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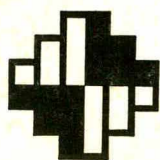
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Kalevi Alestalo

Revised Enterprise Statistics

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Concepts, classifications and methods



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Kalevi Alestalo

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FOREWORD

The Central Statistical Office of Finland has completed a thorough revision of the enterprise statistics.

As a result of the revised Accounting Law, the data base of the enterprise statistics was changed for the year 1974. Simultaneously, the method of compiling these statistics, and their concepts and classifications were also changed.

The concepts, classifications and methods applied in the revised enterprise statistics are described in this report prepared by Mr. Kalevi Alestalo, Head of the Enterprise-statistics Unit of the Central Statistical Office of Finland.

Helsinki, January 11, 1978

Aaro Kenttä

Ilkka Hyppönen

REVISED ENTERPRISE STATISTICS

Concepts, classifications and methods

CONTENTS		Page
	FOREWORD	1
1.	BACKGROUND	5
2	THE COLLECTION OF THE BASIC DATA	7
3.	THE STATISTICAL UNIT AND THE OBJECT POPULATION	8
	3.1. The statistical unit	8
	3.2. The object population	9
4.	CLASSIFICATIONS RELATING TO THE STATISTICAL UNIT	10
	4.1. Industrial classification	10
	4.2. Classification by category of owner	13
	4.3. Classification by size	14
5.	THE VARIABLES	14
6.	SAMPLING	19
	6.1. Forming the frame population	19
	6.2. Allocation of the sample and the sampling sizes	23
	6.3. Estimation of the population parameters	26
Encl. No. 1	Sampling sizes in the allocation	
Encl. No. 2	Sample of the enterprise statistics in 1974	

Background

"Enterprise statistics should describe the total economic activity of enterprises during a year, i.e. receipts, their utilization, assets and investments, liabilities and own capital, valuations and reserves, labour utilization and other comparable items. In addition, enterprise statistics should describe the relationships between enterprises, e.g. their creditor, debtor and proprietary relationships."¹⁾

Enterprise statistics of the type described above have previously been called up under the heading of profit and loss and balance sheet accounts statistics. These statistics have been compiled for manufacturing, wholesale and retail trade, construction,²⁾ transport and communications,³⁾ and housing corporations and co-operative housing societies.

However these statistics were defective:

1. in coverage
2. with respect to the basic data
3. with respect to the estimation methods.

The defects in the coverage of these statistics were mainly due to the lack of a register covering the whole enterprise sector, i.e. the frame population of enterprises. A great number of enterprises, covering entire branches of industry, were left outside the statistics.

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- 1) State Development Programme for Official Statistics for 1974-1979, Encl. 1, p. 14.5.
 - 2) Separate statistics for building construction and special trade contractors.
 - 3) Separate statistics for: Sea transport, stevedoring and forwarding; bus transport; travel agencies; and telephone services.

Besides, the statistics for certain groups of transport and communications and of construction failed to describe the total level of activities, since the coverage of the sample was unknown.

The revised enterprise statistics are not based on a comprehensive enterprise register either. The enterprise register kept by the Central Statistical Office of Finland only covers enterprises carrying on business activities which are subject to sales tax. In the revision, the enterprise register was used for forming a frame population in those branches of industry where the register gave sufficient coverage.

This was true in manufacturing, wholesale and retail trade, and sub-contracting in building construction. In order to increase the coverage of enterprise statistics in various divisions of industry, the registers of private associations, for example, and other information were used in forming the frame population. A considerable part of the corporate sector (e.g. certain services) is still not included.

The defects in the data base of profit and loss and the balance sheet accounts statistics were centred on the classification of business transactions and on the valuations and allocations. From the point of view of the principal users of the data, the classification of business transactions was too rough and superficial as regards the contents of various items.

The fact that valuations and allocations were not included in these statistics (for example, in connection with inventories) left room for different interpretations of the figures and made them difficult to use. In the revision, an attempt has been made to remedy these defects by increasing the number of specifications of business transactions and allocations and by, to some extent, supplementing the data with specifications of valuations. The basic data have mostly been valued in accordance with the Accounting Law, but on certain points the business transactions have been valued at their real performance value.

The defects in the estimation method are closely related to the flaws in the registers used for the frame population. The estimation coefficients in profit and loss and balance sheet accounts statistics for the total manufacturing sector were based on data from the statistics on manufacturing. These statistics cover all manufacturing establishments, (excepting those with less than five employees). Consequently the estimation is influenced by establishments on enterprises with trade or other non-manufacturing activities as their principal activity.

A similar situation arose in the statistics for wholesale and retail trade, since the estimation of the figures was done on the basis of sales data according to establishment statistics.

In the revised enterprise statistics the data on the frame population of these major divisions of industry are derived from the enterprise register. This will eliminate the overlaps referred to above.

2. The collection of the basic data

The enterprise statistics describe the economic activity of enterprises and data on this activity are collected within an enterprise in its accounting framework. Likewise, the basic data for enterprise statistics are mainly based on information gathered from corporate accounting and primarily from corporate bookkeeping.

Corporate accounting is modelled mainly according to the demands of the Accounting Law and the Accounting Statute, the tax laws (especially the Act on Taxation of Business and Professional Income), bookkeeping practices and enterprises' internal need of information. However, from the statistical point of view the various laws and other factors influencing corporate accounting fail to make the practice sufficiently uniform. In fact, the laws provide a rather wide framework with plenty of room for adaptation by individual enterprises.

The bookkeeping systems may even vary noticeably between similar companies. In addition, as the enterprise statistics are to be presented not only from the point of view of the corporate economy but also from that of macroeconomy,¹⁾ the collection of the basic data raises many problems. Taking account of both these aspects means that the data base for enterprise statistics has to be more highly specified.

The overall reform of enterprise statistics was timed to coincide with the revision of the Accounting Law and the Accounting Statute. The revised Accounting Law, complemented by a revised Accounting Statute, came into force on January 1, 1974, and the data corresponding to the needs of the revised enterprise statistics were first collected for the year 1974. During 1974, a great number of enterprises revised their data systems. This made it possible for them to take into account the data requirements of the statistics on enterprises²⁾.

3. The statistical unit and the object population

3.1. The statistical unit

The statistical unit is an enterprise, i.e. an independent legal entity (a decision-making or institutional unit). Such a unit is able to make available full income statement and balance sheet data. In other words, it is the smallest unit with independent bookkeeping and independent accounts. The statistical unit can thus be a joint stock company, cooperative society, partnership, limited partnership, shipping company or some other association principally engaged in corporate activities and thereby seeking profit. However, the statistical unit can also be, for example a sales association founded by a group of companies, not for the

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- 1) Enterprise statistics are becoming more and more important as primary statistics for national accounting.
 - 2) The largest companies were informed in advance of the data needed for the company statistics for 1974.

purpose of making profit, but for assisting its members in seeking profit. Furthermore, a business set up by a private businessman can constitute a statistical unit (while a professionally employed person cannot)¹⁾.

3.2. The object population

The objekt population²⁾ of the enterprise statistics covers those statistical units, as defined above, which have carried on business in each statistical year and belong to the following institutional sectors³⁾:

1. Non-financial enterprises, corporate and quasi-corporate, excluding the sectors 111 (Unicorporated central government enterprises) and 113 (Unicorporated local government enterprises⁴⁾.
51. Households of employers and ownaccount workes, excluding ownaccount workers and farmers.

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- 1) Only such entrepreneurs who according to the Accounting Law, are liable to doubleentry bookkeeping are statistical units.
 - 2) The objekt population is the real population that, in principle, the description is concerned with. For practical reasons, the object population and the frame population almost always differ.
 - 3) Handbooks No. 5, Classification of Institutional Sectors, Central Statistical Office of Finland, Helsinki 1975, ISBN 951-46-1508-5.
 - 4) Unincorporated central and local government enterprises are not statistical units. They do not meet the criterion of independence and only imperfectly meet that of a full set of accounts.

4. Classifications relating to the statistical unit

4.1. Industrial classification

The enterprise statistics apply the standard industrial classification (SIC)¹⁾ adopted by the Central Statistical Office of Finland in 1972. An enterprise can have one or more establishments. When determining which branch of industry, it belongs to, the industry of each establishments is defined first (on the basis of commodities manufactured or sold in the premises concerned). Then the enterprise is classified to the industry of those establishments which employ more than 50 per cent of the total labour force. The industrial classification proceeds in this way step by step from the one-digit level to the three-digit level, which is the detailed level used. There are, however, enterprises which cannot be placed uniquely according to this rule at the three or even two-digit level. For such enterprises so-called unspecified branches ending in a zero or zeroes, have been formed, for example, 610 for unspecified wholesale trade and 300 for unspecified manufacturing²⁾. In the enterprises falling within division 300, more than 50 per cent of the employees work in manufacturing but less than 50 per cent work in any one sub-division of manufacturing. Such companies are also referred to as industrial complexes.

The branches of enterprises in manufacturing, wholesale and retail trade and special trade contractors have been defined using the Enterprise Register of the Central Statistical Office while those of other enterprises have been defined by the Enterprise Statistics. The register inquiries carried out every two years up-date the information on the industries defined by the Enterprise Register. The data on other industries is up-dated by the Enterprise Statistics.

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- 1) Handbooks No. 4, Standard Industrial Classification (SIC), Central Statistical Office of Finland, Helsinki 1972, ISBN 951-46-0035-5
 - 2) SIC contains no codes ending in a zero and therefore the definition differs from SIC on this point.

As stated above, the enterprise statistics follow the standard industrial classification of the Central Statistical Office of Finland. This does not, however, imply that a certain digital level has been systematically pursued; within manufacturing, a number of divisions at the SIC three-digit level have been aggregated. In some cases of transport and communication the industrial classification of the enterprise statistics follows the SIC five-digit level.

The three-digit codes in the enterprise statistics differ from those in SIC in the following cases:

Industrial classification	Code in the enterprise statistics	Corresponding SIC codes
Mining excluding fuels and metals	290	29
Unspecified manufacturing	300	-
Unspecified manufacture of food, beverages and tobacco	310	-
Manufacture of food	311	311, 312
Manufacture of beverages and tobacco products	313	313, 314
Manufacture of textiles and wearing apparel, except footwear	321	321, 322
Manufacture of leather, fur garments, leather articles and footwear	323	323, 324
Manufacture of wood, and wood and cork products (except furniture)	331	331
Manufacture of furniture and fixtures (except primarily of metal)	332	332
Manufacture of pulp, paper and paperboard	341	341
Printing, publishing and allied industries	342	342
Manufacture of chemicals and other chemical products	351	351, 352
Petroleum refineries	353	353

Industrial classification	Code in the enterprise statistics	Corresponding SIC codes
Manufacture of rubber and plastic products	355	355, 356
Manufacture of china, pottery and glassware and other nonmetallic mineral products	361	361, 362, 369
Basic metal industries	371	371, 372
Manufacture of fabricated metal products and machinery	381	381, 382
Manufacture of electrical appliances, instruments and other precision instruments	383	383, 385
Manufacture of transport equipment	384	384
Other manufacturing	390	390
Electric light and power	410	4101
General house contractors	511	511
Special trade contractors	512	512
Land and water way construction	524	52
Unspecified wholesale and retail trade	600	-
Unspecified wholesale trade	610	-
General wholesale trade	611	611
Wholesaling of food and beverages	612	612
Wholesaling of textiles, clothing and leather articles	613	613
Wholesaling of iron and electric wares	614	614
Wholesaling of motor vehicles	615	615
Wholesaling of production articles	616	616
Other wholesaling proper	617	617
Agency	618	618
Unspecified retail trade	620	-
General retail trade	621	621
Retailing of food and beverage	622	622
Retailing of alcoholic	623	623
Retailing of textiles, clothing and footwear	624	624
Retailing of iron wares, machinery and agricultural supplies	625	625

	Code in the enterprise statistics	Corresponding SIC codes
Retailing of furnishings	626	626
Automobile retailing and service	627	627
Pharmacy and cosmetic retailing	628	628
Other retailing	629	629
Unspecified catering and accommodation	630	-
Gatering	631	631
Accommodation	632	632
Water transport	712	712 ¹⁾ excl. 71212, 71213
Air transport	713	713
Stevedoring	714	71232
Forwarding	715	71912
Travel agencies	716	71911
Road haulage	717	7114
Bus transport	718	7112
Telephone services	721	72002

4.2. Classification by category of owners

The Central Statistical Office of Finland fixed the classification of institutional sectors in 1975. However, so far the enterprise statistics do not fully cover the institutional sectors of their object population; not all branches of industry are yet represented, as can be seen from section 4.1. Therefore, the classification of institutional sectors cannot yet be applied fully in the enterprise statistics. However, this classification is based i.a. on the categories of owners. The following such categories are reported in the enterprise statistics:

1) Excluding SIC 71212 (coastal water transport and SIC 71232 stevedoring).

1. Private domestic
2. State
3. Municipality
4. Municipal federation
5. Foreign ownership over 20 per cent but at most 50 per cent
6. Foreign ownership over 50 per cent
7. Other

4.3. Classification by size

The enterprises included in the statistics have been divided into five categories according to the number of employees:

Category	Number of employees ¹⁾
1	from 1 to 4
2	from 5 to 19
3	from 20 to 49
4	from 50 to 99
5	100 or more

5. The variables

A great number of variables are reported in the enterprise statistics. In the following, certain central items and principles are described.

The variables can be grouped in the following way:

- income statement
- balance sheet
- specification of inventories
- specification of fixed assets and other long-term expenses
- specification of taxes
- specification of gross sales or turnover
- specific data on various branches of industry

1) Average during an accounting period. The average number of employees working part-time is converted into the equivalent number of full-time employees.

The items of the income statement and the balance sheet comply with the model patternset in the Accounting Statute of 1974. Variable and fixed expenses are not reported separately in the income statement, but in other respects it is reported in greater detail than that required in the statute. Correspondingly, the balance sheet is reported in somewhat greater detail than the balance sheet pattern in the Accounting Statute. The detailed description is necessary partly in order to reach the required balances in the description of business transactions between various statistical units. The macroeconomic aspects call for further specification.

The Act on the Taxation of Business and Professional Income and the Accounting Law, which have a central influence on corporate accounting, are primarily based on the so-called "cost-income" theory. Business transactions are entered into the books on a "commitment"¹⁾ and the "matching principle"²⁾ is applied when closing the accounts.

The Act on the Taxation of Business and Professional Income and the Accounting Law permit, however, a few exceptions to these principles. Most important of them are permitted undervaluation of inventories, accumulation of various reserves and depreciation exceeding that allowed by the cost-income theory. Common to all these exceptions is the fact that, contrary to the "matching principle", certain costs, for which the corresponding income has not yet accrued, may be entered prematurely as expenses. For example, an amount not exceeding half of the acquisition cost of the inventories remaining at the end of the accounting period may be entered as expenses. These exceptional rules are widely used by enterprises seeking to smooth out results from various accounting periods.

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- 1) According to the "commitment basis", the costs are entered into the books on the date of receipt of a factor of production and incomes are entered on the delivery date of a product.
 - 2) According to the "matching principle", the income belonging to the accounting period is entered in the income statement as receipts. The costs are broken down into two categories. Costs that have contributed to accrued income during the accounting period, or are expected to bring no more income, are entered in the income statement as expenses while the rest of the costs are entered on the active side of the balance sheet.

In most cases the variables of the enterprise statistics are specified to a sufficient degree from the point of view of periodization of the transactions.

The aim of the enterprise statistics is to describe the total economic activity of enterprises. This requires of gross reporting. Consequently, the aim is to record the corporate data systematically in such a way that no income, cost or payment is omitted. The process starts from gross sales (gross earnings). Correcting them for subsidies connected to lowered prices and other adjustments of the sales resulting from discounts, credit losses and losses on exchange, indirect taxes etc. gives the turnover. From this various operating costs are deducted, for example, the purchase value of the turnover assets purchased during the accounting period (excluding sales tax).

Some items show a partial consideration of the demands of national accounting. The contents and classification of these variables differ from the normal accounting conventions. Such items are, for instance, "office, advertising, cleaning etc. material costs" and "acquired services". The aim is to set apart such purchases of material and such service-like operating costs (services purchased from other economic units) as are not included in inventories. In labour costs, the above-mentioned gross principle is reflected as this item not only describes the labour costs incurred during the accounting period, but all wages and salaries paid during the accounting period, including pay roll taxes and/or employers' social security payments.

Due to the processing of certain variables in disagreement with the "matching principle", the income statement of the enterprise statistics contains a few adjustments "correcting" the periodization of expenses. "Change in inventories", "manufacturing for own use" and "costs of research and development etc. entered among the assets" are such items. Of these, "change in inventories" corrects the "purchases of turnover assets", "labour costs" and other items for expenses not belonging to the accounting period which should instead be entered on the assets side of the balance sheet as inventories.

Similarly "manufacturing for own use" and "costs of research and development etc. entered among the assets" correct the result by an amount equal to the entry of these costs on the assets side of the balance sheet.¹⁾

1) When manufacturing fixed assets for own use or carrying out, for instance, research and development, costs (labour, material etc.) arise, which are entered on the assets side of the balance sheet. As these costs (which are not expenses) pass through the income statement, it is necessary to adjust these items.

The main items in the income statement of the enterprise statistics

Gross sales	.....
Subsidies (conneted with sales)	.....
Adjustments (of the sales)	<u>-.....</u>	
Turnover	.....
Purchases of turnover assets	.....
Office, advertising, cleaning etc. material costs	.....
Acquired services	.....
Labour costs	.....
Social security costs	.....
Rents and leases	.....
Other operating costs	.....
Subsidies (to cover expenses)	-.....	
Manufacturing for own use	-.....	
Change in inventories	+.....	
Change in undervaluation of inventories	+.....	
Costs of research and development etc. entered among the assets	<u>-.....</u>	<u>-.....</u>
Gross margin	.....
Depreciation	<u>-.....</u>	
Net earnings (losses) from operations/Operation surplus (deficit)	.....
Other income:		
Interest	.....
Dividends	.....
Rents and leases	.....
Other income	<u>.....</u>	<u>+.....</u>
Other expenses	-.....	
Change in reserves	+.....	
Interest	-.....	
Direct taxes/Tax refunds	+.....	
Profit (losses) for the accounting period/surplus (deficit)	<u>+.....</u>	<u>-.....</u>

The balance sheet items reported comply, in the main, with the pattern in the Accounting Statute. They are valued according to the Accounting Law and the values are consequently book values. The balance sheet is accompanied by two tables of specification with supplementary data on the valuation of various types of inventories and fixed assets. The specification of inventories shows the acquisition costs and the amount of undervaluation at the beginning of the accounting period, the price fall deduction made at the end of the accounting period and the change in undervaluation. The aim, by specifying inventories and other long-term expenses (e.g. investments, is to measure the changes in various types of assets at their business value i.e. their real transaction value. In addition, the specification shows the depreciations item by item and the increases and decreases in value. Furthermore, information is given on the breakdown, of gross sales or turnover by branches of industry, and on the number of employees and entrepreneurs, working hours, wages and salaries, profit shares and perquisites.

6. Sampling

6.1. Forming the frame population

Since no complete enterprise register covering the whole corporate sector is available, several specific registers and sets of data have been used in forming the frame population.

The way in which the frame population has been formed in various branches is described below.

6.1.1. Industry (SIC 2, 3, 4)

The enterprise register¹⁾ compiled by the Central Statistical Office of Finland in 1972 was used in forming the frame population.

1) See Enterprises liable to pay sales tax in 1972, YR 1976: 4, Central Statistical Office of Finland 1976, ISSN 0355-2373

The enterprise register contains all enterprises liable to sales tax. Not a all such units, however, fall within the definition of the object population,¹⁾ so some had to be left outside the frame population. In the case of manufacturing, 5632 units included in the enterprise register were left outside the frame population, i.e. 36 per cent of the total number of units falling within manufacturing in the enterprise register. The largest group falling outside the frame population is professional workers. Other groups were public business institutions and certain private, non-profit-making corporations carrying on business as a secondary occupation.

However, the frame population formed in this way does not fully cover the object population. The units in divisions 2 and 4 are included only insofar as they carry on business activities subject to sales tax. The greatest differences between the object population and the frame population arise from timing. For a the object population in the 1974 enterprise statistics, refers perfectly to the period in question, while the frame population applied describes the situation at the end of 1972.

6.1.2 Construction (SIC 5)

Two different registers have been used in forming the frame population for construction. Special trade contractors (SIC 512) are subject to sales tax; consequently the 1972 enterprise register²⁾ has been used. For other construction (SIC 511 and 52), the 1973 insurance premium register of building contractors' workers has been used. When the sample had already been taken the corresponding register for 1974 became available and made it possible to correct temporal differences between the object population and the frame population.

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- 1) See point 3.2 above
2) See point 6.1.1 above

6.1.3 Trade, restaurants and hotels (SIC 6)¹⁾

The 1972 enterprise register was used in forming the frame population, and the points concerning the frame population raised in 6.1.1 also apply to branch 6. In the case of this particular branch, 2745 of the units included in the enterprise register, i.e. some 8 per cent of the total, were omitted from the frame population.

The disparities between the object population and the frame population raised in 6.1.1 applies here, too. It may be added that as agency business is exempt from sales tax, the enterprises only carrying on agency business are not included in the frame population.

6.1.4 Transport and communications

The frame population of transport and communications in the enterprise statistics does not cover all enterprises included in the SIC division 7 (Transport, storage and communication). All divisions beginning with 7 and not mentioned in 4.1. (Industrial classification) are omitted from the enterprise statistics, e.g. passenger car traffic (SIC 7113), road traffic supporting activities (SIC 7116) and coast traffic (SIC 71212).

Water transport (712)

The frame population of water transport is based on the list of shipowners of the National Board of Navigation. The enterprises carrying on water transport as their principal occupation were selected from this list. The data needed to keep the frame population up to date is obtained annually from the National Board of Navigation.

1) The data concerning restaurants and hotels (SIC 63) has so far only been collected from larger companies (with 100 or more employees), and therefore the figures for the branch are not published for the present.

Air transport (713)

The frame population of air transport consists of companies carrying on air transport as their principal occupation. However, because of the small number of companies the data is not published.

Stevedoring (714)

The frame population of stevedoring was formed on the basis of the membership register of the Employers' Association of Finnish stevedores in 1973. No accurate data is available on the coverage of the frame population, but it probably approaches the object population.

Forwarding (715)

The frame population of forwarding is partly based on the Finnish Forwarding Agencies' Association's membership list and partly on published lists of enterprises (the "Blue Book"). It is updated by means of various sources. The data for 1974 has been collected from practically the same forwarding agencies as for statistics of profit and loss and balance sheet accounts of sea transport, stevedoring and forwarding in 1972 and 1973.

Travel Agencies (716)

The frame population of travel agencies was formed by selecting all enterprises carrying on travel agency business as their principal occupation from the travel agencies that had been granted a licence by the National Board of Trade and Consumer Interests in 1974.

The frame population is up-dated annually and includes all enterprises in the branch.

Road haulage (717)

The Finnish Road Haulage Association's membership register, with the exclusion of professional haulage firms, served as the frame population of road haulage. The data will not be published for the present because of insufficient reliability.

Bus transport (718)

The Finnish Bus Owners' Association's list of members per 1st May, 1974, served as the frame population. Nearly all bus owners are members of the association, which means that, in practice, the frame population and the object population are coextensive. The frame population is brought up to date annually.

Telephone services (721)

The frame population of telephone services includes all private telephone companies. These have been listed by the Association of Private Telephone Companies in Finland. The list is up-dated annually.

6.2 Allocation of the sample and the sampling sizes

The population of the enterprise statistics is very heterogeneous. Its elementary units range from enterprises with two employees to a large company with 16 000 employees. Due to this heterogeneity and also the need for grouped data, the frame population was broken down by division of industry (c.f. 4.1) and category of size (c.f. 4.3). The fifth category (enterprises with 100 or more employees) is extremely heterogeneous and simultaneously, most important in terms of size. All enterprises in this category were included in the sample. A coverage of 100 per cent was deemed necessary also in the case of state companies and in

- air transport (713)
- stevedoring (714)
- travel agencies (716) and
telephone services (721)

The total number of enterprises in the sample was preliminarily fixed at about 5000. The number was determined by considerations of the data-processing resources available and the volume of data to be processed and reliability requirements. The groups in which all enterprises were to be included contained about 1500 companies.

The remaining 3500 enterprises, were allocated to different strata by Neyman allocation¹⁾ in two stages. Double-stage allocation was resorted to since comparable information on the of different branches was not available. A variation coefficient (C_h), at least to some degree commensurate for various branches, was used. Within each division the allocation by categories of size was proportional to the variances.

The sampling sizes of various branches are

$$n_h = n \frac{N_h C_h}{\sum_h N_h C_h}$$

Where n_h = the sampling size of branch h (see 4.1)
 n = the total number of enterprises (3500) in the sample
 N_h = the number of enterprises in branch h in the frame population
 C_h = S_{hj} / \bar{Y}_h , $j = 1, \dots, 4$, i.e. the total variation coefficient of branch h, S_{hj} is the standard deviation of the turnover of size category j in branch h in the frame population, and \bar{Y}_h is the average turnover (or corresponding) in branch h.

1) See e.g. Cochran: Sampling techniques, Second edition, John Wiley & Sons, Inc., 1968, p. 97.

The sampling sizes (n_h) thus obtained for each branch of industry were further allocated into four categories of size by reapplying the Neyman allocation. The sampling size of category j in each branch of industry h was obtained by applying the formula

$$n_{hj} = n_h \frac{N_{hj} S_{hj}}{\sum_j N_{hj} S_{hj}}, j = i, \dots, 4$$

The variation coefficient (C) and the standard deviation (S) could not be calculated for all branches of industry with the same variable as a basis. In the case of manufacturing, wholesale and retail trade, and special trade contractors in construction, the turnover data in the 1972 enterprise register was used. In other construction the calculations were based on employers' insurance premiums paid in 1973, and in bus transport on the number of employees according to the Finnish Bus Owners' Association's membership register in 1973. In road haulage, the number of lorries entered in the Finnish Road Haulage Association's membership register in 1973 was used.

The sample sizes in various branches of industry, as required by this original allocation, are presented in Appendix No. 1.

The sample used in 1974 differed, however, from the original allocation for two reasons:

- 1) The number of enterprises in certain strata of small enterprises was reduced primarily because of the resources available. Consequently, the degree of accuracy was cut down somewhat.
- 2) The original allocation was based on an incomplete enterprise register for 1972 and the register data was altered afterwards. Consequently, the frame population was adjusted accordingly and this brought about changes in the allocation of the sample enterprises among the strata. In a few cases units from outside the object population occurred in the sample and these were removed.

The actual sample used in the 1974 enterprise statistics is presented in Appendix No. 2.

6.3 Estimation of the population parameters

The branch total estimates are calculated by means of a ratio-estimator. The total estimate \hat{Y}_h for variable y for branch h is obtained as follows:

$$\hat{Y}_h = \sum_{j=1}^5 \left(\frac{\sum_{i=1}^{n_{hj}} y_{hji}}{\sum_{i=1}^{n_{hj}} x_{hji}} \right) X_{hj}$$

in which n_{hj} = the number of enterprises in size category j in branch h
 y_{hji} = the value of variable y for the enterprise i in category j in branch h in the sample
 x_{hji} = the value of variable x for the frame population of the enterprise i in category j in branch h in the sample
 X_{hj} = the total of variables x for the enterprises of the frame population in category j in branch h.

In the various strata of category 5 as well as in other strata with 100 per cent coverage¹⁾ the coefficient $X_{hj} / \sum_i x_{hji}$ in the estimator, is in principle equal to one. Because of failing or rejected answers, this coefficient is often larger than one even in these cases.

1) See 6.2 above

Where no data are received on a stratum of any category of size, the data in this stratum is estimated on the basis of the data on the following category of size.

Estimation may also be made by type of owner¹⁾.

It is performed as described above.

The variable x in the estimator is the turnover in industry (SIC 2, 3, 4), in special trade contractors (SIC 512) and in retail and wholesale trade (SIC 60, 61, 62); the amount of insurance premiums paid for short-term workers in other construction (TOL 511, 52), the number of lorries in road haulage (717) and the number of employees in bus transport (718).

No estimation was possible in branch 712 (Water transport) and 715 (Forwarding) because of their imperfect frame populations.

1) See 4.2 above

Encl. No. 1

Sampling sizes in the allocation

Branch of industry ¹⁾	Number of enterprises in categories 1 to 4	Number of enterprises in category 5	Total number of enterprises in the sample
290	18	2	20
300	4	12	16
310	1	1	2
311	56	67	123
313	3	12	15
321	50	123	173
323	18	19	37
331	293	39	332
332	52	11	63
341	6	22	28
342	67	62	129
351	8	29	37
353	4	3	7
355	36	18	54
361	20	21	41
371	4	9	13
381	181	107	288
383	10	37	47
384	10	30	40
390	33	12	45
410	6	19	25
2, 3, 4 total	880	655	1 535
511	121	20	171
524	65	153	218
5 total	289	306	625

1) See 4.1 above, Industrial classification

Branch of industry	Number of enterprises in categories 1 to 4	Number on enterprises in category 5	Total number of enterprises in the sample
610	-	2	2
611	4	9	13
612	68	8	76
613	33	-	33
614	34	13	47
615	13	8	21
616	100	37	137
617	47	15	62
618	14	6	20
61 total	313	98	411
620	2	57	59
621	129	98	227
622	651	15	666
623	-	1	1
624	277	14	291
625	114	7	121
626	67	1	68
627	178	19	197
628	118	2	210
629	479	5	484
62 total	2 015	219	2 234
63	-	29	29
6 total	2 328	349	2674
712	23	17	40
714	31	13	44
715	72	10	82
716	60	5	65
717	147	5	152
718	126	25	151
721	49	12	61
7 total	508	87	595

Branch of industry	Number of enterprises in categories 1 to 4	Number of enterprises in category 5	Total number of enterprises in the sample
290	18	2	20
300	4	12	16
310	1	1	2
311	56	67	123
313	3	12	15
321	50	123	173
323	18	19	37
331	91	39	130
332	52	11	63
341	6	22	28
342	67	62	129
351	8	29	37
353	4	3	7
355	36	18	54
361	20	21	41
371	4	9	13
381	121	107	228
383	10	37	47
384	10	30	40
390	33	12	45
410	6	19	25
2, 3, 4, total	618	655	1 273
511	103	133	236
512	121	31	152
524	65	20	85
5 total	289	184	473

Branch of industry	Number of enterprises in categories 1 to 4	Number of enterprises in category 5	Total number of enterprises in the sample
610	-	2	2
611	4	9	13
612	65	7	72
613	32	-	32
614	34	16	50
615	13	6	19
616	100	34	134
617	40	15	55
618	14	6	20
61 total	302	95	397
620	4	58	62
621	87	100	187
622	311	13	324
623	-	-	-
624	191	14	205
625	72	7	79
626	42	1	43
627	131	22	153
628	79	-	79
629	186	6	192
62 total	1 103	221	1 324
63	-	29	29
6 total	1 405	345	1 750
712	23	17	40
713	1	2	3
714	31	13	44
715	72	10	82
716	60	5	65
717	87	5	92
718	126	26	151
721	49	12	61
7 total	449	90	538

TILASTOKESKUS

TUTKIMUKSIA

1. *Paavo Grönlund – Olavi Niitamo*, Kansantalouden tilinpidon rakenne. Kesäkuu 1966. 38 s.
2. *Olavi Niitamo*, Taloudellinen malli. Toinen tarkistettu painos. Elokuu 1969. 67 s.
3. *Reino Hjerppe*, Aksiomaattisen menetelmän periaatteista ja soveltamisesta kokonaistaloudellisen kuvausjärjestelmän laatimisessa. Huhtikuu 1967. 45 s.
4. *Aarno Soivio*, Koe akateemisen koulutuksen saaneen työvoiman kysynnän ennustamiseksi. Syyskuu 1967. 12 s.
5. *Paavo Grönlund – Olavi Niitamo*, Suomen kansantalouden tilinpito vuosina 1948–1964, käsitteet ja menetelmät. Maaliskuu 1968. 190 s.
6. *Olavi Niitamo*, Systeemiajattelun eräitä pääpiirteitä. Huhtikuu 1968. 31 s.
7. *Raoul Brummert*, Om företaget och den ekonomiska tillväxten. En mikroekonomisk undersökning. Juni 1968. 169 s.
8. *Kalevi Koljonen*, Pääomakannan käsite ja mittaaminen sekä sovellutus Suomen rakennuskantaan vuosina 1950–1960. Syyskuu 1968. 92 s.
9. *Olavi Niitamo*, Tuotantofunktio, sen jäännöstermi ja teknillinen kehitys. Tammikuu 1969. 49 s.
10. *Eeva-Liisa Kaski*, Näkökohtia aluetilastojen kehittämisestä. 28 s.
Pertti Marjomaa, Aluesuunnittelun tilastojen tarpeesta. 18 s.
Reino Hjerppe, Pääomakannan alueittaisesta jakautumisesta aluesuunnittelun näkökulmasta 17 s.
Antti Somervuori, Tulojen ja elinkustannusten alueellisten erojen mittaaminen. Kesäkuu 1969. 54 s.
11. *Heikki Oksanen*, Monitasosuunnittelun käsite ja perusongelmat. 12 s.
Eila Olkkonen, Suunnittelusta ja päätöksenteosta monitasoprosesseina keskitetysti johdetuissa talouksissa. Syyskuu 1969. 18 s.
12. Tulonjaon kehityspiirteitä vuosina 1955–1968. Maaliskuu 1970. 43 s.
13. *Tarmo Korpela*, Talonrakennustoiminnan lyhyen tähtäyksen ennustemalleja koskeva tutkimus. Kesäkuu 1970. 92 s.
14. *Tor Hartman*, Ylioppilastutkinnosta ja ylioppilaiden lukumääristä tulevaisuudessa. Heinäkuu 1971. (Vain ruotsinkielinen). 32 s.
15. *Reino Hjerppe – Olavi E. Niitamo*, Uuden SNA:n mukaisen kansantalouden tilinpidon perusrakenne. Elokuu 1971. 124+74 s.
16. *Antti Somervuori*, Elinkustannusten ja reaalityulojen alueelliset erot Suomessa. Maaliskuu 1972. 99 s.
17. *Pasi Markelin*, Itsemurhat Suomessa vuosina 1936–1965. Elokuu 1972. 151 s.
18. *Mauri Nieminen*, Syntyvyysfunktion matemaattisesta teoriasta. Sovellutus Suomen väestöön vuosina 1963–1967. Elokuu 1972. 82 s.
19. Vuoden 1971 kuntien kalleustutkimus. Marraskuu 1972. 76 s.
20. *Aarno Laihonon*, Ympäristötilastollisen tietojärjestelmän kehikko. Joulukuu 1972. 130 s.
21. *Reino Hjerppe*, Kokonaistaloudelliseen ohjelmointimalliin perustuva tutkimus tuotannon tekijöiden allokaatiosta Suomessa. Joulukuu 1972. 133 s.
22. *Kimmo Mikkola*, Maassamuutto ja pohjoismainen muuttoliike vuonna 1970. Tammikuu 1973. 85 s.
23. *Aarno Laihonon*, The Framework of an Information System of Environmental Statistics. March 1973. 39 s.
24. *Seppo Leppänen – Tuulikki Lund – Arto Ojala – Reijo Pöytäki*, Osamaksukauppa ja sen säätely Suomessa vuosina 1969–1972. Huhtikuu 1973. 118 s.
25. *Kimmo Mikkola*, Ruotsissa vuosina 1946–1970 ansiotyössä ollut suomalaisväestö. Heinäkuu 1973. 40 s.
26. Neuvostoliiton suunnittelujärjestelmästä. Marraskuu 1973.
Olavi E. Niitamo, Suunnittelusta Neuvostoliitossa. 62 s.
Reino Hjerppe, Neuvostoliiton suunnittelumalleista. 12 s.
Osmo Kuusi, Suunnittelun menetelmistä ja ongelmista Neuvostoliitossa. 27 s.

27. Tulonjaon kehityspiirteitä II vuodet 1960–1972. Joulukuu 1973. 21 s.
28. *Hannu Laine*, Systeemitheorian ja systeemidynamiikan peruskäsitteitä. Toukokuu 1974. 65 s.
29. *Niitamo*, Sosialistimaissa sovellettava kansantalouden tilinpitojärjestelmä. Toukokuu 1974. 95 s.
30. *Leskelä – Salomäki – Virtanen*, Teollisuustuotannon kuukausivolyyymi-indeksin virheet ja niiden korjaaminen lineaarisella regressiomallilla. Syyskuu 1974. 60 s.
31. *Lind – Mäenpää – Puustinen – Simola*, Vuoden 1974 kuntien kalleustutkimus. Syyskuu 1975. 178 s.
32. *Timo Puustinen*, Hintaindeksit ja laadunmuutokset, sovellutus henkilöautojen hintakehityksen mittaamiseen. Lokakuu 1975. 50 s.
32. *Timo Puustinen*, Prisindexar och kvalitetsförändringar, Försök att mäta personbilarnas prisutveckling. September 1976. 54 s.
33. *Risto Kolari*, Kuolleisuus, Kuolleisuuden alueellinen jakaantuminen Suomessa 1961–1972. Marraskuu 1975. 85 s.
34. Kokonaistaloudellisia ongelmia II. Marraskuu 1975. 95 s.
35. Finnish survey on relative income differences. March 1976. 79 s.
36. *Pekka Myrskylä*, Syntyvyys, Syntyvyyden kehitys ja alueelliset erot Suomessa. Heinäkuu 1976. 126 s.
37. Tulonjako, Kotitalouksien ja yksityisten tulonsaajien tulonjako ja sen kehitys vuosina 1966–1974. Heinäkuu 1976. 52 s.
38. *Tuominen – Puustinen*, Kuluttajahintaindeksi, Menetelmät ja käytäntö, Alueittaiset ja väestöryhmittäiset kuluttajahintaindeksit (1972 = 100) ja alueittainen kuluttajahintatilasto, Marraskuu 1976. 76 s.
38. *Tuominen – Puustinen*, Consumer price index, Methods and practice, Consumer price indices (1972 = 100) by regions and population groups and consumer price statistics by regions. March 1977. 76 s.
39. *Heli Jeskanen*, Kansantalouden tilinpidon ennakkotilaston luotettavuus Suomessa vuosina 1968–1973. Joulukuu 1976. 59 s.
40. *Kalevi Ahti*, Hint- ja volyyymi-indeksit kansantalouden tilinpidossa. Joulukuu 1976. 57 s.
41. *Risto Kolari*, Kuolleisuus, kuolleisuuden jakaantumisesta kuolemansyiden mukaan 1951–1972. Huhtikuu 1977. 90 s.
42. *Pasi Markelin*, Siirtolaisuustilastojen kehittäminen Pohjoismaissa. Heinäkuu 1977. 105 s.
43. *Veli-Matti Lehtonen*, Talonrakennusten tuotantokustannukset Suomessa vuonna 1973. Heinäkuu 1977. 85 s.
44. *Pirkko Ahmavaara*, Työvoimakkehityksen ennustaminen, Arviointi pitkän aikavälin työvoimaennustemenetelmistä yhteiskuntapoliittisen suunnittelun välineenä. Heinäkuu 1977. 114 s.
45. *Veli-Matti Lehtonen*, Talonrakentamisen volyyymi 1973=100. Marraskuu 1977. 35 s.
46. *August Leppä*, Kuluttajahinnat Unkarissa ja Suomessa vuosina 1945-1975. Joulukuu 1977. 80 s.
46. *August Leppä*, Consumer Prices in Finland and Hungary 1945-1975. December 1977. 80 s.
47. *Kalevi Alestalo*, Uusitut yritystilastot, käsitteet, luokitukset ja menetelmät. Maaliskuu 1978. 44 s.
47. *Kalevi Alestalo*, Revised Enterprise Statistics. Concepts, classifications and methods. January 1979. 34 s.
48. *Pekka Myrskylä*, Muuttoliike 1950-1975. Lokakuu 1978. 173 s.
49. *Anders Ekman – Sakari Riihelä*, Pientalon rakennuskustannusindeksi. Marraskuu 1978. 28 s.