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news**



DE EUROPÆISKE FÆLLESSKABERS STATISTISKE KONTOR
STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
OFFICE STATISTIQUE DES COMMUNAUTÉS EUROPÉENNES
ISTITUTO STATISTICO DELLE COMUNITÀ EUROPEE
BUREAU VOOR DE STATISTIEK DER EUROPESE GEMEENSCHAPPEN

Luxembourg, Centre Européen, Boite postale 1907 — Tel. 43011 Télex Comeur Lu 3423
1049 Bruxelles, Bâtiment Berlaymont, Rue de la Loi 200 (Bureau de liaison) — Tél. 735 80 40

Editors :

Mr L. Ronchi
Bâtiment Jean Monnet, bureau B 3/091, tel. 4301/2042

Miss G. Conrath
Bâtiment Jean Monnet, bureau B 3/093, tel. 4301/2040

To obtain this bulletin regularly, please apply to :

Statistical office of the European Communities
for the attention of Mrs Simmet, tel. 4301/2038
Boîte postale 1907, Luxembourg

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news items

NEW ORGANISATION CHART OF EUROSTAT

At its 476th meeting of 7th June 1978 the Commission changed on demand of Mr ORTOLI and Mr TUGENDHAT the organisation chart of EUROSTAT.

This decision became effective on 1st September 1978.

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Assistant to Director-General	Niels AHRENDT	L 2990

<u>Administrative unit</u>	<u>Head</u>	<u>Telephone</u>
----------------------------	-------------	------------------

L = Luxembourg 43011 *)
B = Brussels 7358040

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*) For direct dialling dial 4301 followed by the officer's extension number.

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2. Regional statistics and accounts	Raymond SALVAT	L 3204

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3. Social accounts and indicators and health statistics	Joachim WEDEL	L 3289
4. Employment and education statistics	Hildegard FURST	L 2030

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Adviser	Günther THIEDE	L 2989
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2. Agricultural balance-sheets and products	Hans Georg BAGGENDORFF	L 3550

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1. Energy	Jean DARRAGON	L 3271
2. Iron and steel	...	
3. Short-term industrial statistics	Alain CHANTRAINE	L 3219

4. Industrial structure, services and environment statistics	Victor SCHEITGEN	L 3223
- Transport	Brian WILSON	L 3406
- Services	Cleto SIMEONI	L 3561

Directorate F

External trade, ACP and non- member countries statistics	Silvio RONCHETTI	L 3534
1. Statistical methods and classification of external trade	Rolf SANNWALD	L 3557
- Special assignments on methods	Richard KUHNER	L 3537
2. External trade statistics	Joseph NOLS	L 3287
3. Analysis of external trade and general statistics relating to ACP and non- member countries	Alberto DE MICHELIS	L 3533



publications

SUMMARY

Published :

Special publications and series :

Input-Output Tables 1970, Vol. 1-7	20
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To be published shortly :

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Yearbook Iron and steel	17
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ANNUAL PUBLICATIONS

Orange series : Basic statistics of the Community - 1978

ISBN 92-825-0321-6	DK	Price : UKL	2.50
ISBN 92-825-0322-4	DE	DKR	26,50
ISBN 92-825-0323-2	EN	USD	4.80
ISBN 92-825-0324-0	FR	BFR	150
ISBN 92-825-0325-9	IT		
ISBN 92-825-0326-7	NL		

208 pages Format A 6

Editions DK, DE, EN, FR, IT, NL published in October 1978

Selection of the most important Community statistics and comparison with some European countries, the United States of America, Japan and the USSR.

This selection covers the following subjects :

- | | |
|--------------------------|---|
| - Population | - External trade |
| - Labour force | - Prices |
| - Research and education | - Earnings and hours of work |
| - National accounts | - Social accounts |
| - Agriculture | - Standard of living |
| - Energy | - Finance |
| - Industry | - Regional population and gross domestic product. |
| - Transport | |

Purple series : National accounts ESA - Aggregates - 1960-1977

ISBN 82-825-0660-6	EN/FR/NL	Price : UKL	4.90
ISBN 82-825-0661-4	DA/DE/IT	DKR	52,50
		USD	9.70
		BFR	300

Approximately 160 pages Format A 4

Editions EN/FR/NL and DA/DE/IT to be published in December 1978

Results of the principal aggregates of the national accounts drawn up according to ESA (European System of Integrated Economic Accounts). Development and comparison between the Community as a whole (EUR 9), the nine Member States, the three prospective Member countries (Spain, Greece, Portugal), the United States and Japan.

Yellow series : Employment and unemployment statistics

ISBN 92-825-0504-9

Price : UKL 8.50
DKR 86
USD 16
BFR 500

222 pages

Format A 4

Multilingual edition

published in November 1978

This publication presents the most recent series on employment and the working population, unemployment and trade disputes, thus bringing the 1977 volume of "Population and employment" up to date.

The appearance of a publication on "Demographic statistics" since the 1977 volume was published has enabled this analysis to concentrate on employment and unemployment. The main population data are, however, provided for reference in the first chapter.

The usual tables on employment and the working population are complemented by new statistics on paid employment by NACE classes. The tables on unemployment resume the series published monthly by the Statistical Office. There are additionally a number of specific analyses and a certain number of data on offers of employment and jobs found. Trade disputes are shown as numbers of days lost per 1000 employees per branch.

An historical section provides a summary of the main data in the form of chronological series, some of which go back as far as 1950

The explanatory notes give details of the various concepts used and of the national definitions which served as a basis for the processing of the data.

Green series : Fisheries - Fishery products and fishing fleet - 1974-1975

ISBN 92-825-0523-5

Price : UKL 8
DKR 88
USD 15,50
BFR 500

134 pages

Format A 4

Multilingual edition published in November 1978

This volume of fishery statistics contains supply balance-sheets for fishery products for Member States of the EC for the years 1974 and 1975, a revised series of per capita consumption data for the period 1959-75 and statistics on catches, quantities and values of landings, unit values and the fishing fleet.

Production of vegetables and fruit - 1966-1977

ISBN 92-825-0470-0

Price : UKL 5
DKR 51,75
USD 9.15
BFR 300

98 pages Format A 4

Multilingual edition published in October 1978

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 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 1974, 1975 and 1976. The recapitulation summarizes production data for the 9 member countries from 1966 to 1977, the data for the latter year being partially incomplete and provisional.

Blue series : Yearbook - Iron and steel

ISBN 92-825-0590-1

Price : UKL 16.50
DKR 175
USD 32.50
BFR 1 000

Approximately 130 pages Format A 4

Multilingual edition to be published in December 1978

Yearly statistics on the structure and the economic situation of Community's iron and steel industry : employment, size of enterprises, plants, crude steel-, iron and scrap balances, production of iron ore, pig iron, crude steel, finished steel and end products, consumption of raw materials, works deliveries and receipts, external trade of scrap and ECSC products, indirect foreign trade, steel consumption, investments of the iron and steel industry, prices and levy.

Ruby series : Coal statistics 1977

ISBN 92-825-0546-4

Price : UKL 2.50
 DKR 26
 USD 5
 BFR 150

82 pages Format A 6

Edition EN/DE/FR published in November 1978

This publication supplies the vast array of harmonized 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. The last chapter includes a list of the mining enterprises and the coke ovens.

Electrical energy statistics 1977

ISBN 82-825-0654-1

Price : UKL 3.30
 DKR 35
 USD 6.50
 BFR 200

Approximately 110 pages Format A 4

Edition EN/FR to be published in December 1978

This publication furnishes detailed harmonized and preponderantly definite data concerning the electrical economy during the past calendar year. It gives the specialist additional information and a rapid updating of time series published in the yearbook Energy. It is composed of six parts : characteristic data - summarized balance-sheets - production - transformation in the power stations - consumption - electrical power plant - mean receipts per kWh.

Red series : NIMEXE Analytical Tables - 1977 - on microfiches

ISBN 92-825-0303-8 published in August 1978	Price :			
	complete series		per microfiche	
	UKL	58	UKL	0.85
	DKR	617	DKR	8,80
	USD	110	USD	1.60
	BFR	3 500	BFR	50

External Trade statistics of the Community and of the Member States in the NIMEXE nomenclature :

- breakdown of products by countries in the 6-digit NIMEXE code Value and Weight (module 1115) and Supplementary Units (module 1116).

The following supplements to this publication are available to be consulted and for possible copying at the Statistical Office of the European Communities :

- 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).

Crimson series : Transport, communications, tourism - 1976

ISBN 92-825-0318-6	EN/FR	Price :	UKL	11.85
ISBN 92-825-0319-4	DE/IT		DKR	123
ISBN 92-825-0320-8	DA/NL		USD	21.65
156 pages	Format A 4		BFR	700
Edition EN/FR published in July 1978				
Editions DE/IT, DK/NL published in August 1978				

Statistics on the infrastructure, on the equipment, and on the operations of the different modes of transport.
Statistics on traffic accidents, on communications (post, telegraph, telex, telephone, radio and television) and on tourism.

SPECIAL PUBLICATIONS AND SERIES

Purple series : Input-output tables 1970

Price :

	complete series	per volume
UKL	30.50	UKL 4.25
DKR	393,50	DKR 55,-
USD	71.60	USD 10.10
BFR	2 500	BFR 350

Special 9-volume series Format A 4

Published :

Volume 1 - Methodology 1970-1975 : 38 pages
Editions FR, DE, EN, NL, IT, DA

Volume 2 - United Kingdom 1970 : 121 pages
Edition EN/FR

Volume 3 - Nederland 1970 : 119 pages
Edition NL/FR

Volume 4 - Italia 1970 : 119 pages
Edition IT/FR

Volume 5 - België/Belgique 1970 : 120 pages
Edition NL/FR

Volume 6 - BR Deutschland 1970 : 124 pages
Edition DE/FR

Volume 7 - France : 124 pages
Edition EN/FR

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.

Comparison in real values of the aggregates of ESA

ISBN 92-825-0215-5	Price : UKL	11.60
	DKR	123,50
	USD	22
	BFR	700

Approximately 264 pages Format A 4

Bilingual edition EN/FR to be published in December 1978

The study provides purchasing power parities (PPP) between the currencies of the nine countries of the European Communities. These PPP's are used instead of the official exchange rates in order to convert nominal values of each country of Gross Domestic Product and its uses into a common unit, purchasing power standard.

The values expressed in this unit are called "real values". These values make a direct comparison between the aggregates of the different countries possible.

Yellow series : Labour costs in industry - 1975

Special series in 4 volumes Format A 4

Multilingual edition	Price complete series : UKL	13.30
	DKR	141
	USD	25.20
Published :	BFR	800

Volume 1 - General results by countries and industries

ISBN 92-825-0260-0	161 pages	Price : UKL	8
		DKR	84,70
		USD	15
		BFR	480

This publication contains the methodology and detailed results of the Community survey of labour costs in industry 1975.

The results cover the number of establishments and employees, the number of hours worked, and the level and structure of labour costs in different industries (73 groups of the divisions 1-5 of the NACE).

The results are published in four volumes, as follows :

Volume 1 : General results by countries and industries

Volume 2 : Results by size of establishments

Volume 3 : Structure of labour costs

Volume 4 : Regional results

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

Price :			
complete series		per volume	
UKL	55	UKL	7.30
DKR	708	DKR	94,50
BFR	4 500	BFR	600
USD	130	USD	17.20

Special series in 10 volumes Format A 4

Published :

Volume 1 - Methods and Definitions : 223 pages
multilingual edition

Volume 2 - Luxembourg : 376 pages
Edition EN/FR

Volume 3 - Danmark : 442 pages
Edition EN/FR

Volume 4 - Belgique/België : 476 pages
Edition EN/FR

Volume 6 - United Kingdom : 380 pages
Edition EN/FR

Volume 7 - Nederland : 418 pages
Edition EN/FR

Volume 8 - BR Deutschland : 458 pages
Edition EN/FR

Volume 9 - France : 476 pages
Edition EN/FR

Volume 10 - Italia : 458 pages
Edition EN/FR

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 : Agricultural statistical studies - 21 (Prof. Dr. H. HANUS)

Investigation into the forecasting of crop yields from meteorological data in the countries of the EC

ISBN 92-825-0534-0	DE	Price : UKL	5
ISBN 92-825-0535-9	EN	DKR	53
ISBN 92-825-0536-7	FR	USD	9.50
		BFR	300

52 pages Format A 4
Editions DE, FR, EN DE published in October 1978

In this study, Dr H. HANUS, professor of agronomy, investigates the relationships between the meteorological conditions in any given year and the yields of certain important field crops. Using a forecasting method which he himself developed and which is already employed by the official statistical services in the Federal Republic of Germany, the author describes the results obtained for Germany and the other eight Member States of the EC in the experiments which he carried out on behalf of the Statistical Office of the European Communities. He concludes that this method seems applicable to other European countries and provides a means of early prediction of the crop yields in any given year. In addition, the study includes a number of methodological observations and conclusions which form a suitable introduction to this method of forecasting.

Red series : List of chemicals in NIMEXE together with their tariff classification and NIMEXE code

ISBN 92-825-0305-4	Price : UKL	6.70
	DKR	71
	USD	12.60
	BFR	400

220 pages Format A 4
Multilingual edition published in August 1978

This list provides all relevant information as to the tariff and statistical classification of the chemical products falling within chapter 28 and 29 of the Common Customs Tariff. It includes 1,300 chemical terms in six languages (by the name used in up-to-date chemical nomenclatures, by common name and by synonym) and is complementary to and an extension of the list of chemical products published in four languages in 1975 and of its supplement published in 1977.

This publication provides :

- an immediate classification (heading and subheading) by their chemical terms in each of the Community languages of the chemical products to be found in the Common Customs Tariff of the European Communities as well as the corresponding statistical classification of NIMEXE;
- a correlation of these terms as between the six languages (specialised, multilingual dictionary).

EUROSTAT PERIODICALS

Yellow series : Hourly earnings - Hours of work

ISSN 0378-3596

Annual subscription :	UKL	9.60	Single copy :	UKL	6.40
	DKR	98,50		DKR	65,55
	USD	16.50		USD	11.10
	BFR	600		BFR	400

Approximately 266 pages Format A 4 half-yearly

This publication which is updated every six months contains harmonized data on workers' hourly wages, on labour costs, and weekly hours worked, plus indices of developments in employees' monthly salaries, by region. The publication also contains some data on the earnings and the conditions of employment of permanent workers in agriculture.

Green series : Crop production

ISSN 0378-3588

Annual subscription :	UKL	40	Single copy :	UKL	4.80
	DKR	410		DKR	49,20
	USD	69		USD	8.25
	BFR	2 500		BFR	300

Approximately 120 pages Format A 4 11 issues per year

The most recent information on

- Crop production of arable land (area, yield, production)
- 1) 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

ISSN 0378-3553

Annual subscription :	UKL	40	Single copy :	UKL	4.80
	DKR	410		DKR	49,20
	USD	69		USD	8.25
	BFR	2 500		BFR	300

Approximately 100 pages Format A 4 11 issues per year

Publication of monthly statistics supplied by Member States in application of the Council's Directives 73/132/EEC and 76/630 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 sugar

Annual subscription : UKL	Single copy : UKL
DKR	DKR
USD	USD
BFR	BFR

Approximately 75 pages Format A 4 11 issues per year

Monthly balance sheets showing the main flows of sugar only, expressed as white sugar equivalent. Products containing sugar (sweetened products) are therefore excluded. The objective of the publication is two-fold : to make provisional annual data rapidly available at the end of the crop year, before the issue of final figures, and to follow the seasonal trends of the different flows.

Monthly statistics of milk

ISSN 0378-3545

Annual subscription : UKL	22.40	Single copy : UKL	2.90
DKR	229,50	DKR	29,50
USD	39	USD	5
BFR	1 400	BFR	180

Approximately 60 pages Format A 4 8 to 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

ISSN 0378-3537

Annual subscription :	UKL	22.40	Single copy :	UKL	2.90
	DKR	229,50		DKR	29,50
	USD	39		USD	5
	BFR	1 400		BFR	180

Approximately 75 pages Format A 4 8 to 10 issues per year

Publication of monthly statistics transmitted by Member States in compliance with the Council regulations 2782/75 and 1868/77 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.

Selling prices of vegetable products

ISSN 0378-6714

Annual subscription :	UKL	43.20	Single copy :	UKL	4.80
(Selling prices of animal products included)	DKR	442,50		DKR	49.20
	USD	74.50		USD	8.25
	BFR	2 700		BFR	300

Approximately 100 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 each of the member countries are given in national currency and in EUA. The percentage variations refer to the same period of the year before. The monthly evolutions of the prices in EUA of most products are illustrated also by graphs.

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Selling prices of animal products

ISSN 0378-6722

Annual subscription :	UKL	43.20	Single copy :	UKL	4.80
(Selling prices of vegetable products included)	DKR	442,50		DKR	49.20
	USD	74.50		USD	8.25
	BFR	2 700		BFR	300

Approximately 125 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 each of the member countries are given in national currency and in EUA. The percentage variations refer to the comparable period of the year before. The monthly evolutions of the prices in EUA of most products are illustrated also by graphs.

Purchase prices of the means of production

ISSN 0378-6692

Annual subscription :	UKL	11.20	Single copy :	UKL	4
	DKR	115		DKR	41
	USD	19.50		USD	6.90
	BFR	700		BFR	250

Approximately 140 pages Format A 4 quarterly

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

EC-Index of producer prices of agricultural products

Annual subscription :	UKL	11.20	Single copy :	UKL	2.40
	DKR	115		DKR	24,60
	USD	19.50		USD	4.15
	BFR	700		BFR	150

Approximately 28 pages Format A 4 bi-monthly

This 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.

Fishery statistics

Annual subscription :	UKL	Single copy :	UKL
	DKR		DKR
	USD		USD
	BFR		BFR

Approximately 72 pages Format A 4 quarterly

The publication contains monthly statistics on the quantities and values of landings for the principal fish species in Member States.

Blue series : Industrial short-term trends

ISSN 0378-7427; 0378-7877; 0378-8008

Annual subscription :	UKL	8	Single copy :	UKL	0.80
	DKR	82		DKR	8,20
	USD	13.80		USD	1.40
	BFR	500		BFR	50

Approximately 50 pages Format A 4 monthly

Publication of short-term industrial indicators.

The publication contains indices of industrial production for about 40 industrial branches and groups of branches. During 1978 the contents will be gradually increased to include indices of turnover, new orders, employees, wages and salaries and hours worked.

Methodological supplements and retrospective series will complete the regular monthly publication.

Quarterly bulletin of industrial production

ISSN 0378-3529

Annual subscription :	UKL	14.40	Single copy :	UKL	4.80
	DKR	147,50		DKR	49,20
	USD	25		USD	8.25
	BFR	900		BFR	300

Approximately 147 pages Format A 4 quarterly

Data on production within the Community of certain raw materials and finished or semi-finished products.

Quarterly iron and steel bulletin

ISSN 0378-3510

Annual subscription :	UKL	14.40	Single copy :	UKL	4.80
	DKR	147,50		DKR	49,20
	USD	25		USD	8.25
	BFR	900		BFR	300

Approximately 120 pages Format A 4 quarterly

Annual, quarterly and monthly statistics of production, deliveries, receipts and foreign trade in iron ore, pig iron, crude steel and rolled steel products, on the consumption of raw materials in the iron and steel industry and deliveries by merchants of steel products and of scrap, together with statistics of the labour force, hours of work and wages in the iron and steel industry.

Monthly iron and steel bulletin

Annual subscription :	UKL	6.40	Single copy :	UKL	0.80
	DKR	65,50		DKR	8,20
	USD	11		USD	1.40
	BFR	400		BFR	50

Approximately 19 pages Format A 4 monthly (11 issues per year)

Monthly statistics on the number of short-time workers; the production of pig iron, crude steel and finished rolled products; new orders, order books and deliveries of ordinary steels; the production and deliveries of special steels; foreign trade in ECSC steel products; the consumption and net receipts of ferrous scrap by the iron and steel industry.

Ruby series :

Coal - Monthly bulletin

ISSN 0378-357X

Annual subscription :	UKL	4.80	Single copy :	UKL	0.65
	DKR	49		DKR	6,50
	USD	8.50		USD	1.15
	BFR	300		BFR	40

Approximately 14 pages Format A 4 monthly (11 issues per year)

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

Hydrocarbons - Monthly bulletin

ISSN 0378-3731

Annual subscription :	UKL	9.60	Single copy :	UKL	0.95
	DKR	98,50		DKR	9,85
	USD	16.50		USD	1.65
	BFR	600		BFR	60

Approximately 20 pages Format A 4 monthly (11 issues per year)

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

Electrical energy - Monthly bulletin

ISSN 0378-3561

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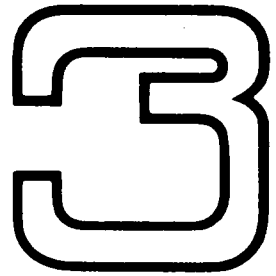
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SOME RECENT DEVELOPMENTS IN THE THEORY OF THE
INDICES USED IN REAL COUNTRY-TO-COUNTRY COMPARISONS

by D. GERARDI

Introduction

This document deals with the methodological problems involved in calculating Purchasing Power Parities (PPP)¹ and, in particular, those encountered in multilateral comparisons between the nine countries of the European Community.

The main properties required for the multilateral method to give valid results can be divided into two groups.

The first group includes the following formal properties:

- a) transitivity of the parities
- b) additivity of values converted into common units by means of the PPP.

The second group includes:

- a) characteristicness and
- b) absence of bias

The most familiar methods used in work on PPP's are:

- Geary Khamis
- EKS
- Walsh
- Van IJzeren

None of these methods meets these two formal requirements at the same time.

¹ Work in the field of international comparison of GDP is described in greater detail in: International Comparison Project (ICP) published by I.B. Kravis, Z. Kennessey, A. Heston, R. Summers ('A system of international comparison of gross product and purchasing power', John Hopkins University Press, Baltimore and London 1975).

All the methods listed have been tried out within the framework of the ICP and the Geary Khamis method was finally selected as the one which offered the most satisfactory results at world level.

An analysis of the GK method, revealing certain drawbacks which it entails, is given below.

A new method has been proposed which differs from the GK method in two respects as regards the definition of international price; the first change concerns the type of average and the second the weighting.

These two changes not only provide results which meet the two requirements, but also simplifies calculations considerably and makes their application more flexible.

Before these new proposals are described a brief reminder of the different requirements is in order, after which a summary of the basic material needed for calculating the parities will be given. Lastly, the need for a unit of currency as a reference base for multilateral comparisons will be explained.

1. Requirements

A. Transitivity

If ${}_h P_j$ is the parity between country j and base country h, a parity calculation method is transitive when the following equation is valid:

$${}_c P_B = {}_A P_B / {}_A P_C$$

${}_c P_B$ being the direct parity between countries B and C and the other side of the equation representing the same parity calculated indirectly by means of country A.

B. Additivity

If ${}_R P_E^z$ is the parity between currency country E and base country h for the r-th constituent part of the aggregate and ${}_R P_E$ represents the overall parity of this aggregate, the method is considered to be additive if the following equation is valid:

$$\sum_{r=1}^M {}_R P_E^z V_r^z = {}_R P_E V_h$$

M being the number of constituent parts of the aggregate ($1 < M \leq N$) and N being the number of elementary articles.

In other words, for each country the sum of the converted values of the constituent parts V_r^z (expressed in common units using the parities corresponding to this constituent part) must be equal to the overall value V_h expressed in common units by means of the overall parity.

C. Characteristicness¹

Characteristicness is often adopted as a criterion, but it is not very easy to define it clearly. In a binary comparison, characteristicness is maximal since, in a comparison between two given countries, the complete basic material - and only this material - relating to the two countries is used.

In the case of a multilateral comparison, characteristicness must be sacrificed in order to achieve transitivity, which means that the two criteria clash.

The EKS and Van IJzeren methods attempt to achieve transitivity losing as little characteristicness as possible, i.e. to 'minimize' the deviation between the binary parities and the transitive parities. The GK and Walsh methods calculate transitive parities directly taking no account of the binary parities. It is generally agreed that the GK and Walsh methods provide parities which satisfy the criterion of characteristicness to a lesser degree than the EKS and Van IJzeren methods.

¹ See also L. Drechsler: 'Weighting of Index Numbers in International Comparisons' R.I.W., March 1973.

D. Absence of bias

Absence of bias means that the index obtained is situated near the middle of the interval calculated on the basis of the Laspeyres and Paasche indices for the original binary comparison.

The EKS and Van IJzeren methods can be considered as extensions of the Fisher indices and, in a binary comparison, the resulting parities are Fisher indices. It can therefore be considered that these two methods reveal a slight bias.

The GK method reveals greater bias, particularly under certain circumstances. For instance, in a binary comparison between two countries having very different dimensions, the index obtained using the GK method is dominated by the structure of the lesser-sized country. Experience with multilateral comparisons have shown that the GK indices tend to go beyond the interval referred to above.

The four criteria so far mentioned can be complemented by others, but for the purposes of this document they have not been further developed since they have no bearing on the final selection of the method presented below.

2. Basic material

For a given aggregate in National Accounts there must be a basket of N products considered as representative of the aggregate for all the participating countries.

The most common case is that of a basket of N products for which all the prices are known in each of the countries concerned. In addition, the values corresponding to each product making up the basket are also known.

Consequently, if N is the number of product and K the number of countries, the basic material consists of two complete matrices, one for prices and the other for values:

$$P = \parallel p_{ij} \parallel \quad \text{et} \quad V = \parallel v_{ij} \parallel \quad \begin{array}{l} i = 1, 2, \dots, N \\ j = 1, 2, \dots, K \end{array}$$

3. The Geary Khamis method

The GK method is used as the starting point. In order to explain this method the basic material referred to in paragraph 2 (complete matrices of prices and values) has been used. These two matrices may be used to work out a matrix of implicit volumes Q , the generic element of which is calculated as follows:

$$q_{ij} = v_{ij} / p_{ij}$$

The GK method is based on:

- 1) A definition of international price
- 2) A definition of parity between central country E and each one of the K countries;

These definitions are as follows:

$$p_i^E = \frac{\sum_{j=1}^K p_{ij}^E q_{ij}}{\sum_{j=1}^K q_{ij}} \quad i = 1, 2, \dots, N.$$

The international price of each product is therefore equal to the arithmetical average of national prices (expressed in a common currency by means of the overall parities) weighted with the corresponding volumes of the K participating countries.

$$p_{jE} = \frac{\sum_{i=1}^N p_i^E q_{ij}}{\sum_{i=1}^N q_{ij}} \quad j = 1, 2, \dots, K.$$

The parities are calculated using Laspeyres' index between country E and each of the K countries used as base.

These two equations constitute a system of homogenous equations (N + K equation) for which the unknown quantities are the N international prices and the K parities.

The GK method, when applied to the basic material shown in section 2, meets the transitivity requirement, but not the additivity requirement for all aggregate levels of the constituent parts, i.e. as required by the definition of complete additivity (see 1.B).

In fact, if in the case of an aggregate level higher than the elementary articles, the GK method is applied separately to each of the constituent parts of a specific aggregate, the parities $\int P_E^1$ are obtained. The sum of the M real values ($M < N$) derived for each country from these parities is not equal to the total real value calculated using the overall parity $\int P_E$, i.e. by applying the GK method to all GDP's.

Nevertheless, a special kind of additivity can be obtained from the GK method by calculating, for the M constituent parts, parities $\int P_E^*$ on the basis of the international prices obtained by means of the GDP parity.

This means that the GK method is modified in that it is distorted to provide additive results.

However, this modification entails a drawback from the point of view of the concepts involved in the method: for a constituent part of a given aggregate the parity $\int P_E^*$ is not equal to the parity $\int P_E^1$ of a constituent part calculated without taking the other parities of the whole into account. 'Sectorial characteristicness' is not therefore observed, i.e. the parity of one part (sector) of the whole is not calculated using exclusively the relevant basic material. In other words, the parity of this constituent part $\int P_E^*$ depends on all the prices and all the values relating to the basket as a whole. Any modification to a price or a value therefore modifies all the parities.

4. Critical examination of the definition of international price

As stated in the introduction and as will be shown in the next two sections, the drawbacks of the GK method can be attributed to its specific definition of international price.

Khamis claims that, assuming there is free competition, the international price of the GK method can be considered as the 'equilibrium' or 'average' price.

However, in the case of most products the free competition condition does not exist and the interpretation of this international price as an equilibrium price therefore seems unrealistic. In any case, even if this interpretation could be accepted, the following question will have to be asked: is the structure of international prices resulting from this concept of equilibrium price the most suitable for the role of 'bridge country' when economic parities are derived? It should not be forgotten that the main objective is to obtain reasonable estimates of the relationships between the general price levels in the countries considered in the comparison and that international prices constitute only a means to this end. What is needed is a definition of international price, which, perfectly compatible with this instrumental function, provides the parities with the necessary requirements as far as possible.

5. First international price definition proposed

The first stage is to take a single weighting for all products when defining international price. As will be clearer below, this is one, although not the only, pre-requisite (at least for our type of analysis) for achieving a method which meets the requirements of additivity and transitivity at the same time.

The definition of international price we propose here is as follows:

$$1) \quad p_i^E = \sum_{r=1}^K r P_r p_{ir} P(r) \quad i = 1, 2, \dots, N$$

in which we have:
$$\sum_{r=1}^K P(r) = 1$$

The $P(r)$ can therefore be interpreted as a probability function to be assigned to the random variables affecting the national prices of each article converted into common units. The p_i^E therefore represent the average values of these N random variables.

The parities between country E, represented by the p_i^E international price structure, and the K original countries are then calculated as follows:

$$2) \quad {}_jP_E = \frac{\sum_{i=1}^N p_i^E p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} \quad j = 1, 2, \dots, K.$$

Parities ${}_jP_E$ are then used to calculate the parities between the K countries as follows:

$${}_rP_j = {}_rP_E / {}_jP_E \quad \forall (j, r).$$

Replacing p_i^E in 2), the result is:

$$\begin{aligned} {}_jP_E &= \frac{\sum_{i=1}^N \sum_{x=1}^K {}_xP_E p_{ix} p_{ij} p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} = \\ &= \sum_{x=1}^K {}_xP_E p_{ix} \frac{\sum_{i=1}^N p_{ix} p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} \end{aligned}$$

The final result is:

$$3) \quad {}_jP_E = \sum_{x=1}^K {}_xP_E p_{ix} {}_jI_x^L \quad j = 1, 2, \dots, K$$

${}_jI_x^L$ being the Laspeyres index for country r in relation to country j.

Expression 3) is the same as that proposed by Van IJzeren who calls it the 'homogeneous groups method'; it is derived from a more general (weighted) version of his 'tourist' model.

If the weighting used in the definition of international price is the same for all countries, i.e. if $p(\alpha) = \frac{1}{K}$ ($\alpha = 1, 2, \dots, K$), the definition of international price becomes:

$$4) \quad p_i^E = \sum_{\alpha=1}^K \alpha P_E p_{i\alpha} / K \quad \alpha = 1, 2, \dots, N$$

In this case, expression 3) becomes:

$$5) \quad K_j P_E = \sum_{\alpha=1}^K \alpha P_E j_{\alpha}^L \quad j = 1, 2, \dots, K$$

5) still represents the homogeneous groups method, but derived from the non-weighted version of the tourist model.

If $K = 2$, the parity obtained by means of 5) coincides with the one provided by the Fisher index.

In other words, at least the following two economic interpretations are possible in the case of the Fisher method:

- the first associated with Van IJzeren's (non-weighted) tourist model,
- the second connected with the explicit definition of international price (in the case of a uniform, i.e. non weighted, probability distribution).

Adopting a single weighting for all articles in the international price definition and, especially, a standard weighting for all countries makes it possible to use the Van IJzeren method. In terms of its characteristicness and absence of bias, this method offers advantages over the GK method while still providing the latter's advantages of economic interpretation as regards the explicit definition of international price; it does not, however, meet the requirement of additivity.

The following section will demonstrate how a method meeting the additivity requirement can be worked out from the results so far obtained.

6. The method to be used for Community purposes

If a single weighting is used in the international price definition for all articles, additivity can be obtained merely by taking the geometric average instead of the arithmetical average, i.e. the international price should be defined as follows:

$$1) \quad \varphi_i^E = \prod_{\tau=1}^K ({}_j P_E p_{i\tau})^{P(\tau)} \quad i = 1, 2, \dots, N.$$

The parity definition remains as follows:

$$2) \quad {}_j P_E = \frac{\sum_{i=1}^N p_i^E p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} \quad j = 1, 2, \dots, K.$$

We can therefore write:

$${}_j P_E = \frac{\sum_{i=1}^N \prod_{\tau=1}^K ({}_j P_E p_{i\tau})^{P(\tau)} p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}}$$

or:

$$3) \quad {}_j P_E = \prod_{\tau=1}^K ({}_j P_E)^{P(\tau)} \frac{\sum_{i=1}^N \prod_{\tau=1}^K p_{i\tau}^{P(\tau)} p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} \quad j = 1, 2, \dots, K.$$

In 3) the factor $C = \prod_{\tau=1}^K ({}_j P_E)^{P(\tau)}$ is constant in relation to j which has no effect on the parities between the K original countries and can therefore be eliminated.

In the case of uniform probability distribution, 3) can be written thus:

$$4) \quad {}_j P_E = C \frac{\sum_{i=1}^N \prod_{\tau=1}^K p_{i\tau}^{1/K} p_{ij}}{\sum_{i=1}^N p_{ij} p_{ij}} \quad j = 1, 2, \dots, K.$$

This last method is the one which we propose should be used for Community purposes.

The following conclusions may be drawn from this model:

- From the point of view of interpretation of the model:

It corresponds to the GK model and to the modified version of Van IJzeren's 'homogeneous groups' method, and is based on the international prices. An additional and valuable advantage is that the parities between the original countries are independent from the conversion factors used in the international price definition. The official rates of exchange can also be used.

- From the point of view of the requirements:

The two fundamental requirements, transitivity and additivity, are met and the loss in terms of characteristicness and absence of bias compared with Van IJzeren's homogeneous groups method is probably very small. As regards additivity, it should be noted that the international prices are calculated univocally and in advance without using the parities (which are unknown). These prices are used to calculate the parities at all aggregate levels thus providing additivity.

- From the practical point of view:

The method can be used easily when the basic material is incomplete, as will be shown in section 8.

- From the point of view of calculation:

The system of equations is reduced to an explicit form, thus simplifying calculations considerably.

7. Application of the new method in the case of incomplete data

It frequently happens that the basic material is not as described in section 1 and has limitations.

- The prices of the N products are not known in all the countries concerned. This is the case, for instance, of the 1975 survey of household consumption in the European Community, when the GDP first had to be broken down into a number M of elementary categories. These categories are defined in such a way that for each one and for each pair of countries there is at least one product for which the price is known in both countries.
- The weighting (current value) is not known at individual parity level, but at elementary category level.

Because of these two limitations in the basic material, for each elementary category we have a complete matrix of binary parities:

$$F^i = \parallel_j F_{jk}^i \parallel$$

The equations formulated in the previous section should therefore be adapted in order to use parities in the place of prices.

Equation (1) in its original form:

$${}_j P_E = c \frac{\sum_{i=1}^M \left[\prod_{k=1}^K p_{ik} \right]^{1/K} p_{ij}}{\sum_{i=1}^M p_{ij} p_{ij}}$$

can be written as follows:

$$\begin{aligned} {}_j P_E &= c \frac{\sum_{i=1}^M \left[\prod_{k=1}^K \frac{p_{ik}}{p_{ij}} \right]^{1/K} p_{ij} p_{ij}}{\sum_{i=1}^M p_{ij} p_{ij}} = \\ &= c \frac{\sum_{i=1}^M \left[\prod_{k=1}^K j p_{ik}^i \right]^{1/K} v_{ij}}{\sum_{i=1}^M v_{ij}} \end{aligned}$$

Symbol i can represent a product or an elementary category of products.

When this model is applied to the M elementary categories the equations then become:

$$(2) \quad {}_j P_E = c \frac{\sum_{i=1}^M \left[\prod_{z=1}^K {}_i F_z^i \right]^{1/K} \cdot v_{ij}}{\sum_{i=1}^M v_{ij}} =$$

$$= c \frac{\sum_{i=1}^M {}_j P_E^i v_{ij}}{\sum_{i=1}^M v_{ij}} \quad j = 1, 2, \dots, K.$$

Parity matrix F^i can be written as follows:

$$F^i = \left\| \left\| {}_j F_k^i \right\| \right\| \quad \begin{array}{l} i = 1, 2, \dots, M \\ z = 1, 2, \dots, K \\ j = 1, 2, \dots, K \end{array}$$

The elements of these matrices can be calculated in a number of ways. Two cases can be distinguished according to the presence of a significant weighting in the elementary categories:

- No weighting available: in this case the price relationship of the products belonging to one elementary category are aggregated using a simple geometric average. This method of calculating the parities for the elementary categories satisfies the country reversal test, i.e.:

$${}_B P_A = 1 / {}_A P_B$$

- Weighting available, not for the individual products, but within the elementary categories, by groups of products. In this case, it is possible to use Fisher's index for aggregating the price relationships of the products belonging to one elementary category.

Furthermore it is also possible to use Fisher's index in the first case and therefore, in order to use a standard method for all the elementary categories, Fisher's index should be applied in all cases.

The method drawn up in this section and illustrated by equations (2) provides the parity for country E in relation to the other participating countries (j).

The parities between countries can be derived directly from these parities as follows:

$${}_j P_l = {}_j P_E / {}_l P_E \quad \forall (j, l)$$

This is valid at all aggregate levels of the elementary categories.

One special feature of this method is that, at elementary category level, the parity between countries coincides with the parity calculated using the EKS method. For one elementary category i the following may be formulated:

$${}_j P_l^i = {}_j P_E^i / {}_l P_E^i = \left[\prod_{r=1}^k {}_j F_r^i \right]^{1/k} / \left[\prod_{r=1}^k {}_l F_r^i \right]^{1/k} = \left[\prod_{r=1}^k \frac{{}_j F_r^i}{{}_l F_r^i} \right]^{1/k} = {}_j^{EKS} P_l^i$$

Selecting the simple geometric average for defining international price therefore confers this special feature on the new method.

8. Conclusions

We have seen in the preceding paragraphs that in order to have parities which are both transitive and unbiased and at the same time additive real values we must use a method based on the concept of "average price" defined as follows:

$$p_{iE} = \sqrt[k]{\prod_{\alpha=1}^k p_{i\alpha}}$$

With such a method a "direct" quantity index Q_j is obtained:

$$Q_j = \frac{\sum_{i=1}^N p_{iE} q_{ij}}{\sum_{i=1}^N p_{iE} q_{iL}}$$

and parities between countries derived from the ratio of the value index V_j and the quantity index Q_j :

$$P_j = V_j / Q_j = \frac{\sum_{i=1}^N p_{ij} q_{ij}}{\sum_{i=1}^N p_{iL} q_{iL}} \bigg/ \frac{\sum_{i=1}^N p_{iE} q_{ij}}{\sum_{i=1}^N p_{iE} q_{iL}}$$

By analogy with these results a direct method for calculating parities could be obtained as follows:

$$q_{iE} = \sqrt[k]{\prod_{\alpha=1}^k q_{i\alpha}}$$

$$P_j = \frac{\sum_{i=1}^N p_{ij} q_{iE}}{\sum_{i=1}^N p_{iL} q_{iE}}$$

The indirect quantity index ${}_k Q_j$ derived by this method would thus be

$${}_k Q_j = {}_k V_j / {}_k P_j = \frac{\sum_{i=1}^N p_{ij} q_{ij}}{\sum_{i=1}^N p_{ik} q_{ik}} / \frac{\sum_{i=1}^N p_{ij} p_{ie}}{\sum_{i=1}^N p_{ik} p_{ie}} = {}_k Q_E / {}_k Q_E$$

This latter method still provides parities and quantity indexes which are not biased by the differences in the sizes of countries. For, if the quantities for a country were multiplied by "s" the average quantities become:

$$q_{iE}^1 = \sqrt[k]{s} \cdot q_{iE}$$

which obviously does not change the results. The use of the geometric average permits us also in this type of method both to eliminate the bias and to avoid the use of "standardisation" coefficients for the quantities (eg. such as ${}_k Q_E = \frac{\sum_{i=1}^N p_{ik} q_{iE}}{\sum_{i=1}^N p_{ik} q_{iA}}$) which would be necessary for other types of average to avoid bias.

If the basic data is incomplete the average quantity q_{iE} will be replaced by:

$$q_{iE}^{(R)} = \sqrt[k]{\prod_{\alpha=1}^K V_{i\alpha} P_{R\alpha}^i}$$

where R is a reference country chosen from among the K. It should be noticed that the parities for each individual position ${}_k P_R^i$ must be transitive. Parities between countries will then be calculated as follows:

$${}_k P_j^i = \sum_{\alpha=1}^M {}_k P_j^{\alpha} q_{iE}^{(R)} / \sum_{\alpha=1}^M {}_k P_k^{\alpha} q_{iE}^{(R)}$$

The results are of course independent of the country chosen as R. For two countries R1 and R2 we have:

$${}_k P_j^i (R1) q_{iE}^{(R1)} = {}_k P_j^i (R1) \sqrt[k]{\prod_{\alpha=1}^K V_{i\alpha} P_{R1\alpha}^i} = \sqrt[k]{\prod_{\alpha=1}^K V_{i\alpha} P_j^{\alpha} (R1)}$$

$${}_k P_j^i (R2) q_{iE}^{(R2)} = {}_k P_j^i (R2) \sqrt[k]{\prod_{\alpha=1}^K V_{i\alpha} P_{R2\alpha}^i} = \sqrt[k]{\prod_{\alpha=1}^K V_{i\alpha} P_j^{\alpha} (R2)}$$

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