

*Statistical requirements for  
the measurement of the change in the volume and the price  
of trade services*

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## 1. Introduction and problem statement

The product of trade activity consists of a service of making available, for the users, goods which are not produced by the enterprise which sells them. This trade service is characterised by a whole group of complicated processes of transport, storage, distribution, presentation, etc. It can assume many varied forms.

In a competitive economy, the value of this service is measured by the gross margin, which is basically the difference between the value of goods sold and the value of goods purchased. To be more specific, one could write:

$$\text{Gross Margin} = \text{Sales} - \text{Purchases} + \text{change in stocks.}$$

It is interesting to measure the changes in the value of the trade service and, as it is for all "service-products", to analyse it through its two component parts - volume and price.

An INSEE (France) contribution, presented in this meeting by M. Picard, shows how this analysis will proceed. Finally, it will lead to the definition of the change in the price of trade services, as the product of the change in the price of the whole group of products sold, by the change in the rate of gross margin, for a precisely specified form of sale.<sup>1</sup>

This document aims to define which conditions should be met in order to obtain comparable measures in a number of countries. Reference is made to the "Trade" chapter of Eurostat's methodological manual on service statistics.

There are two kinds of conditions:

- First of all, a nomenclature is necessary which is capable of isolating those forms of sale corresponding to a specific product-trade service.
- Secondly a statistical observation system is necessary, making available the quantitative variables needed to calculate the volumes and prices of trade services.

These variables are:

- a) Turnover
  - of which "the turnover realised by purely commercial trade operations";
- b) the analysis of trade turnover by product categories;
- c) the value of purchases of products for resale;
- d) the change in stocks of products for resale;
- e) the selling prices of the goods.

<sup>1</sup> A prior reading of the INSEE contribution is necessary to fully understand this document. However, a concise definition of the price index of trade service is presented in annex 1.

"Variables" a, c and d" are necessary for the calculation of the gross margin. Variables "b" and "e" are necessary for the preparation of price indexes allowing the activity by volume to be attained. The relationship between the change in the margin ( $\Delta M$ ) and the change in the activity by volume ( $\Delta V_0$ ) will, in turn, give the change in the price of the trade service ( $\Delta p$ ).

## 2. Requirements concerning nomenclature

It is necessary to have a classification system available which is closest to the forms of sale i.e. the types of trade service provided. Firstly it is advisable to make a distinction between wholesale and retail trade.

- 2.1. For the former, the type of trade service provided depends heavily on the nature of the products sold. The sales formula called "cash and carry" is not sufficiently widespread to be taken as an operational criteria for data collection or for the classification of statistical units (enterprises or local units). However, if the structural surveys showed that, for any one product category, the "cash and carry" formula had become important (e. g. concerning 20 % of turnover), it would be advisable to separate it because it corresponds to a particular "volume-price" analysis.

For wholesale trade, therefore, ISIC Rev. 3 or NACE Rev 1 to 3 digits can be retained as a nomenclature of forms of sale.

- 2.2. On the contrary, retail trade poses the problem of a subdivision of the ISIC or NACE.

The ISIC or NACE can provide a satisfactory starting point as they allow the distinction between:

- retail trade in stores;
- retail trade not in stores;

For the former, ISIC and NACE make the distinction between retail trade in non-specialized stores and in specialized stores, each being subdivided according to whether or not food products predominate. For the latter a distinction is made between sale by mail order, sales in markets and other forms of sale outside stores.

This structure permits the introduction of an analysis of trade by form of sale and this is indispensable for the "volume-price" analysis.

For retail trade in non-specialized stores with food predominating, at least the following forms should be introduced:

hypermarkets  
supermarkets  
mini-markets  
traditional grocery stores  
retail trade in deep-frozen food products.

For retail trade in non-specialized stores where food is not predominant, a distinction will be made between the following forms:

Department stores

Other non specialized stores where food is not predominant.

We say "at least" because depending on the country, forms of sale might have to be considered as, for example, "magasins populaires" in France, or "variety stores" in anglo-saxon countries.

On the other hand, some groupings can work for retail trade in stores specializing in food products (one single position suffices) or in non-food products (2 or 3 positions would suffice).

Each country will be left to choose the appropriate forms of sales which seem to correspond to specific and sufficiently important "service-products": enterprises managing "specialized large stores" should be, for instance, distinguished in several countries.

Below a suggested nomenclature adapted to the "volume-price" analysis is presented.

NACE REV 1		ISIC REV 3
521	Retail sale in non-specialized stores	521
52.11	Retail sale in non-specialized stores with food, beverages and tobacco predominating Hypermarkets Supermarkets Minimarkets Traditional grocery stores	52.11
52.12	Other retail sale in non-specialized stores Department stores Other non-specialized stores	5219
52.2.	Retail sale of food, beverages and tobacco in specialized stores	522
52.3	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	523
52.31 52.32&3	Dispensing chemists Retail sale of medical goods, cosmetics and toilet articles	5231 5231
52.4	Other retail sale of new goods in specialized stores	523
52.6	Retail sale not in stores	525
52.61	Retail sale via mail order houses	5251
52.62	Retail sale via stalls and markets	5252
52.63	Other non store retail sale	5259

### 3. Requirements concerning the statistical units.

For the "volume-price" analysis the local unit will be the most appropriate statistical unit, being the nearest to forms of sale. If, therefore, all the necessary variables could be obtained in one country from the local sales units, this would be the best opportunity to fully understand the change in the price of the trade service.

However, in most countries, the local unit cannot provide the necessary variables, in particular the breakdown by activity of the turnover, that of the goods, and the change in stocks for resale.

This is why the "Trade" chapter of Eurostat's methodological manual on service statistics recommends the enterprise as the main statistical unit. It is true that an enterprise can manage a number of local units carrying out different forms of sale. However, a certain specialization does exist. Large enterprises specialize in the management of "hypermarket" type stores, others in the management of department stores. Classification by main activity means it is possible that the recorded variables will be influenced by one predominant form of sale, and will thus correspond to a given trade service.

### 4. Conditions relative to the observation of the variables

The necessary variables were specified in the introduction. They are for each sectors of the retained nomenclatures:

- a - the turnover realised in activities of buying and selling without change;
- b - the breakdown of this turnover by product;
- c - the value of purchases of goods for resale;
- d - the change in stocks of goods for resale;
- e - An index of the selling price of the goods which make up the turnover of each of the retained sectors:

This list assumes the existence of the following in the countries considered:

- 1 - Annual sample surveys on enterprises, or on local units, in order to obtain variables a, b, c, d;
- 2- An observation of selling prices by product;
- 3- Statistical instruments or national accounting methods which ensure that annual changes are reliable.

#### 4.1. The variables used in the surveys

The necessary variables appear in Eurostat's sectoral manual "Trade". They are variables 8 (Turnover); 8a (Turnover by product and by activity); 13a (Purchases of products for resale), and 30a (change in stocks of products purchased for resale).

These variables allow the calculation of the turnover and of the gross margin (equivalent to the value of the trade service).

Variable 8a (turnover analysed by activity and by product) is indispensable. The obtaining of this variable assumes that the data, by value or by percentage, has been collected from the statistical units (enterprise or local unit) for each sub-sector retained by the classifications system. The use of the C.P.C., or better, of the C.P.A. would permit a better comparison between countries but it is important that the products correspond to the nomenclature used in the country for the observation of retail prices.

The breakdowns which could be proposed to enterprises managing "Department stores" as well as to wholesale textile, clothing and leather enterprises (NACE Rev. 1 5141 et 51.42), in order to break down their turnover, are presented in annexes 2 and 3.<sup>2</sup>

#### **4.2. The observation of the prices of products sold**

A distinction must be made between wholesale and retail trade.

##### **4.2.1. Wholesale trade**

When indexes of the prices of products sold are available, it suffices to compile a price index for each subsector which allows the turnover to be deducted.

Unfortunately, very few countries have such indexes. In this case, the problem is insolvable, unless draft price indexes are available within the framework of the creation of "input-output" tables.

##### **4.2.2. Retail Trade**

Every country has indexes available for the price of household consumption. The prices of retail sales of commercial products are the object of detailed study. Therefore, for each sector or sub-sector, an annual price index can be compiled, weighting the elementary indexes of the price index by the weight of each product in the sector's turnover.

#### **4.3. Ways of ensuring consistency of time series.**

The "volume-price" analysis assumes that reports on the changes in the variables for two consecutive years can be drawn up, and thus that the margin of error which exists throughout the levels observed in the surveys can be reduced.

Two methods exist, which will merely be mentioned here:

- either maintaining, at least partially, the sample's content for two successive annual surveys;
- or using data which is presented in the national accounts.

<sup>2</sup> These annexes 2 and 3 are adapted from the questionnaires used in the annual french enquiry on distributive trade.



As far as the first case is concerned, it is important to remember that the sample surveys recommended by Eurostat in its programme, are exhaustive for one part of the sample (large commercial enterprises, for example those with more than twenty people employed). For this part, the coherence of changes in annual values is assured. For the other part, it is sufficient to renew only half the sample, and to compare the changes in the variables obtained for the same enterprises.

As for the second case, the compilation of a "satellite account" for "Trade", linked to the central national accounts, is a very useful exercise in order to measure annual changes in the sector. When it exists, the measurement of prices and volumes for trade services becomes much easier and more reliable.

##### **5. Specific problems concerning commercial trade by non-commercial businesses.**

In a modern economy, enterprises tend to vary their activities. Many enterprises belonging to the manufacturing or services industries are involved in the purchasing and reselling of goods. It would be perfectly legitimate to think that a trade service provided by a non-commercial business will present certain characteristics, concerning the size of the gross margins and their changes both in volume and in price. Commercial operations carried out by non-commercial businesses (according to their main activity) can influence the "volume-price" analysis of trade services. Therefore, it is interesting to study them both at micro and at macro-economic level.

Does the European system on the whole of the productive sector, set up by Eurostat, allow this study?

The reply is positive as far as the necessary accounting variables are concerned.

For service industries, the "General Framework" foresees that from now on, the turnover, the purchases and the stocks concerning operations of resale without change, should be distinguished. For manufacturing industries, the manual which is in the process of being drafted and which is based on the fourth directive's accounting conventions, will also allow the same variables to be obtained.

There is much uncertainty surrounding the study of prices. The deflation of the trade turnover assumes a price index corresponding to the composition of this turnover. The surveys envisaged for non-commercial businesses do not foresee the analysis by product of the turnover of these businesses.

But one can assume that in almost all cases, the enterprise's commercial operations will deal with products narrowly linked to its main activity. However, if the realised turnover is large, it is recommended to proceed with a complementary survey on this matter. It is noted that the problem would be solved if the survey covered local units, with a questionnaire containing a framework of analysis for turnover.

However, as the recommendations made for non-commercial sectors stand, only an approximate calculation could be hoped for.

## 6. Conclusion

- A. The programme currently proposed by Eurostat in the "Trade" chapter of the methodological manual should allow the calculation of value, volume and price indexes for trade services provided by businesses whose main activity is trade.

However, this has two conditions:

- 1) that a thorough study of the selling prices of commercial products is available;
- 2) that the classification systems (ISIC or NACE) are refined in order to take forms of sale into account.

These conditions are met in different ways for wholesale and for retail trade.

As far as wholesale trade is concerned, the nomenclature is satisfactory to the extent that the "cash and carry" formula is not very widespread: the form of trade service is dominated by the category of products sold, which are the clue to the nomenclature. On the other hand a study of prices of products sold by wholesalers is not generally available and it is improbable that efforts will be made to develop one.

However, approximate annual measures can be used, which are drawn up by national accountants for the INPUT-OUTPUT tables at constant prices.

For retail trade, however, a study of the selling prices of products sold is available, being the prices of household consumption. If one knows the structure of the trade turnover for products, one can compile price indexes for each sector. On the other hand, the classification systems ISIC and NACE must be refined to bring them nearer to forms of sales. In other words for the "price-volume" analysis of services, it is necessary to create subsectors corresponding to the different types of shop or of sales formula. Progress is by no means impossible, (It depends upon the trade statisticians' will to improve their knowledge) and can be introduced into the statistical system without too much difficulty.

- B. As far as trade services carried out by non-commercial businesses are concerned, we will have to be satisfied with an approximate calculation until such time that an analysis, even summary, of the turnover realised in purchase-resale operations, is introduced into surveys on enterprises within the non-commercial sectors.
- C. Finally, one last condition must not be forgotten: that a coherent chronological series should be available, at least for two consecutive years. This assumes either the use of survey procedures (entirely or partially constant samples) or the use of "national accounting" type methods which lead to "arbitrated" aggregates whose changes from one year to the next are valid, and concern the turnovers, the purchases, the gross margins and the stocks.

## ANNEX 1:

## Concise definition of the price index for the trade service

Let  $r$  be the mark-up rate

and  $T$  the Turnover

for two successive years  $t = 0$  and  $t = 1$

Also let  $\Delta p$  be the change in the selling price

and  $\Delta vo$  the change in the turnover at constant prices or by volume.

This will give:

$$\frac{T_1}{T_0} = \Delta p \cdot \Delta vo$$

$$\frac{\text{Gross margin 1}}{\text{Gross margin 0}} = \frac{r_1 T_1}{r_0 T_0} = \left[ \left( \frac{r_1}{r_0} \right) \cdot \Delta p \right] \cdot \Delta vo$$

$$\left[ \left( \frac{r_1}{r_0} \right) \cdot \Delta p \right] \quad \text{is the price index of the trade service if } \Delta vo \text{ is its volume index}$$

Adapted from "Le commerce en 1987 - Rapport de la Commission des comptes commerciaux de la Nation" June 1988. In "INSEE collection", series c n° 152 October 1988. Page 61 note (7).

## ANNEX 2: PROPOSED TURNOVER ANALYSIS FOR ENTERPRISES MANAGING DEPARTMENT STORES

PRODUCTS RESOLD WITHOUT CHANGE

Breakdown into  
national  
currency or as a %

RETAIL SALES (resales to individuals)

Clothing	Clothing (clothes, shirts, underwear, hosiery, haberdashery).
textiles	Shoes.
Leather	Leather goods (including gloves, presents).
	Household textiles, carpets.
	Furniture, bed linen.
	Materials, taps and valves, sanitary equipment, wood and joinery for the household.
	Cutlery, household utensils, glassware, crockery hardware, do-it-yourself and gardening equipment.
Household	Ironmongery, maintenance products, paints and varnishes, wall papers, plastic coverings.
equipment	Household appliances and electric household appliances (heating, cookers, refrigerators,
maintenance	washing machines, small electric household appliances, electrical supplies).
	Radios, television sets, tape recorders, record players, and records, magnetic tapes.
	Crockery, pottery, glassware, lighting, sewing and ironing machines, musical instruments
	other household articles and equipment.
	Perfumes, cosmetics, medical goods.
	Motorcycles, bicycles and accessories, spare parts.
	Stationery, office supplies, newspapers and magazines, old books.
Hygiene	New books
Culture	Photography, cinema, optics and films.
Leisure	clocks and watches, jewellery.
	flowers, seeds and pets.
	Sports and camping equipment.
	Other non-food products (weapons, games, toys, fancy goods)
	Food products

WHOLESALE SALES (resales to tradesmen and other professional users) Specify:....

MOTOR VEHICLE TRADES and SERVICES (sales of fuel and lubricants, other garage activities)

OTHER ACTIVITIES (industrial production, repairs...) Specify:....

TOTAL

# ANNEX 3: PROPOSED TURNOVER ANALYSIS FOR WHOLESALE TEXTILE, CLOTHING AND LEATHER ENTERPRISES

INDUSTRIAL, ARTISANAL or AGRICULTURAL PRODUCTION (including the wholesale wool trade)

Preparation and trade of wool, removal of wool

Other productions. Specify

Breakdown in National currency  
or in %

PRODUCTS RESOLD WITHOUT CHANGE

WHOLESALE SALES (resales to tradesmen and other professional users, excluding sales on commission)

Crude natural and synthetic fibre textiles, half finished textiles, threads and yarns, bags, ropes.

Crude leathers and hides.

Worked leathers and hides (except articles prepared in leather and hide).

Worked leathers and hides (except articles prepared in leather and hide).

Fur skins and furs (except articles prepared in fur skins and fur)

Men's clothes 1.

Women's clothes 1.

Shirts, underwear, hosiery, babywear (except children's articles).

Children's clothes.

Haberdashery, knitting wool, tailor and dressmaking supplies.

Hats, other clothing accessories except gloves and umbrellas.

Shoes and other footwear.

Leather goods, travelling accessories, presents, gloves, umbrellas.

Clothing materials.

Furniture materials, curtains.

Sheets, household linen, blankets.

Carpets, rugs.

Other articles (sports, camping, furnishings) Specify...

RETAIL SALES (resale to individuals)

Clothing (except clothing materials).

Furniture materials, sheets, household linen, curtains, carpets, rugs.

Other products. Specify:...

COMMISSIONS RECEIVED ON (2):

Raw material textiles and semi-finished products.

Textiles, clothing, shoes and leather goods.

Other products. Specify:...

SERVICE SUPPLIES and other activities Specify:...

TOTAL

1 Including coats, raincoats, sports and work clothes, rubber, plastic, leather, hide, fur clothes.