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EUROSTAT NEWS

9-1977

DE EUROPÆISKE FÆLLESSKABERS STATISTISKE KONTOR
STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
OFFICE STATISTIQUE DES COMMUNAUTÉS EUROPÉENNES
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Publications
B.P. 1907
Luxembourg
Grand Duché de Luxembourg

Printed in Belgium

Catalogue-number : CA-AB-77-009-EN-C

EUROSTAT NEWS
9-1977

Manuscript completed 2.9.1977

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PART 1 NEWS ITEMS

ATTEMPTED FORECAST OF THE POPULATION OF SCHOOL AGE IN THE MEMBER STATES OF THE COMMUNITY

In the following an attempt has been made to forecast trends in the population attending school and university between now and the end of the century. This forecast is based on two types of data : annual births in each of the Member States, and population forecasts drawn up by each of these States.

The figures for compulsory schooling, the 1st level and the 1st stage of the 2nd level, refer to the population which is legally obliged to attend school. Figures for the 2nd stage of the 2nd level and the 3rd level, on the other hand, refer to the population of an age to receive education at this level; trends in the percentage actually opting for education at this level (degree of scholarization) have not been taken into account. Lastly, the reader's attention is drawn to the fact that these figures are based on the national definitions of compulsory schooling and at the different levels of education, in terms of age, and that these definitions are not the same throughout the Community

1. Compulsory schooling

Examination of the birth rates in the Member States shows that widely differing trends in the numbers subject to compulsory schooling are to be expected in each country between now and the 1981/82 school year. These numbers will increase in one country only, Ireland, from the base index of 100 in 1975/76 to around 105 in 1981/82. They will remain stable in France and decrease in all the other countries, by 5-10 % in Italy and Denmark, 10-15 % in the Netherlands, the United Kingdom, Belgium and Luxembourg, and more than 20 % in the Federal Republic of Germany.

In the longer term, the national demographic forecasts seem to indicate that between 1990 and 2000 the population subject to compulsory schooling will be more than 30 % below its current level in the Federal Republic of Germany and 10 % below in the Netherlands and Luxembourg. After a period of decline which will be greatest around 1985, this population is expected to increase again in the United Kingdom, reaching a level comparable to the present level at the end of the century; this will also be the case in France and Italy. In Ireland, on the other hand, a steady growth is expected until the end of the century when the population of compulsory schooling age will be almost 40 % greater than it is now.

Raising the school-leaving age to 16 (i.e. one extra year) from the 1978/79 school year would lead to an increase in the numbers subject to compulsory schooling of 15 % in the Federal Republic of Germany, 12 % in the Netherlands, 14 % in Luxembourg and 10 % in Ireland in 1981/82. In Belgium and Italy - where compulsory schooling ends at 14 - the increase would be around 27 %; in these two countries, raising the school-leaving age by one year only would result in an increase of around 13 % in the school population.

2. First level

During the next five school years, the numbers in first-level education (i.e. the youngest group for whom schooling is compulsory) are expected to increase in Ireland only and to remain stable in France. In the Federal Republic of Germany, they are expected to decrease by one-third between now and 1981/82, and by between 10 and 15 % in all the other countries.

In the longer term, the numbers in first-level education are expected to stabilize at a level 30 % below their current level in the Federal Republic of Germany and 10 % below in the Netherlands. In France, they are expected to remain stable or even increase slightly, and this will also be the case in the United Kingdom after a period of decline which will reach its maximum level (-20 %) around 1985.(1)

3. Second level

Between now and 1981/82, the numbers of pupils of an age to attend second-level establishments are not expected to vary by more than ± 5 % from their current level in all the Member States. After that, the trend will be the same as that recorded for the first level over the next few years.

The numbers of pupils in the second stage of the second level will increase in practically all the countries between now and 1981/82; this increase could be 10 % or over in the Federal Republic of Germany, Denmark, Italy and the United Kingdom. Obviously, the trend in subsequent decades will be parallel to that in the lower levels.

This observation must be qualified, however, in the light of the trends in the degrees of scholorization at this level, which will almost certainly show an increase and are expected to offset the foreseeable decrease in the numbers of school age in the Federal Republic of Germany and the Netherlands and to result in a higher increase in the other countries.

4. Third level

The population of an age to take third-level courses is expected to remain stable in the next five years in France, Denmark and Belgium. The other countries are expected to record an increase which could reach 15-20 % in the Federal Republic of Germany. However, the numbers are expected to start declining in 1985/86 in the Federal Republic of Germany, the Netherlands and the United Kingdom and increase slightly in France.

Towards the end of the century, this trend will result in a slightly higher population in France, a slightly lower population in the Netherlands and the United Kingdom, and a population which is more than 20 % below its current level in the Federal Republic of Germany. Here again, these estimates must be corrected, however, in the light of trends in the degrees of scholarisation.

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(1) National projections for the other countries are not available to the Statistical Office for the time being.

INDUSTRIAL AND ENVIRONMENTAL STATISTICS

Principal activities 1976/77 and 1977/78

The outline which follows is intended to help readers understand the work of Directorate E (Industrial and environmental statistics).

1. Work carried out 1976/77

1.1 Radical rationalization of the questionnaire and publications programme for iron and steel statistics (see EUROSTAT News 3/4-1977, p. 5 et seq.).

1.2 Reorganization of publications in the field of energy statistics (see EUROSTAT News 10/11/12-1976, p. 16).

1.3 Publication of the NIPRO - Common Nomenclature of Industrial Products (see EUROSTAT News 10/11/12-1976, p. 17).

1.4 First results of the annual survey of industrial activity : confidential, internal publication for the years 1972 and 1973.

1.5 First results in the field of economic indicators : continuous publication of production indices (see EUROSTAT News 5/6-1977, p. 6 et seq.).

1.6 Establishment of a system of raw materials statistics (see EUROSTAT News 3/4-1977, p. 8 et seq.).

2. Programme 1977/78

2.1 Methodological improvement and further development of the energy balance sheets (indication of actual energy losses during conversion and utilization).

2.2 Implementation of the rationalization programme for iron and steel statistics (completion : beginning of 1978).

2.3 Results of annual surveys of industrial activity for the years 1974 (still confidential and for internal use) and 1975 (first issue of a regular publication).

2.4.1 Publication of the bulletin on "Economic indicators for industry" (from January 1978).

2.4.2 Supplementary publication for production indices with the other indicators for which provision is made in the Directive on short-term statistics.

2.4.3 Adoption by the Council of Ministers of the Directive concerning statistics on the state of the construction industry; first results.

2.5 Commencement of an EC index of producer's prices for industrial products.

2.6 First results (1975) for the raw materials supply balances.

Various measures, including some reorganization, have been carried out in accordance with the principle governing the activities of Directorate E : concentration on essentials. It is hoped this will contribute substantially to improved statistical efficiency, above all by permitting

- provision of more up-to-date information, especially in the field of short-term statistics (if need be by the use of estimates);
- flexibility in adapting to the requirements of users. In accordance with the basically policy-oriented approach to statistics, particular importance is attached to the requirements of the "political" directorates-general of the Commission.

DEPENDENCE OF THE EUROPEAN COMMUNITY ON EXTERNAL SUPPLIES OF RAW MATERIALS

The European Community does not only depend to a fairly high degree on energy imports (oil) from third countries, but is equally dependent on external sources of raw materials in respect of metals.

The following table shows the percentage dependence of the European Community as compared with the USA and Japan for a number of important metals. The data are based on simple ratios for 1975 and are naturally subject to a degree of error arising from a limited period of time being taken into consideration. The level of economic activity alone, for example, may cause the statistical raw materials dependence to vary from year to year. In addition, the significance of the statistics is impaired by discrepancies between the concepts employed (e.g. ore and crude metal) : this source of error cannot be entirely eliminated by converting the ore figures on the basis of average metal content.

DEPENDENCE ON EXTERNAL SUPPLIES OF RAW MATERIALS (1)

1975

	EC		USA		Japan	
	(a)	(b)	(a)	(b)	(a)	(b)
Aluminium	74	38	90	59	100	64
Lead	91	64	62	4	87	56
Copper	99	85	72	2	97	50
Zinc	82	70	74	42	77	63
Tin	95	66	86	62	98	87
Manganese	99	(98)	92	(82)	(99)	(82)
Nickel	100	(98)	90	(89)	100	(92)
Tungsten (wolfram)	77	.	54	.	76	.
Iron	76	40	61	23	99	63

(1) Domestic consumption minus domestic production as a proportion of domestic consumption, i.e. net imports as a proportion of domestic consumption (import dependence)
(a) Primary denpendence (without recycling)
(b) Primary dependence,plus recycling from the domestic market
( ) Estimate

The difference between the figures in columns (a) and (b) depends on the rate of recycling for the metal in question (recycling of materials from the domestic market for domestic use). The recycling figures are obtained by deducting net scrap imports from total scrap consumption. It is clear that the very high degree of dependence on imports can be significantly reduced by intensive recycling (in conjunction with economies in the use of raw materials).

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PART 2 EUROSTAT PUBLICATIONS

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ANNUAL PUBLICATIONS

Orange series : Basic statistics 1977

Price :	£	2.30
	DKr	23,45
	US$	4
	FB	150

204 pages Format A 4

DK, D, E, F, I and N editions published in August 1977

Selection of the most important Community statistics and comparisons with certain other European countries, the United States, Japan and the USSR. This selection covers the following sectors :

Population
Labour force
National accounts
Research and education
Agriculture
Energy
Industry
Transport
External trade
Incomes and hours of work
Social accounts
Standard of living
Prices
Finance
Regional population and employment.

Purple series : Public expenditure on Research and Development in the Community countries 1974-1976 (CREST)

Price :	£	4.65
	DKr	46,90
	US$	8
	FB	300

132 pages Format A 4

Multilingual edition published in July 1977

This summary report contains an analysis of trends in public expenditure on R&D in member states from 1970 to 1976, together with an analysis by the purpose or objective in the 3 most recent years, 1974 to 1976.
Public expenditure on R&D is running at slightly more than 1 % of the Gross Domestic Product of the Community, and at about one part in thirty of the budget of central government. There are important differences between member states in both the level, and in the pattern of their expenditure

Balances of payments - Global data (1970-1976)

Price : £ 4.80
DKr 49,20
US$ 8.25
FB 300

Approximately 96 pages Format A 4

Multilingual edition to be published in September 1977

This publication provides the latest available annual data on the global balances of payments (flows) and the external position of the monetary authorities (amounts outstanding) of each European Community country and of the United States and Japan.

The presentation includes totals relating to the nine Member States (EUR-9) as a whole.

For the first time, the data are expressed in millions of European units of account (Mio EUA); they are presented according to the EUROSTAT's balance of payments scheme and cover the period 1970 to 1976.

Regional statistics - Community's financial participation in investments - 1975

Price : £ 6.25
DKr 63
US$ 10.70
FB 400

218 pages Format A 4

Multilingual edition published in August 1977

Up-dating of and commentary on the data relating to the regional disperion of the financial participations agreed by the Community in 1975 with regard to regional development, according to the following forms :
- European Agricultural Guidance and Guarantee Fund (EAGGF), guidance section
- European Coal and Steel Community (ECSC Treaty articles 54 and 56.2a)
- European Investment Bank (EIB)
- and, for the first time, European Regional Development Fund (ERDF).

Yellow series : Population and employment

Price :	£	6.25
	DKr	63
	US$	10.70
	FB	400

201 pages Format A 4

Multilingual edition published in August 1977

The first part of this volume presents the most recent data relating to population, employment, unemployment, vacancies and industrial disputes. The second part provides the same data in the form of time series of which several go back to 1950.
The tables of population, employment and industrial disputes are of annual figures, while the tables of unemployment and vacancies are on montly bases.
The introductory note explain the different concepts which are generally employed, as well as the national definitions which have been used as the basis for the figures.

Statistics on education - 1970-1976

Price :	£	7.70
	DKr	78,15
	US$	13.35
	FB	500

Approximately 240 pages Format A 4

Multilingual edition to be published in September 1977

This publication presents the principal figures relating to the school and university systems in the Community between the schoolyears 1970/71 and 1975/76. To the statistics previously published in this field (distribution of pupils and students by type and level of education and by region) have been added new data which will from now on be periodically updated.
The distributions of numbers of pupils and students have also been calculated by age and according to the foreign languages learned; students have been classified by field of study. In a certain number of countries it has been possible to isolate and analyse separately foreign pupils and students. Finally, for the first time in this publication there are tables concerning the teaching staff and on the educational expenditure of general government. It will be noted that all the classifications by level or field of study correspond to those in the International Standard Classification of Education (ISCED).

Earnings in agriculture 1975

Price :	£	6.30
	DKr	26
	US$	11
	FB	400

Approximately 115 pages Format A 4

Multilingual edition to be published in September 1977

This publication contains the methodology and detailed results of the first Community survey of earnings of permanent workers in agriculture in 1975.
These results cover labour forces, earnings and monthly duration of paid work, broken down by sex, age, training, type of work, relative size of holding and the provision or not of payment in kind. In the case of certain countries, these data are also broken down by major region.

Série verte : Production of vegetables and fruit

Price :	£	4.80
	DKr	49,20
	US$	8.25
	FB	300

Approximately 98 pages Format A 4

Multilingual edition to be published in September 1977

This edition contains statistics of areas and production of vegetables and fruit in the 9 countries of the EC.

A common presentation for all countries has been adopted for the first time in the tables by country. They show details, by product, of the cultivated area, yields achieved and usable production for vegetables, and the total area, production area and usable production for fruit. The data relate to the years 1973, 1974 and 1975.

The recapitulation summarises production data for the 9 member countries from 1965 to 1976, the data for the latter year being partially incomplete and provisional.

Ruby series : Coal statistics - 1976

Price : £	2.40
DKr	24,60
US$	4.20
FB	150

Approximately 100 pages Format A 4

Multilingual edition to be published in September 1977

This publication supplies the vast array of harmonised data, in large part definitive, permitting one to see at a glance the actual and synthetic activity in the coal industry over the past year. The concepts used are those utilized within the coal industry. The data catalogued include : hard coal, patent fuel, coke, lignite and lignite briquettes and encompasses production, stock movements, foreign trade and inland deliveries. The provisioning of cokeries and of electrical power stations are also analysed.

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NIMEXE Analytical Tables - 1976 - on microfiches

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£	30.50	£	0.60
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- breakdown of products by countries
  in a 4-digit NIMEXE code (module 1121) and
  in a 2-digit NIMEXE code (module 1131)
- breakdown of countries by products
  in a 6-digit NIMEXE code (module 2111)
  in a 4-digit NIMEXE code (module 2121) and
  in a 2-digit NIMEXE code (module 2131).

CST Analytical Tables - 1976 - on microfiches

published in August 1977

Price :

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£	20	£	0.80
DKr	205	DKr	8,20
US$	34.50	US$	1.40
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- breakdown of products by countries
  in the 5 and 3-digit CST code (module 1311)
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- breakdown of products by countries in the 2 and 1-digit CST codes (module 1321)
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SPECIAL PUBLICATIONS AND SERIES

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147 pages Format C 5

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Published : D, E, F

It is the constant concern of the official statistical services to safeguard the confidentiality of the information with which they are entrusted. Each Member Country has its own customary procedures taking the form, in many cases, of national laws defining the rules of confidentiality applicable to business statistics.

These rules, which were elaborated in a national context, are now applied to Community statistics where they have led, in combination, to a far more drastic shrinkage of information thant that which they cause at a national level. At the same time, in industrial circles in every Member Country, there is evident reluctance to release more information than is released by the others, apprehensions conducive to the development of a restrictive approach.

For that reason, the Statistical Office of the European Communities has decided, in agreement with the national statistical services, to examine this problem with a view to its solution. This report is a major contribution to such an undertaking. Its preparation was rendered possible by the collaboration of the various National Statistical Institutes, which not only provided the author with the necessary information regarding the laws and practices relating to the confidentiality of business statistics in their respective countries but also submitted their comments on the first version of the report. Nevertheless, as the author himself has emphasized in his preface, the opinions expressed in this document are strictly his own, and are in no way to be taken as those of the national statistical services or of the Commission of the European Communities.

By circulating this report, the Statistical Office of the European Communities hopes to elicit the reactions and opinions of its readers, including in particular the organisations representing the producers and users of business statistics.

<u>Consumer price indexes in the European Community</u>

Price : £ 3.20
DKr 31
US$ 5.40
FB 20C

87 pages Format A 4

Editions D, E, F published in August 1977

The national consumer price indexes, an important indicator in any economic and social evaluation, have been harmonized only to a limited extent at European level. The study shows up their peculiarities in the fields of technique and methodology. By highlighting the differences in these indexes from country to country - differences which hitherto have not been presented in such elaborate detail - it is possible to estimate their comparability and to obtain the basis for a subsequent harmonization of this statistical series.

Purple series : Input-Output Tables 1970

	Price : complete series		Price : per volume	
	£	30,50	£	4,25
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	FB	2.500	FB	350

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Volume 1 of this series describes the methodology established by the SOEC for the construction of input-output tables calculated, from the year 1970 on, according to Community rules. A general description of the input-output table is given, with some detail on its various components and their relationships. The classifications and the accounting rules which are used are defined by a number of references to the European System of integrated economic Accounts (ESA). The last chapter shows a few examples of the way in which the tables can be used for economic analysis.

Each of the volumes 2 to 7 deals with the input-output table of one country (United Kingdom, the Netherlands, Italy, Belgium, Germany, France). In each volume, the first part describes the problems encountered when using the Community classifications and methods and the adjustments made in order to improve comparability from one country to another. A short description of the table is also given. The second part is composed of the input-output table expressed in units of account EUR, tables of direct coefficients (vertical and horizontal) and several tables of indirect coefficients (inverse matrix, content of imports, content of primary inputs in the final uses).

Volume 8 will put together the tables for the countries and the one for the Community. Volume 9 will present the corresponding coefficient tables and will include a comparative analysis of the economic structure of the various countries.

Structure of earnings in wholesale and retail distribution, banking and insurance in 1974

Price :

complete series		per volume	
£	55	£	7,30
DKr	708	DKr	94,50
FB	4.500	FB	600
US$	130	US$	17,20

Special series in 10 volumes Format A 4

Volume 1 - Methods and Definitions : 223 pages
multilingual published in February 1977

This survey has been conducted simultaneously, and according to identical methods, in the 9 countries of the European Community.

Its essential objective was to obtain details of the earnings and of individual characteristics (sex, age, level of professional qualification, length of service, etc.) of employed persons, and of the structure (branch of activity, size, etc.) of the enterprises employing them, in order to bring out the relationships between these facts and the levels of remuneration.

The results are published in one volume for each country.

Green series : EC-Index of producer prices of agricultural products

Price :		
	£	6.20
	DKr	62,50
	US$	10.70
	FB	400

Approximately 180 pages Format A 4

Multilingual edition to be published in September 1977

This publication is a treatise. It contains the description of the method, the composition and, enriched by graphs, the evolution of the new EC-Index (EUR-9) of the producer prices for agricultural products (base 1970 = 100).

The field of observations covered by the index has been enlarged with regard to the former EC-Index (EUR-6). Numerous seasonal products have been included. Whereas on the annual basis the index comprises also the prices for fruit and vegetables, this information is not yet available at monthly level.

The evolutions presented are concerning the months from January 1969 to December 1975.

Ruby series : Gas prices

Price :	£	13.90
	DKr	140,70
	US$	24
	FB	900

Approximately 160 pages   Format A 4

Editions E/F, D/I to be published in September 1977

The study gives the results of the enquiry into gas prices for the period 1970-76 in the nine countries of the Community, with a breakdown covering 29 locations and indication of three values (price without taxes, taxes,selling price). The results are presented in tabular form, illustrated with graphs, and accompanied by a commentary for each country covering : organisation, regulations, tariffs, taxes and detailed analysis of prices. The study concludes with an international comparison for the gas industry overall.

EUROSTAT PERIODICALS

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price

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	FB 1.500		FB 180

approximately 195 pages Format A 4 monthly

Principal figures on the short-term economic evolution in the enlarged Community, i.e. : employment, industry, services, foreign trade, prices and wages, finance, balance of payments.

Yellow series : Hourly earnings - Hours of work

subscription :	£ 8.60	individual issue :	£ 5.70
	DKr 85,40		DKr 57,60
	US$ 14.70		US$ 9.80
	FB 540		FB 360

approximately 248 pages Format A 4 6-monthly

Harmonized data on workers' hourly wages and weekly hours worked, plus indices of developments in employees' monthly salaries. These data are broken down according to NACE, and, for certain countries, by region.

Green series : Crop production

subscription :	£ 25	individual issue :	£ 2.85
	DKr 270		DKr 30,80
	US$ 42.70		US$ 4.90
	FB 1.750		FB 200

approximately 120 pages Format A 4 11 issues per year

The most recent information on
1) Crop production of arable land (area, yield, production)
or Fruit and vegetable production (area, yield, production)
2) Areas sown (twice a year)
3) Stocks and deliveries of cereals and potatoes
4) Meteorological report
5) Supply balances for crop products (3 or 4 per year).

Monthly statistics of meat

subscription :	£ 32.80		individual issue :	£ 3.85
	DKr 354			DKr 41,55
	US$ 56.10			US$ 6.60
	FB 2.300			FB 270

approximately 132 pages Format A 4 monthly

Publication of monthly statistics supplied by Member States in application of the Council's Directives 68/161/EEC and 73/132/EEC concerning surveys to be carried out in the cattle and pig sectors. The bulletin contains information on slaughterings, on foreign trade in live animals, on production by species and by country. In addition, it may also give information on head structure - comments (red pages) - information about supply balances.

Monthly statistics of milk

subscription :	£ 20		individual issue :	£ 2.60
	DKr 215,50			DKr 27,60
	US$ 34.15			US$ 4.40
	FB 1.400			FB 180

approximately 70 pages Format A 4 10 issues per year

Publication of weekly and monthly statistics transmitted by Member States in compliance with the Council directive of 31st July 1972, on the statistical surveys to be made by Member States concerning milk and milk products (72/280/EEC).
The bulletin contains the data relating to cows milk collection and the production of processed products by the dairy industry. From time to time the bulletin may contain a commentary on the supply balance sheets and information on dairy structure.

Monthly statistics of eggs

subscription :	£ 20		individual issue :	£ 2.60
	DKr 215,50			DKr 27,60
	US$ 34.15			US$ 4.40
	FB 1.400			FB 180

approximately 70 pages Format A 4 10 issues per year

Publication of monthly statistics transmitted by Member States in compliance with the Council regulation 1349 and 2335 on the commercialisation of hatching eggs and farmyard poultry chicks. The bulletin contains data on the selection, multiplication and the uses by species as well as trade with third countries. In addition the bulletin may contain data on structure of hatcheries, commentaries (pink pages) and information on supply balance sheets (green pages).

Selling prices of vegetable products

subscription :	£	28.60	individual	£	3.75
(Selling prices of animal	DKr	308	issue :	DKr	41,45
products included)	US$	48.80		US$	6.40
	FB	2.000		FB	260

approximately 108 pages Format A 4 bi-monthly

Monthly and annual up-dating of the prices of the most important vegetable products and of a number of products processed by the food industry. The prices for EUR-9 are given in national currency and in EUC as well. The percentage variations refer to the previous month and to the same period of the year before. The monthly evolution of the prices of almost all products is illustrated also by graphs.

Selling prices of animal products

subscription :	£	28.60	individual	£	3.75
(Selling prices of vegetable	DKr	308	issue :	DKr	41,45
products included)	US$	48.80		US$	6.40
	FB	2.000		FB	260

approximately 140 pages Format A 4 bi-monthly

Monthly and annual up-dating of the prices of the most important animal products and of a number of products processed by the food industry. The prices for EUR-9 are given in national currency and in EUC as well. The percentage variations refer to the previous month and to the comparable period of the year before. The monthly evolution of the prices of almost all products is illustrated also by graphs.

Purchase prices of the means of production

subscription :	£	10.70	individual issue :	£	3.60
	DKr	115,50		DKr	38,50
	US$	18.30		US$	6.10
	FB	750		FB	250

approximately 150 pages Format A 4 quarterly

Up-dated monthly and annual figures for the principal products bought by farmers. The series for EUR-9 cover animal feed, fertilizers, transport and heating fuels, seeds and pesticides.

EC-Index of producer prices of agricultural products

subscription :	£ 11	individual issue :	£ 2.40
	DKr 115		DKr 24,60
	US$ 19		US$ 4
	FB 700		FB 150

approximately 28 pages Format A 4 bi-monthly

This monthly publication presents for EUR-9 and each of the member countries the evolution of the indices of the producer prices for agricultural products during the last known 12 months.

Blue series :

Quarterly bulletin of industrial production

subscription :	£ 8.60	individual issue :	£ 2.85
	DKr 92,50		DKr 30,80
	US$ 14.65		US$ 4.90
	FB 600		FB 200

approximately 170 pages Format A 4 quarterly

Annual and quarterly indices of industrial production in the countries of the Community.
Data on production within the Community of certain raw materials and finished or semi-finished products.

Quarterly iron and steel statistical bulletin

subscription :	£ 21.45	individual issue :	£ 7.15
	DKr 231		DKr 77
	US$ 36.60		US$ 12.20
	FB 1.500		FB 500

approximately 340 pages Format A 4 quarterly

Yearly, quarterly and monthly statistics on production, deliveries, receipts, new orders, order books, external trade and stocks of iron and manganese ore, pig iron, crude steel and finished steel, on the apparent consumption of crude steel, on the consumption of raw materials in the iron and steel industry and on deliveries, receipts and stocks of iron and steel merchants and scrap merchants, on the registered labor force, hours worked and wages in the iron and steel industry.

Ruby series :

Coal - Monthly bulletin

subscription (Coal, Oil	£	12.85	individual issue :	£	0.45
and natural gas,	DKr	139	(Coal)	DKr	4,65
Electrical energy)	US$	22		US$	0.75
	FB	900		FB	30

approximately 8 pages Format A 4 monthly

Produce monthly the principal statistical series characterising the short term movements in the coal industry.

Oil and natural gas - Monthly bulletin

subscription (Coal, Oil	£	12.85	individual issue :	£	0.72.1/2
and natural gas,	DKr	139	(Oil and	DKr	7,70
Electrical energy)	US$	22	natural gas)	US$	1.25
	FB	900		FB	50

approximately 16 pages Format A 4 monthly

Produce monthly the principal statistical series characterising the short term movements in the petroleum and gas industries.

Electrical energy - Monthly bulletin

subscription (Coal, Oil	£	12.85	individual issue :	£	0.35
and natural gas,	DKr	139	(Electrical	DKr	3,85
Electrical energy)	US$	22	energy)	US$	0.35
	FB	900		FB	25

approximately 12 pages Format A 4 monthly

Produce monthly principal statistical series characterising the short term movements in the electrical economy in general and fuel consumption in power stations in particular.

Red series :

Monthly external trade bulletin

subscription :	£	21.45	individual issue :	£	2.60
	DKr	231		DKr	27,60
	US$	36.60		US$	4.40
	FB	1.500		FB	180

approximately 130 pages Format A 4 monthly

General summary of foreign trade of the European Community by countries and by products.
Trends in EC trade by countries and by products.
Indices.
Trade of the main non-EC countries.

Trade flows

subscription : individual issue :

approximately 30 pages Format A 4 bi-monthly

Analysis of the external trade and related statistics of trading partners of the Community, particularly state-trading countries.

Crimson series : Transport/Monthly tables

subscription :	£	10	individual issue :	£	1.15
	DKr	108		DKr	12,30
	US$	17.10		US$	1.95
	FB	700		FB	80

approximately 60 pages Format A 4 monthly

Monthly data on the carriage of goods and travellers, registration of motor vehicles, traffic accidents, etc. Publication on completion of the principal tables to appear in Annual statistics of transport and communication, tourism.

PART 3 CONTRIBUTIONS TO EUROPEAN STATISTICS (STUDIES, ANALYSES)

This part of "EUROSTAT NEWS", which will appear occasionally, contains original contributions on statistics, in particular on European statistics. The authors alone are responsible for the articles in question and the opinions expressed are not necessarily those of the Statistical Office of the European Communities nor of the Commission. The articles appear in one language only, that chosen by the author.

APPLICATIONS OF INFORMATION THEORY IN A STATISTICAL WORKSHOP

A.D. Cunningham

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APPLICATION OF INFORMATION THEORY IN A STATISTICAL WORKSHOP

1. Introduction

The object of the present note is to list a number of straightforward applications of information theory to what can be called 'workshop' problems. Information theory can be dated back, at least to Shannon (1948), and had rapid acceptance and application in the field of communications engineering. The books of Kullback (1959) and Theil (1967 and 1972) are stages in the development of this type of measure of information in the field of statistics. There have been various applications, or discussions of possible applications to statistics, e.g. Hildenbrand and Paschen (1964), Finkelstein and Friedberg (1967), Horowitz (1970), Regional Statistics (1972), Phlips (1975), Sawyer (1976), but despite allowances for the time lags inevitable with new techniques, the applications to statistics can only be described as both half-hearted, and few. A review article, Hart (1975), gives the impression that information theory measures are an unnecessary complication of a situation well understood in terms of variances, and moment distributions.

One reason for these few applications in statistics seems to be an impression among some people, based on the associations of a name used for the principal measure of information, viz. "entropy", that the use of these measures involves large assumptions, and the smuggling in of a metaphysics which may later be unpacked to draw all kinds of unforeseeable and probably undesirable conclusions. On the other hand nobody feels this danger with variances.

Instances are given of the ways in which EUROSTAT has investigated the uses of information theory measures which can readily be seen not to involve any such metaphysical assumptions, and which are simply matters of analysing the pattern of, and differences within sets of figures. In the same way, as the analysis of variance is basically a matter of summing the squares of numbers, and partitioning that sum, so the information theory measures are based on summing the products of numbers, and of their logarithms, and partitioning this sum. The techniques are analogous, and complementary. Unlike the analysis of variance, the information measures are limited to non negative numbers, but the limitation is not very restrictive with economic and social data.

The applications are based on calculating the information content, or entropy of a set of numbers, i.e. on calculating the weighted average of the logarithms of the shares which each figures has of the relevant total. The techniques have the advantage of being non-parametric, applying in cases where one has no knowledge of underlying distributions and their theory is already largely developed, most conveniently in Theil (1967 and 1972). For most people and in most situations they are simpler than the alternative measures. In the applications discussed below, for which two programs have been written on a mini computer, the measures summarize the properties of data and can be used to help in the shaping of the tables in which data will be published, and in the writing of interpretative notes on the figures.

In simple cases adequate solutions to these workshop problems can of course be obtained by ad hoc methods, but there are advantages in a comprehensive approach which:

- applies equally well with all categories of data, subject only to the requirement of being non-negative;
- can be related to statistical theory, in those cases where assumptions about distributions are reasonable (e.g. can be related to variances in the common situation where the distribution can be approximated by the Log normal);
- is unembarrassed by large or small numbers of classes, or of numbers in classes;
- facilitates the making of reproducible judgments, and the generation of rankings between categories;
- produces measurements on a continuous scale whose limits are known, and which uses all the data to produce the summary figure and not simply one or two points on a distribution, to produce an answer to a "Go No-go" question;
- can be partitioned into additive components, each of which can be discussed separately.

2. Problems with which information theory can help

2.1 Recognizing the risk of disclosure

The problems of preserving the confidentiality of data have recently been discussed thoroughly by Ader (1977). Probably the commonest rules for detecting cases where a total must be suppressed because too large a proportion of the total comes from a few large respondents take the form:

$$\text{Suppress if} \qquad \frac{1 - C_n}{C_m} \leqslant K_1$$

where C_m and C_n are 2 points on the cumulative concentration curve, and K_1 is a constant.

An alternative rule which has the advantage of being expressed in terms of a single number, a measure of concentration, and of using all the data to work out that measure, takes the form:

Suppress if the information measure (the entropy) $\leqslant K_2$

The lower bound to the entropy is zero, corresponding to pure monopoly or complete concentration. If $K_2 = 0.9$ in units of natural logarithms one obtains a degree of protection which is commonly satisfactory. A variant of the rule is phrased in terms of the antilogarithm of entropy, and expressed in "an equivalent number of equal sized units". ($K_2 = 0.9$ implies an equivalent number of equal sized units of EXP $(0.9) \simeq 2.5$, or a degree of concentration between duopoly and triopoly). These measures have the advantage that there is a simplification of principle in that the topic of assessing the risk of disclosure is reduced to the topic of measuring concentration in which there is an independent interest; the measures facilitate the drawing of the important distinction between concentration, measured by entropy, and inequality, measured by the difference between the actual entropy and the maximum value which it could have in the defined situation. The entropy is the sum of a number of components, each the contribution of a respondent, and each of which can be discussed separately.

2.2 When to roll up?

A perennial problem, when one has got the data, is that of deciding whether it is worth publishing the full detail of a classification, or whether to roll up a proportion of its cells. One needs a measure of how much information there is in its breakdown in relation to the total information, and to the number of cells which have to be printed.

The inverse problem is that of deciding, before one has got a breakdown, whether the maximum gain of information which it could produce would be worth the effort required to provide the data. Statisticians are constantly giving solutions to these dual problems by the exercise of their judgments, which are commonly good, but neither exact nor reproducible. Theil (1975, p. 32) provides procedures by which the first stage of such judgments can be replaced by calculations which have both these desirable qualities. The procedures have been used in EUROSTAT to guide the drawing up of a shortened classification of goods for transport statistics, and in the analysis of data on R&D expenditure.

2.3 Analysing cross tabulations

The entropy of a 2-way table (and by extension of n-way tables) can be analysed into components associated with the differences within and between rows and columns, and when interactions for which the term 'mutuel information' is used (Theil, 1972, p. 115). By this procedure, the main feature of a table can be readily identified. The information has been used in EUROSTAT to guide the writing of reports, and the forms in which tables are presented, notably in the 1977 report on Government Financing of R&D.

The analysis is useful:

- in detecting heterogeneities in the data, detecting the outliers, or the ' odd man out', and in suggesting alternative groupings to the data;
- in comparing differences in structure between countries and over time;
- in assessing whether there is sufficient extra information in a cross tabulation of 2 variables to justify the printing of the table. The judgment is essentially a comparison of a quantity of information with a threshold, either an absolute quantity or a threshold determined by the sampling errors present. Test calculations may show, for example, that

a proportion of the two way tables which are possible contain no more information than is provided by the row and column totals. The scope for mutual information as a screen to eliminate unnecessary publication therefore seems to be large.

2.4 The limits to prorating

One common problem is that of setting limits to the amount of data which can safely be prorated. The difficulty arises because some data is available broken down by a classifying variable, and some data is available only in aggregate. If the proportion of the latter is small, then it is natural to want to distribute the aggregate data pro rata, and to produce classified figures.

But there are limits to the situation in which prorating is reasonable, and it is necessary to discuss how these limits can be set. The simplest rules, and ones widely used are phrased entirely in terms of the proportions of data for which the breakdown is available, and the proportion which must be prorated. One might, for example, prorate if the % of data to be prorated does not exceed 20% of the total. But a better solution would be one which takes into account the distribution of the known data. The more evenly this is spread between categories the more ready one would be to prorate the remainder. By calculating the maximum and the minimum values possible for the entropy of the estimated total, then more sensitive rules can be defined.

2.5 Setting objective criteria for derogation

One important reason for not having all the classifying information by which to break down totals (to which reference has been made earlier) is that, in the judgment of the survey planners, it was not reasonable to request it. To provide the information seemed disproportionately expensive, or difficult in relation to the main body of the data. Examples would be where small firms are given shortened forms, or when one decides that some sub-matrix has values too small to justify the work of estimating its values to a reasonable relative accuracy (the absolute error of estimation will never in this circumstance be large).

In these cases there is the problem of setting the threshold or drawing a line, of defining a out-off point, or the sub matrix, and it is necessary that the choices should not only be reasonable, but should be accepted readily as reasonable and defensible. The difficulty is not large with thresholds based on size. "De minimis non curat lex", and there is ready acceptance of the idea of a short form for a small firm. There is not likely to be much argument about any threshold proposed by the Statistical Office.

Where the exemptions concern countries, the situation is different: to make distinctions between countries without an explicit rationale and clear cut procedures is an invidious operation, but unless some such distinctions are made, draft legislation is liable to run into difficulties in Council from any Member States who feel that proposals which do not take into account their special circumstances will both put them to disproportionate trouble, and generate data which may be seriously misleading.

The need is to provide a rationale for the making of selective derogations which will not seriously influence the accuracy of the main figures to be derived, and which can be justified and applied objectively. One approach lies in the discussion of sampling errors and this may be sufficient to let the lines be drawn in an acceptable fashion. Another approach which is complementary rather than competitive lies in the calculation of bounds to the maximum uncertainties, defined in terms of entropy measures or information, which are introduced by such exceptions. This requires some data, either from a previous survey or from a pilot study at a more aggregated level. A case study has been worked out in some detail of the maximum information losses which would be involved if two sub matrices of the matrix of region to region goods transport in EUR 6 had been replaced by country to country flows only, but there has not yet been any application of the ideas to legislation. One advantage of this approach is that it provides a motivation for a country which believes that it will be exempted by a rational calculation of thresholds, to press for the adoption of a pilot survey which will provide the evidence for such exemption, rather than simply opposing the whole project as long as it feels it can.

3. Making examples available

Examples take up space and the most convincing examples are calculations on data which one already knows and understands, in which one can see that the main conclusions of the analysis are true and, in consequence, is prepared to trust the analysis in other cases. It is not possible to present in a limited space more than 1 example, and that in an abbreviated form, but the examples which have been computed so far are available from the writer, who will also arrange for the analyses to be computed on any reasonably small volume of data provided by an enquirer. It is not too difficult to program the calculations for any convenient computer.

3.1 One example: Labour Costs in the Wholesale and Retail Trade, Banking and Insurance in 1974 (Statistical telegram, Demographic and Social Statistics, EUROSTAT 1-1977).

From this Statistical telegram there can be extracted the table below. The two parts of the table have each been analysed separately, using the technique referred to in para 2.3. One part of the data is standardized to units of EUR per head, and will therefore show little variation. The other data, of employment, naturally shows much greater variation, but in both cases what is of interest are the differences in the variations, and the degree to which the data can be explained by a combination of two systematic factors, one for the country and one for the sector.

Table 1

Labour costs per month and number of employees in the distributive trades, banking and insurance in 1974 (1)

N A C E		B.R. Deutschland	France	Italia	Nederland	Belgique/ België	Luxembourg	United Kingdom	Ireland	Denmark
		Labour costs per month								in Eur
61	Wholesale trade	706	569	498	716	685	537	356	354	753
64/65	Retail trade	556	452	436	513	471	361	260	288	636
811/812	Banking	858	802	1.047	776	982	735	493	530	875
82	Insurance	860	687	852	833	797	741	478	498	996
		Number of employees (in 1.000)(2)								
61	Wholesale trade	718,5	568,8	195,5	209,2	115,2	5,6	567,6	29,8	99,2
64/65	Retail trade	758,9	498,7	113,4	155,8	113,3	3,1	1148,0	24,8	49,5
811/812	Banking	398,5	323,4	231,3	77,9	62,7	5,3	328,1	14,8	36,3
82	Insurance	173,4	85,0	61,0	28,1	24,2	0,5	149,5	6,9	11,2

(1) Enterprises with 10 and more employees
(2) Total full-time and part-time employees; annual average

The results can be summarized in this table of the degrees of inequalities (c.f. para 2.1) to be found in each of the two variables, within each category of the data.

Table 2

Differences within	Inequalities (1) between	
	Labour costs in EUR per month per employee	Number of employees
Germany (FR)	.015	.124
France	.022	.155
Italy	.063	.107
Netherlands	.015	.194
Belgium	.033	.132
Luxembourg	.037	.205
United Kingdom	.030	.230
Ireland	.029	.118
Denmark	.014	.218
Wholesale trade	.033	.425
Retail trade	.035	.642
Banking	.026	.441
Insurance	.024	.504
Mutual information	.004	.028

(1) Measured in units of natural logarithms.

Inspection of these tables shows:

- the figures of the right-hand column are about one order of magnitude greater than those of the left-hand column. This is to be expected, for the reasons already given, in all the lines except the last line. In this last line the mutual information for labour costs is low, i.e. these are largely determined by a combination of the two systematic factors, namely country and sector. This is not the case for the number of employees where the higher mutual information shows that some of the figures are subject to important individual factors which require investigation;

- of the countries, Italy has the highest variation in costs per sector, and the lowest variation in number of employees per sector. This is caused by the high costs, and high proportions of Italian employment concentrated in the relatively small banking sector, and to a lesser extent in the insurance sector. It is supplemented by the low employment in Italy in what is, overall, the largest sector, namely retail distribution;
- Denmark, the Netherlands, and Germany have the lowest inequality (i.e. the greatest equality) between sectors in their costs;
- the United Kingdom has the greatest variation between sectors in its employment. This is due to the large numbers recorded as employed in retail distribution;
- there are greater variations between countries in costs, in the wholesale and especially in retail trade, than in either banking, or in insurance. The variation in employment in retail distribution is particularly great in consequence of the characteristics noted earlier of Italy, and of the United Kingdom.

4. References

Ader, G	(1977)	Confidentiality and Business Statistics in the European Economic Community EUROSTAT 1977
Finkelstein, M.O. and Friedberg, R.M.	(1967)	The application of an Entropy Theory of Concentration to the Clayton Act. The Yale Law Review Vol 76 pp 667-717
Hart, P.E.	(1975)	Moment Distributions in Economics: an exposition JRSS Series A Vol 138 Part 3 1975
Hildenbrand, W. and Paschen, H.	(1964)	Ein axiomatisch begründetes Konzentrationmass Statistical Information 1964 No 3 EUROSTAT
Horowitz, I	(1970)	Employment Concentration in the Common Market JRSS Series A Vol 133 Part 3 1970
Kullback, S.	(1959)	Information Theory and Statistics Dover Publications New York 1968
Phlips, L.	(1975)	The Measurement of Industrial Concentration: a reassessment based on European data Statistical Studies and Surveys 3 1975 EUROSTAT
Regional Statistics	(1972)	Yearbook of Regional Statistics 1972 EUROSTAT 1972
Sawyer, M.	(1976)	Income Distribution in OECD Countries Occasional Studies OECD July 1976
Shannon, C.E.	(1948)	A Mathematical Theory of Communication Bell System Technical Journal Vol. 27 republished by University of Illinois Press
Theil, H.	(1967)	Economics and Information Theory North Holland Publishing Co. Amsterdam 1967
	(1972)	Statistical Decomposition Analysis North Holland Publishing Co. Amsterdam 1972

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Boîte postale 1003 - Luxembourg

Catalogue number : CA-AB-77-009-EN-C