F ☐ electricity

These data were given by:_____

Signature:_____

Name in block capitals:_____

Address:_____

Telephone:_____

PLEASE REMEMBER TO COMPLETE FORM 1!
SEE OVERLEAF FOR FILLING INSTRUCTIONS

PLEASE RETURN THIS FORM BY 15 FEBRUARY 1991 TO THIS ADDRESS:

STATISTICS FINLAND, POPULATION AND HOUSING CENSUS 1990, P.O.BOX 770, 00101 HELSINKI

The 1990 population and housing census is conducted, for the first time ever, entirely on the basis of existing register data, which means that no inquiry forms are posted to the population. In connection with the census a sample survey is carried out in order to test the quality of the data collected from register sources.

In this sample survey data are collected on dwellings and residents from a total of 23 000 buildings, which have been randomly selected for the study. The data collected may only be used for the compilation of such statistics and for such research purposes that can cause no harm or damage to the people concerned. All researchers and staff with access to these data are under obligation to maintain secrecy at all times.

INSTRUCTIONS:

The numbers below refer to the circled numbers on the questionnaire form.

1 Listed on the form are those persons who according to the Central Population Register lived in the dwelling at the time that the forms were being printed. Please delete the names of those persons who did not live in the dwelling on 31 Dec 1990. Use the empty lines to fill in the names and identity codes of those persons who lived in the dwelling on 31 Dec 1990 but who are not listed.

2 Please put a tick against the names of those persons who lived together or co-habited as husband and wife without being married to one another.

3 Please put a tick against the names of those persons who lived in the dwelling as subtenants on 31 Dec 1990.

4 Please put a tick against the names of all those persons who were lived in the dwelling temporarily. For each person, indicate the reason for their temporary residence.

Temporary residence means that the person concerned lives in this dwelling temporarily, but is officially registered as living in a different dwelling.

Temporary residence may be motivated by study reasons, short-term employment, or some other reason. Visits, holidays or other similar short-term stays of less than 3 months' duration do not count as temporary residence.

For each person added to the list, please indicate whether they lived in the dwelling permanently or temporarily on 31 Dec 1990. Also, for each person living in the dwelling temporarily, please state the reason for their temporary residence.

5 The occupant of the dwelling is the resident who owns the dwelling, who lives in the dwelling as the principal tenant, or whose employer has provided the dwelling.

Item D refers to a rented dwelling that has been provided to the occupant by the employer.

Item E refers to a dwelling for which no rent is paid.

6 The definition of floor area includes kitchen, other heated space (e.g. utility room, walking cupboard) as well as sauna (when in dwelling). Do not count balcony, porch, unheated hall space or similar or boiler room, cellar, garage or unheated storage room.

7 Kitchen is a room with a window and measuring at least $7m^2$, specifically intended for cooking.

Kitchenette is a space fitted as a kitchen but measuring less than $7m^2$.

Cooking area is a space intended for cooking purposes and mainly marked off by walls but directly adjacent (with no fixed doors) to other living space. Spaces fitted with kitchen equipment but not separated in any way from other living space are also classified in this category.

8 Count in the number of rooms all rooms intended for living purposes except the kitchen or kitchenette. A room is defined as a space with a window and with a minimum floor area of $7m^2$ and a mean height of at least 2 metres. A walking cupboard, porch, or similar is not counted as a room.

9 This question only applies to a sauna that is within the dwelling itself, not to a sauna in a separate building or shared with other households.

STATISTICS FINLAND

POPULATION AND HOUSING COUNT 1990

STATUTORY CONFIDENTIAL

Statistics Finland is a government office charged with the responsibility to compile statistics on various aspects of life in society. On December 31st, 1990, Statistics Finland is conducting a statutory population and housing census. All owners of buildings that have been randomly sampled for this evaluation study of the census, are required by law to provide the information requested in the forms herein about the dwelling concerned. The data shall be provided for the situation as at October 15th, 1990. The data printed on the form have been drawn from the buildings and dwellings file of the Central Population Register. Before filling in the form please read the instructions overleaf. Please return the form in the envelope enclosed to Statistics Finland by November 2nd, 1990.

Enquiries: (90) 1734 3600 Jorma Heimonen
1734 3567 Marita Oksanen
1734 3498 Riitta Rosenberg

Building:
Municipality | Village/District | House/Block | Site | Inspection code | Building no.

1. According to the register the building was completed in 19__

   Is this correct?

   ☐ Yes
   ☐ No, the building was completed in 19__

2. *According to the register the floorage of the building is*

   Is this correct?

   ☐ Yes
   ☐ No, the floorage is ___ m^2

3. According to the register the building is intended for use as

   Is this correct?

   ☐ Yes
   ☐ No, the building is intended for use as

4. The building's present owner _____

5. The building has been basic repairs

   ☐ Yes, in 19__
   ☐ No

6. The building's main heating system (please select one alternative only)

   ☐ water central heating
   ☐ air central heating
   ☐ electric heating
   ☐ stove heating
   ☐ no fixed heating installation

7. The building's main heating fuel (please select one alternative only)

   ☐ oil, gas
   ☐ wood, peat
   ☐ district heating
   ☐ electricity
   ☐ coal
   ☐ other, please specify

8. The building has (please tick yes or no for each item)

electricity	☐ yes	☐ no
sewer	☐ yes	☐ no
piped water	☐ yes	☐ no
hot water	☐ yes	☐ no
sauna in same building	☐ yes	☐ no
sauna in separate building	☐ yes	☐ no

9. The building is connected to the following municipal networks (please tick yes or no for each item)

electricity network	☐ yes	☐ no
sewer network	☐ yes	☐ no
piped water network	☐ yes	☐ no

10. The main building material used for the building's supporting structures is (please select one alternative only)

    ☐ concrete
    ☐ brick
    ☐ steel
    ☐ wood
    ☐ other, please specify

11. The total number of residential dwellings in the building is

    ____ The total number of offices is

    ____ These data were given by:

Signature: _____

Name in block capitals: _____

Address: _____

Telephone: _____

PLEASE RETURN THIS FORM TO STATISTICS FINLAND BY 2 NOVEMBER 1990

SEE OVERLEAF FOR FILLING INSTRUCTIONS

The 1990 population and housing census is conducted, for the first time ever, entirely on the basis of existing register data, which means that no inquiry forms are posted to the population. In connection with the census a sample survey is carried out in order to test the quality of the data collected from register sources.

In this sample survey data are collected on a total of 25 000 buildings, which have been randomly selected for the study. The data collected are used for testing the reliability of the register sources. According to legislation these data may only be used for the compilation of such statistics and for such research purposes that can cause no harm or damage to the people concerned. All researchers and staff with access to these data are under obligation to maintain secrecy at all times.

INSTRUCTIONS:

Questions 1, 2 and 3 have been completed in advance on the basis of register data. Please check these data and correct any mistakes. If any data are missing, please fill in.

2. Floorage is defined as the combined floor space of all stories in the building, including the floor surfaces of all rooms that are used for living or working purposes. For example, in a two-storied detached house with residential rooms and attic space upstairs, only the floor space of the rooms will be counted in the floorage. In the basement, only those spaces are included in the figure that fall under the principal end-use of the building.

3. The intended use of the building is determined on the basis of the use that takes up the largest part of its floor area. If the building is unoccupied, intended use is determined on the basis of the purpose it was originally built for.

5. Basic repairs refers to major and extensive repairs that are comparable to complete re-building.

6. Only state the one main method that is used in heating the building.

   Two methods of central heating are distinguished; with circulating water and with circulating air.

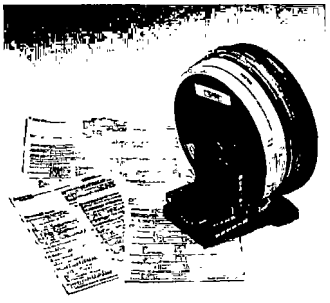
   Electrical heating means that the building is heated with electric heaters or radiators in different parts of the building.

7. District heating refers to a system where heat is supplied to the building from a district heating centre outside the building and serving more than one building.

10. This question refers strictly to the material of the building's supporting structures. If, for instance, a building has a brick walls but the actual support structures are made of wood, this is defined as a wooden house rather than a brick house.

11. A residential dwelling is defined as any dwelling that has its own entry from outdoors or through a staircase. If a residential dwelling is entered through another residential dwelling, the two spaces are counted as one residential dwelling. One office is constituted by the facilities used by one occupant in the building.

Evaluation study of the 1990 Census



The population census data of 1990 are the first cencus data in Finland to have been compiled exclusively from register data. The register-based census was supplemented by a questionnaire-based census taken on a small sample and a comparison was made between the two data files. This report describes how, and why, the register-based data differ from the questionnaire-based data. The data selected for comparison describe the economic activity of the population, housing conditions, dwellings and buildings.

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