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Use and Significance of Classifications for Retail Trade

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*Roberto Gismondi*¹ - ISTAT - ITALY

1. Problems with classifications: an overview

One of the main problems that many analyses on enterprise statistics has to face today is the difficulty to evaluate the loosing of information suffered moving from micro-data to macro-data: these aggregates, substituting the total set of elementary data summing up their informative content, are defined on the basis of a list of items, collected in a general frame that we usually call a statistical classification.

In reality, not always this informative content is reproduced in its total part: during the passage from the elementary data to the aggregated ones a lot of relevant information can be lost; in other words, a part of *not observable heterogeneity* is the implicit cost of using a synthetic of elementary indicators, in terms of unobservable different individual behaviours.

The economic classifications play a fundamental role: among the different inspiration criteria, there is one given by the possibility, at least in theory, to describe the different dynamics about particular groups of elementary units, pooled by the belonging to the same typology.

This typology can depend on the sector of economic activity, the localisation, the number of persons employed, and/or other characters specific of the dominion of relevant information.

But, in practice, two big problems must be faced:

1. not always, as it was said before, a classification can reflect the behavioural differences among the various groups of units, because of the presence of very different units in the same class; symmetrically, classifications with an high breakdown could appear redundant, and they could in reality be approximated by more basic but equally informative breakdowns.
2. Generally speaking, the classifications adopted at international level cannot describe the real form of competition among enterprises, because they do not reveal, only in one side, the real entity of the competitor markets. For example, if we classify retail shops in large distribution and traditional shops we implicitly accept the idea that the competitors belong to different classes, whilst the newest competitions arise and develop inside particular groups of enterprises originally similar, but in reality developing toward new internal profiles and market strategies.

In addition, for year 2002 EUROSTAT foresees an update of the official NACE and CPA² regulations following a revision of HS (Harmonised System) in 2001. This update should concern only broadly agreed and indispensable amendments, since no new Council Regulation – necessary in order to introduce more significant revisions – will be possible before year 2007.

¹ Roberto Gismondi (Gismondi@istat.it) is senior researcher in ISTAT, where he is responsible for the Unit “Short-term Indicators for the Service Sector”. ISTAT is not responsible for the opinions herein expressed, that must be attributed to the author only, as well as possible mistakes.

² They are, respectively, the EU versions of ISIC Rev.3 (dealing with activities) and CPC (dealing with products), valid worldwide. EUROSTAT will work towards agreement with UN on a common time-schedule for updates/revisions of ISIC/CPC and NACE/CPA.

The exact scope of the revision will depend on the future evolution of the linked classifications as well as user needs. The main issues will be dealt to: a) improve the classifications from a methodological point of view; b) take into account some pressing proposals from users; c) correct a number of inconsistencies.

In the meantime statistical agencies must face a growing demand for data on both the supply and the demand for services, which cannot be fully satisfied by the use of present economic classifications. Although NACE Rev.1 dates from 1993 and CPA was revised in 1995, they do not adequately respond to the quickly growing and changing service sector.

Following EUROSTAT (1999.2), the main reasons for such a long time necessary to improve official classifications are the following ones:

- changes in the real world are detected only some years after their start-up;
- additional years are needed in order to guarantee a general agreement of a sufficient number of countries on the new classes to be added or modified;
- additional time is needed in the EU legal system to legally adopt the new classification;
- more time is needed to practically implement the new classification and convert time series.

As a consequence, some fundamental questions are:

1. what and why should we change anything?
2. Is the creation of new items (or a deeper breakdown of previous ones) really useful for a better comprehension of particular economic sectors?
3. Are there specific tools to evaluate the overall quality of a classification?

Being these topics too wide and difficult to be herein fully discussed, we decided to focus the attention on the third question that, as we'll try to show, it's fundamental to take good decisions concerning questions 1 and 2 as well.

In particular, the above mentioned problems are quite important when we analyse economic sectors particularly relevant for the whole economy. One of these is certainly internal trade: the overall weight in terms of number of enterprises of NACE 50 (retail trade of vehicles and fuel), 51 (wholesale trade) and 52 (other retail trade) is equal to one third in Italy and about 29% in the EU. Moreover, EU estimates of trade account for some 13% of total value added, and among Member States this percentage varies from 9% to 17%.

Following previous researches on this field, in this paper we go more in depth for what concerns different ways of building-up and evaluating a classification (paragraph 2), adding further details for retail trade (paragraph 3). The "core" exercise, presented in paragraph 4, is based on a pilot study, recently carried out in Italy, aimed at crossing retail turnover seen both from the side of the main activity of enterprises (evaluated with NACE Rev.1) and the type of product sold (evaluated with CPA). Finally, in paragraph 5 we draw some conclusions and raise some questions for the Voorburg group, in order to evaluate the possibility to do a better use of available data (often got sustaining very high survey costs) and furnish to users new keys of reading for macro-data.

2. Alternative ways to evaluate a classification

The problem of the choice of a classification has been also faced by Powell-Hill (1997). In that context it was considered fundamental to evaluate: who are the users of data?; What is the underlying philosophy of the classification (for instance, the coding system should be the same for manufacturing and non-manufacturing products?); What is a product in the service sector?; How many aggregation schemes should be defined in advance and should be taken into consideration in developing the product coding system?

Herein we can resume, as a summary, the possible classifications by which economic activities could be analysed in the following five typologies, based on the *main purpose that the classification should satisfy*. Some of them are not exclusive, in the sense that could partially overlap:

1. **one or more standard classifications**. Generally speaking, we can refer to Industrial Classifications (referred to the enterprise) and Product Classifications (referred to the product).
2. **Alternative classifications suggested by users**. We can have: non-standard groupings of standard industries; non-standard groupings of production units; product groupings and groupings involving the breakdown or redefinition of production units; satellite accounts (see point 5 below).
3. **Classifications which implementation guarantees a low response burden for enterprises** (for instance, for retail trade the rather trivial, but anyway relevant distinction between food and non-food sales).
4. **Some *ad hoc* classifications, optimal from some statistical point of view**: for instance, the above mentioned derived classifications (see following point c).
5. **Classifications significant from an economic point of view** (e.g., the ones useful for the satellite accounts purposes or for identifying the consumption functions)

On the other hand Monducci (1998), referring to enterprises, suggested a breakdown of classifications by *main source of information variability*. In this case - mostly concerned with an “enterprise” approach rather than a “type of product” one - if it’s necessary to individuate some grids by which the phenomena to study can be segmented, we can refer more in detail to:

- a) **classifications external to the enterprise**, that are based on information related to objective elements and independent to the enterprise peculiarities: economic destination of the production, prevalent technological content of the production, rate of sector concentration, different key reading on the territory, and so on.
- b) **Classification internal to the enterprise**, based on different firm configuration, evaluated on the basis of absolute terms or in relation to information referred to other groups of enterprises: international spread, economical-financial performance, profitability, and so on.
- c) **Derived classifications**, especially based on the use of multidimensional data analysis techniques.

Generally speaking, the classifications concerning the previous points from 1 to 3 are concerned with type a, while there is a strong link between typologies 4 and c on one hand, and 5 and b on the other.

As a consequence, tools to evaluate the goodness of a certain classification depend on its main purpose and underlying philosophy. The exercise proposed in paragraph 4 is based on the main above mentioned purposes 1 and 5, so as on typology a) for what concerns the source of data variability. Other examples will be given in the following sub-paragraphs.

2.1 Standard classifications

The actual main EU classification of activities (NACE Rev.1) stratifies retail trade enterprises according to their “prevalent activity”, on the basis of the typology of products, i.e. the “physical” characteristics of the goods sold and, but only to a lower extent, the type of sale-service offered to clients, mostly limited to the specification of the type of outlet in which sales have been done. As recalled by Knight (1998), there is a problem in defining which variable should be used to determine the main activity of an enterprise (turnover, persons employed, value added,...). Some weak points of NACE seem to be the following:

- it doesn’t highlight the overlap between type of product and type of sale service both affecting

the overall sale activity.

- Misclassification problems often occur. It is not seldom to find stores (especially not-food stores) that according to their size and sale area are classified among small retailers, even if the products sold are shown to the clients according to some characteristics of the large-scale distribution, such as self-service, counters at the exit, and so on. Moreover, the belonging to any associative form (buying groups, voluntary chains, co-operatives, franchising) could hardly stress this problem because associated enterprises seem to perform quite differently from the others. We remind that the associative forms are totally excluded from the existing EU classifications³, being considered as groups of enterprises.
- The concept of “specialisation” is sometimes not realistic. As a matter of fact the split by prevalent activity derived from NACE Rev.1 can not necessarily reflect the real composition of goods and commodities sold by the enterprise; this is particularly true for mixed and not-specialised enterprises and it complicates performance analyses, especially as far as not-food enterprises are concerned.

2.2 Classifications suggested by users

Following Nijhowne (1997), we can recall that businesses think of the producers of a particular group of products as constituting an industry. When they are interested in the market for particular products and in analysing market share, they may describe that group of products as “an industry” and form a Trade association to look after their interests. A business can belong to as many “industries” as the products that it produces.

A particular and simple classification, thought for the monthly retail sales survey, is currently used by ISTAT in addition to NACE Rev.1 (and to ATECO 91, the Italian classification equivalent to NACE up to four digits), that remains the basic classification from which this special one is derived. This *ad hoc* classification is based on 15 groups of products (plus three additional groups for not specialised stores and sales by mail) - easily linkable to NACE classes - and is the result of continuous contacts with category associations, users, traders, research centres, national accounts experts and the enterprises themselves.

In any case, users’ needs seem to be more addressed to timeliness than to breakdowns by sector or geographic area, and this is true for the majority of Italian economic sectors.

2.3 Low response burden

As a matter of fact, while statistics are quickly moving towards a more and more wide and integrated International Statistical System, the need to contain the statistical nuisance is forcing many countries in developing strategies aimed at using all the existing statistical data and at limiting the recourse to new surveys if not strictly necessary.

As a consequence, serious problems of coherence between standard classifications and available breakdowns of data often occur: a very common case concerns the increasing recourse to administrative data that, not being originally thought to satisfy statistical needs, present serious problems of inconsistency with standard definitions and classifications.

Moreover, when a statistical survey is going on, respondents often accept to collaborate with the statistical agency only if data can be furnished in the same format they use for their businesses, without any particular care about the linkage with standard classifications.

So the choice of a classification could completely be done on the basis of its probability to be implemented in practice in survey frameworks. For instance, in retail trade a common format for quick data spread out as preliminary results could be limited to the dualism between food and not-food products, as far as the recourse to administrative VAT data in tourism statistics obliges to limit the calculation of output indicators to the whole “hotels” category, without any detail concerning

³ But in CPC we have the item 625: “Retail trade services on a fee or contract basis”.

the presence of a restaurant or the number of stars.

2.4 Statistical optimality

As said yet, an evaluation on the informative impact of a classification can be reached using an approach referred to the inevitable losing of information determined by the recourse to groups of enterprises, activities or products instead of the individual micro-data.

It can be stated that, *coeteris paribus*, the informative level of a classification, fixed a certain character to study, will be as greater as higher is the variance of this character varying the modalities of the adopted classification. That can be explained by the fact that a classification characterised by modalities individuating a very steady phenomenon is not able to add any type of information respect to the phenomenon itself.

From this point of view an optimality criterion for a classification could be based on the degree of variance explained by the classification, referring to a given main variable of interest (value added, turnover,...). From the basic ANOVA model we have the following identity:

$$(TOTAL) \text{ VARIANCE} = (BETWEEN) \text{ VARIANCE} + (WITHIN) \text{ VARIANCE}$$

where the *between* variance is explained by the classification's groupings and the *within* variance is the residual component concerning the degree of heterogeneity inside each group. The losing of information due to the classification criterion can be measured by the ratio between residual and total variance. On the contrary, the informative content of the classification can be evaluated by calculating the statistical significance of the Fisher's *F* test, based on the ratio between the explained and the residual variance and the degrees of freedom concerned.

In practice, this approach is influenced by the implicit hypothesis of normality about the studied character, it doesn't take care of the number of modalities (groups) on which each analysed classification is based and it could often lead to highly significant *F* values even if the informative content of the classification is not satisfying.

However, the class of magnitude of a variance depends highly on the average intensity by which this character appears in the reference dominion; moreover it is however necessary to dispose of a relative *index of informativity*, variable between the minimum value 0 and the maximum value 1 (highest information).

Supposing that our character is not negative, we know that fixed a certain mean *M*, the maximum value of a variance *VAR* is given by the quantity $(n-1)M^2$, where *n* is the number of modalities of the adopted classification (and, therefore, the number of terms on which the variance has been calculated. Modalities could be given by Divisions, Sections, Groups, Classes, Sub-classes and so on). As proposed in Gismondi and Mirto (1998), a "Coefficient of Informativity" (CI) associated to the *i-th* classification can be given by the following formula:

$$CI_i = \frac{VAR_i}{(n_i - 1) M_i^2}.$$

The utility in using a relative index is related to the fact that it is possible to compare coefficients calculated for classifications related to different phenomena (for example, an amount and a variation, or the same amount evaluated in different populations).

For what concerns retail trade, Anitori and Gismondi (1998) proposed an in-depth statistical analysis according to data derived from the monthly retail trade survey. The statistical efficiency of the Italian ATECO '91 (and, as a consequence, of the same NACE '91) was studied using different tools, among which an analysis of variance. It was carried out fixing turnover at the enterprise level as dependent variable and according to different sector breakdown levels, such as categories (5-digits), classes (4-digits) and groups (3-digits). Moreover, alternative *ad hoc* classifications were tested, as the one used by ISTAT based on 15 groups of products and the one requested by

EUROSTAT in the Short-term Business Statistics Regulation and based on 8 groups.

It was quite clear that the “bottom-up” approach, that allows to pass from the 5-digit level to larger groups such as the 4-digit headings or the 3-digit headings, produced a decreasing trend of explained variance. In particular, whilst the 4-digit classes and the *ad hoc* groups requested by ISTAT and EUROSTAT seemed to produce the same results, the 3-digit groups showed to be the less efficient in terms of explained variance, as to confirm that a certain level of detail of products has to be maintained.

2.5 Economic significance

When analysing particular economic sectors, one of the most important needs is the attempt to measure their overall impact on the whole economy, feasible with the recourse to satellite accounts.

For what concerns internal trade, in a recent paper Lancetti (1997) stressed the importance of a more in depth approach to analyse trade activities, remarking the need to link the developments of national accounts and enterprise statistics thanks to a “satellite account approach”.

Among the main goals reachable with the availability of a trade satellite account, some are strongly concerned with the need to manage, use and update *ad hoc* classifications for trade activities. For instance, information needs that we currently must face and that turn out to be strongly related to the recourse to very detailed classifications are the following ones:

- analysis of trade activities by reference to turnover: by NACE group or class; by product; by form of sale; by size class; by type of local unit. A relevant practical example is given by the monthly retail trade indexes currently calculated in Italy by ISTAT.
- “Product-sectors” matrices of sales, or the so called “who sells what” matrices, in order to evaluate: by which sub-sectors is a given category of goods distributed; how do the sales of a given sector break down over different products. On this field ISTAT has taken part to a European project aimed at breaking down retail turnover by type of product sold, and on the basis of its provisional results we could carry out the attempt described in paragraph 4.
- Analysis of distribution circuits and channels, and evaluation of trade margins at each stage of the channel. A good example of such a use is given in Pisani and Piergiovanni (1998), where trade margins have been estimated on the basis of the breakdown of sales by type of product sold.

Finally, all the yet rather exhaustive topics seen above should be viewed and interpreted at a local level, in order to map the territory on the basis of different uses of sales spaces, i.e. going forward the definition and identification of the “trade districts”.

In other words, at the local level the supply of a certain product could be based on a complex mixture of different types of supplies: for instance, if we look at dresses since the end of '80 we can often identify three different “levels” of supply (Fornari, 1989):

- medium-high area, based on *prêt-à-porter* and boutiques;
- medium area, based on traditional shops and department stores, hypermarkets;
- low area, based on discounts, proximity shops, itinerary traders,

whilst no official classification includes a similar taxonomy in its theoretical frames.

3. Particular problems for retail trade

These problems can be divided in two typologies:

1. problems concerning the implementation of given classifications;

2. problems concerning the not availability of (official) classifications for certain purposes

They are strongly connected each other, because difficulties encountered concerning point 1 could depend on the need to define and implement alternative classifications.

Generally speaking, for what concerns trade businesses we recall that the most part of the requests derived from the Structural Business Statistics Regulation (entered into force in 1995) and the whole requests concerning the module C of the Short-term Statistics Regulation (entered into force in 1998) obliges every EU Country to furnish data (amounts or indexes) classified on the basis of the main activity of enterprises (see EUROSTAT, 1998.3 and Gismondi, 1998.2).

As a consequence, it's straightforward to evaluate the rightness and the realism of this principle, strongly linked to the concept of specialisation.

First of all, we must identify the most suitable variable to evaluate the main activity and, then, measure it at the single enterprise level.

Secondly, we must choose the technique by which operate the classification. For instance, United Kingdom uses the "Top down method" (Knight, quoted). The idea is to ensure that the classification given to a unit falls somewhere in the broad area of economic activity with which the business is mostly concerned. After having attributed the value added (or other relevant output measures) to each appropriate Class/Subclass we determine the Section with the largest share, then the Division, the Group and finally the Class/Subclass. As a consequence, it's possible that the Class/Subclass to which an enterprise is coded is not the largest Class/Subclass if the largest Class/Subclass falls to an area which is not the main activity of the business overall.

On the other hand, in Italy (Puglisi, 1996) a "Bottom-up approach" is used, by which first the largest Class to which the enterprise is assigned is determined, and then Groups and Divisions following the prevalence criterion.

With this example it's clear that comparability of data at the international level is, first of all, a problem of homogeneity on how to classify enterprises. It's worthwhile to underline how, at the moment, no official standard indicators for evaluating data comparability are mentioned nor in sector manuals or in Regulations and Directives, even though in the last cases various recommendations are given, more or less, in the form of analyses to be carried out each Country and given to EUROSTAT.

The various combinations of distributive formats and products mixtures derive from the need to apply marketing strategies able to satisfy a more and more requiring and attentive clientele. It follows that the simple dichotomy "specialised" and "not specialised" for a sale point often turns out to be too generic in order to define the real features of the economic activity.

Just to limit our attention to a preliminary, but necessary step forward new classifications rules we should distinguish between the "small and medium surface specialised shop" and the "large specialised shop", which intrinsic profile is rather different.

In the first case we mostly deal with a traditional shop, also called proximity shop, mainly frequented by people living in the neighbourhood and accustomed to the service delivered; for what concerns products, they are mostly "not groceries" (e.g. problematic goods as jewelry, Informatics, particular sports...), for which the service given by employees has a strong influence on the buying decision.

In the second case we often deal with "large distribution surfaces", modern and able to offer a wide variety of products, most of which "groceries" (e.g. not problematic goods as food, beverages, other not-food first necessity goods).

So it's clear that the concept of specialisation is not synonymous of modernity, because it's not so strictly linked to the sale surface, whilst in the official classifications we can just find references to the trade-off based on the degree of specialisation, by which frequent mistakes could occur.

If it's too difficult to take directly into account, in a retail trade classification, statistical measures as surface, localisation and type of clientele, we could recommend the recourse to economic classifications based on different concepts of specialisation. Herein we propose three possibilities (Pellegrini, 1996):

1. **specialisation by type of product.** In a traditional sense, it overlaps with what derived from the main activity of enterprises. In a modern sense, it can lead to the "shops by theme", with only one product or one "line" of products. The first proposes assortments based on all the families of goods able to "recall" the selected theme to clients (for instance, travelling, gifts...). The second ones restricts the assortment to one typology or one line only (for instance, history books, bonsai plants, videogames...), based on the possible highest number of references, in order to propose an exhaustive supply on the selected topic.
2. **Specialisation by consumption function.** the basic criterion is the complete satisfaction of the buying needs connected with a particular consumption function. The large specialised surfaces are the main suppliers of such kind of assortments: we can think to bricolage, furniture and appliances for the house, gardening, sport articles, toys, electronic tools for domestic use. The strongest point is the possibility to view in one occasion only a wide set of goods related to the same consumption function.
3. **Specialisation by opportunity of shopping.** assortments are built-up depending on the opportunity of clients to go shopping. An example is given by the convenience stores annexed to fuel stations, which assortment has the only constraint to be suitable for the possible opportunities of shopping of people in travel: parts and accessories for cars are sold in the same place and at the same time with food products and other credit and telecommunications services.

Additional lack of details were stressed by INSEE (1999): in March 1999 M. Lemaire submitted to EUROSTAT a document concerning some additional information useful to evaluate trade activities but not asked in the SBSR. Among them we recall:

- a) breakdown of enterprises based on the type of clientele: for instance, breakdown of sales to private and professional users (in this way a better alignment between turnover got from enterprises and household consumption could be achieved);
- b) breakdown of turnover for the only enterprises associated with others;
- c) breakdown of enterprises by type of retail outlet owned (and, as a consequence, the corresponding breakdown of turnover by type of outlet. This information is fundamental to evaluate the degree of concentration of the market);
- d) breakdown of turnover by type of product sold;
- e) breakdown of turnover by trade mark.

We add to the previous list:

- f) breakdown of enterprises by type of link with others (no link, franchising, buying group, voluntary chains, localisation in a shopping centre,...). The Italian empirical evidence shows how better performances can be achieved, *coeteris paribus*, by associated enterprises.
- g) breakdown of enterprises by type of telematic appliances (no informatic tools, personal computers, mainframe,...).

For what concerns point c, ISTAT succeeded in linking data coming from its ASIA archive and from the Ministry of Commerce and Industry, and at the moment 1996 data are available. For point e the build up of the trade satellite account is going to an end in next November, while referring to point d, an attempt is presented in the next paragraph.

4. Links between NACE and CPA

Coming back again to Nijhowne (quoted), we can state that the same product may be produced by more than one industry because it may be both the principal product of one industry and the secondary product of another, but also because industries may be defined in terms of the production process used.

As a consequence, additional information is needed about the typologies of products sold by retail enterprises preliminarily classified on the basis of the prevalent activity criterion. In other words, the same enterprise, when selling highly different types of products, should be “counted” as many times as the different consumption functions dealt with. In this regard, EUROSTAT has been trying for some time to promote among the member States application of the CPA classification (based on the “type of sale-service” rather than on the type of product marketed), together with the NACE Rev.1 classification.

Moreover, as yet mentioned, national accounts needs steer the availability of a breakdown of retail turnover by product in order to estimate trade margins. The preliminary attempt carried out in Italy by Pisani and Piergiovanni is fully integrated in the Business Statistics Approach, as recommended by the GNP Committee. In this way the evaluation of hidden economy on the tradable goods (demand side) is strictly coherent with the evaluation of hidden economy concerning commercial enterprises (supply side); furthermore, using the margins matrix we can perform an accurate coherency check balancing the supply and demand side estimates within an input-output framework.

Moving from National Accountants’ needs to short-term statistics, we have to face the choice of how calculating the monthly sales indexes: on the basis of the enterprise’s prevalent activity only (each enterprise is used only once for the calculations, on the basis of its unique or main activity), or utilising the same enterprise as many times as the kinds of products in relation to which not-null sales have been registered in the reference period? The choice depends strictly on the degree of correspondence between the enterprise’s main activity resulting from the available extraction list, and on the degree of precision with which the prevalent activity fully expresses the actual typological array of products sold. From the Italian experience, we found that *the choice leads to different results*. This is mostly due to the fact that, *coeteris paribus*, the retail trade enterprises selling more than one type of products (typologies were analysed on the basis of CPA at 4-digits level) show a better performance than the others.

Given these premises, the main purpose of the project “Breakdown of Turnover by Product”⁴ was to provide statistics concerning the subdivision of retail trade⁵ enterprises income for the year 1997, according to the kinds of goods sold. This kind of information is in great demand, for several reasons:

- it provides information on the markets for different products, the channels for distribution of goods and the degree of mixed activities in the enterprises; in other words, it’s fundamental to evaluate market shares.
- It gives the basis for establishing price indices for distributive trades and for the assessment of activity codes for enterprises.
- Furthermore, it is important for National Accounts, giving input to estimation of trade margins – as yet mentioned – for different products and for checking and improving household consumption figures.

The basic idea consists in designing a matrix in which the lines bear the CPA categories, and the columns the NACE classes, evaluating the weight in terms of turnover of the non-diagonal terms of

⁴ EUROSTAT: Contract n. 8471007: *Statistics for the breakdown of turnover by product for retail trade enterprises*. The comments contained in this paragraph are based on provisional data, elaborated by Anna Rita Giorgi.

⁵ EUROSTAT is going to launch a further pilot study concerning the breakdown by product for wholesale enterprises.

this matrix, which comprehensively represents the degree of “imprecision” of a classification of commercial enterprises based solely on the NACE prevalent sales activity.

In practice, columns concern “who” is selling and rows “what kind of sale service” is sold to clientele. This is not a trivial problem, also because it may have a direct impact on the meaning of business economic data classified by the main activity of enterprises, on the correct calculation technique of a sales index and on the evaluation of trade margins as well.

Addressing to EUROSTAT (1998.1) for additional details, we only recall that ISTAT managed the project following an action plan based on three steps: use of data already available; use of additional data available by a new *ad hoc* survey; estimation techniques. Near one year of work was necessary to carry out such an experiment, which result will be elaborated at the EU level and officially diffused as soon as possible by EUROSTAT.

Anyway, what should be strongly underlined before evaluating whatever classification frame is the problem concerning the uncertainty about right classification of enterprises in term of main activity, as it comes from the original statistical archive. At the moment, the main activity assigned by register(s) couldn't be the (only) one that the enterprise manages.

This circumstance can depend on two main causes. The first is internal to the body in charge to update the register (in this case ISTAT itself), because the updating process could be too slow and the information derived from the archive too old. The second one is due to the fact that many enterprises - especially the smallest ones - are involved in continuous changes and transformations by which they try to remain in the market and are statistically difficult to be monitored in the short-medium term: one example is given by repair services, in Italy often more oriented to retail trade (like in the case of repair of shoes) or installation of electrical household equipment (like the case of electricians).

In this study we considered:

- for what concerns the classification of enterprises, all NACE Rev.1 classes (4-digits) for Division 52 (Retail Trade);
- for what concerns the classification of products, all CPA categories (5-digits) for retail trade and, in addition, a few items related to wholesale trade and retail trade of cars, parts and accessories, fuel.

In this context we didn't take into account wholesale and retail trade of cars and fuel, so that we managed 25 5-digits CPA categories; moreover, since the specialisation concept is the fundamental topic to be discussed, we also rejected not specialised stores (NACE 52.1); because of the impossibility to establish a direct link among CPA and the product sold by enterprises classified in NACE groups 52.5 (second hand goods) and 52.6 (sales outside shops), these groups were excluded as well, so that 22 final NACE classes were taken into account.

The complete table where turnover concerning retail enterprises belonging to 22 NACE classes is broken down by 25 types of products classified using CPA categories is reported in the appendix (table 6.1), containing also a statistical resume of its main contents (table 6.2) and a *legenda* for NACE and CPA.

The most relevant results are due to the strict correspondence between NACE and CPA (in practice they overlap until 4-digits level).

From now on, x_{ij} will indicate turnover concerning the enterprises classified in NACE j and related to product i . Having been excluded not specialised stores from the analysis, global supply and demand of goods are both equal to x , while x_i is the global demand of product i and $x_{.j}$ is the global supply offered by the enterprises classified in activity j . Looking at figures, some remarks are necessary on the following aspects, up to now scarcely analysed in practice.

Weight on total supply. It's given by the marginal figures by columns, in absolute (d) or relative figures (k); in symbols $x_{.j}$ and $x_{.j}/x$ respectively.

Weight on total demand. It's given by the marginal figures by rows, in absolute (e) or relative

figures (l); in symbols x_i and x_i/x respectively.

Supply specialisation index. It's based on the diagonal terms of the matrix in absolute figures (a) or relative figures (f): in this case is given by the ratio x_{ij}/x_j . When it's equal to 100 turnover of a certain NACE class (type of supply) is due to the correspondent type of products only.

Demand specialisation index. Itself is based on the diagonal terms, but in relative figures (g) is given by the ratio x_{ii}/x_i . When it's equal to 100 global demand concerning a certain type of products is satisfied by enterprises of the correspondent NACE class.

Moreover, in the matrix each diagonal term has been put in boxes, the highest supply except diagonal (maximum by columns) in bold character and the highest demand except diagonal (maximum by rows) underlined. Dotted lines identify NACE 3-digits diagonal blocks. The main results have been resumed in the next scheme.

Significantly lower level of specialisation for food industries (and products). This result is evident, because of the presence of many not diagonal terms inside the dotted box identifying food industries and products. Supply specialisation indexes range in a very narrow interval, going from 8,0% (52.23: fish, crustaceans and molluscs) to 31,9% (52.27: other food products); more heterogeneous is the behaviour of the demand specialisation index, going from 3,1% (52.24: bread, cakes, flour and sugar confectionery) to 100,0% (52.26: tobacco products). Moreover, in many cases the weight of highest supply (except the diagonal term) is higher than the diagonal: this happens for NACE 52.21 (fruit and vegetables), 52.22 (meat and meat products), 52.23, 52.24, 52.25; the same effect occurs from the product side, because the weight of highest demand (except the diagonal term) is higher than the diagonal for CPA 52.21, 52.23, 52.24, 52.25 and 52.27. From table 4.1 - in which a resume of table 6.1 using 3-digits NACE and 3-digits CPA only is proposed - better results can be achieved (the supply and demand specialisation indexes are equal, respectively, to 95,3% and 91,5%), meaning that the concept of specialisation for retail trade food shops is practically relevant only at the very raw 3-digits level. In any case, a very particular case is given by tobacco products.

Enterprises classified as specialised in NACE 52.26 (retail sales of tobacco products) are quite not specialised. It's evident from the column corresponding to 52.26: we have eight products sold different from tobacco, of which seven concerning not-food products. On the other hand there is a complete specialisation from the demand side, since the 100,0% of tobacco products are sold by enterprises classified in NACE 52.26. This is also a valid example of the different meaning of the specialisation concept when applied to enterprises or products.

Food products are significantly sold by retail enterprises specialised in cosmetics and toilet articles (NACE 52.33). On a lower extent, this case is similar to the previous one: we have eleven types of products sold different from cosmetics, which turnover is just relevant for food products. Also in this case there is a complete specialisation from the demand side, since the 97,7% of cosmetics and toilet articles are sold by enterprises classified in NACE 52.33 (the 71,3%) or 52.31 (pharmaceutical goods, with the 26,4%, which features are obviously not so different from NACE 52.33).

Enterprises classified as specialised in NACE 52.44, 52.45 and 52.46 (household equipment and appliances; hardware, paints and glass) are, in practice, not specialised enterprises in retail sales of other not-food products. It's evident from the fact that, excluding repairs, these classes show the highest values of the index i (weight of highest supply except the diagonal) amongst the not-food sector and relatively poor levels of the diagonal terms. This peculiarity is particularly relevant for 52.44 and 52.46, for which we have respectively ten and nine products sold different from the diagonal one, all included in group 52.4. Also in this case, the degree of

specialisation measured from the demand side is quite higher, with the only exception of 52.45.

Enterprises carrying out repairs (52.7) are strongly specialised, except 52.73 (repair of watches, clocks and jewels). In fact, almost the half of their activity is also based on sales of products classified in CPA 52.48.2 (sales of watches, clocks, jewels, sport goods...). This evidence is due to the intrinsic nature of the service delivered; in any case, the weight of this sector on supply (index k) is rather poor (0,1%, the lowest one after NACE 52.32: medical and orthopaedic goods).

Summary: dualism specialised – not specialised and ambiguities in definition. As a final, resuming remark, we can assess an overall goodness of the structure of NACE for retail trade; however, not specialised activities are quickly growing not only in a strict sense (the weight on global demand of NACE 52.1 - concerning not specialised stores and not included in the analysis – is about 33% in terms of turnover), but in a wider sense as well: the proof is given by the above underlined strong presence of not specialised activities in the group 52.4, which weight on global demand (excluding 52.1) is very high and equal to 67,9%, as derived from table 4.1.

Table 4.1 – Breakdown of turnover by product with 4-digits NACE and CPA

Product classifications		NACE Rev.1				TOTAL
CPA	CPC	52.2	52.3	52.4	52.7	
52.2	6222	17.650	1.642	2	0	19.294
52.3	6227	134	<u>15.851</u>	7	0	15.993
52.4	6223+6224+6226	741	71	<u>82.391</u>	337	83.540
52.7	6221+6225	0	0	0	<u>2.536</u>	2.536
TOTAL		18.524	17.565	82.400	2.873	121.363

Diagonal (a)	17.650	15.851	82.391	2.536	118.428
Highest supply except a (b)	741	1.642	7	337	2.728
Highest demand except a (c)	1.642	134	741	-	2.517
Total supply (d)	18.524	17.565	82.400	2.873	121.363
Total demand (e)	19.294	15.993	83.540	2.536	121.363
Weight of diagonal on supply (f=a/d)	95,3	90,2	100,0	88,2	97,6
Weight of diagonal on demand (g=a/e)	91,5	99,1	98,6	100,0	97,6
Average weight [h=avq(f,g)]	93,3	94,5	99,3	93,8	97,6
Weight of highest supply (i=b/d)	4,0	9,4	0,0	11,7	2,2
Weight of highest demand (j=c/e)	8,5	0,8	0,9	-	2,1
Weight on global supply (k)	14,9	13,4	69,6	2,1	100,0
Weight on global demand (l)	15,3	14,5	67,9	2,4	100,0

Legenda

52.2	Food, beverages and tobacco products
52.3	Pharmaceutical, medical products and cosmetics
52.4	Other products
52.7	Repairs

Note

Figures are in EURO (million). Diagonal: figures in box. Highest supply (columns): bold figures. Highest demand (rows): underlined figures.

So, the shortest summary got from the previous remarks sounds as a steering proposal in

favour of a deeper and more frequent quality evaluation of the classifications used to calculate and diffuse statistical data on industries and products. Since the basis of both NACE and CPA is given by the dualism between “specialised” and “not specialised” activities, a conjoint analysis of activities and products, able to cross data as in table 6.1, seem to be fundamental in the next future.

Among the reasons of that, we find the need to measure the information gap paid when a simpler and less analytical classification is used in place of a more detailed one. An example is given in table 4.1, where we packed the same data from table 6.1 in a four by four simpler matrix, identified by the only NACE and CPA groups 52.2, 52.3, 52.4 and 52.7.

Since in this case the global specialisation index raises to 97,6%, the recourse to a more detailed scheme like the one of table 6.1 has an implicit cost equal to $97,6-74,3=23,3$ percent points of additional variability not explained by the specialisation frame implicitly adopted.

Table 4.2 – Breakdown of turnover by product with more detailed NACE and CPA clusters

Product classifications		NACE Rev.1							TOTAL
CPA	CPC	52.2 except 52.26	52.26	52.3	52.41 52.42 52.43	52.44 52.45	52.46 52.47 52.48	52.7	
52.2 except 52.26	6222 except 62228	17.163	142	1.642	0	0	2	0	18.950
52.26	62228	0	345	0	0	0	0	0	345
52.3	6227	0	134	15.851	0	0	7	0	15.993
52.41+52.42+52.43	6223	0	71	33	30.216	348	139	50	30.857
52.44+52.45	6224	0	109	14	377	11.762	492	136	12.891
52.46+52.47+52.48	6221+6225+6226	142	418	24	298	4.466	34.293	151	39.793
52.7	Not in retail trade	0	0	0	0	0	0	2.536	2.536
TOTAL		17.305	1.219	17.565	30.892	16.575	34.933	2.873	121.363

Diagonal (a)	17.163	345	15.851	30.216	11.762	34.293	2.536	112.166
Highest supply except a (b)	1.642	-	134	348	492	4.466	-	7.082
Highest demand except a (c)	1.237	590	262	377	4.466	492	151	7.576
Total supply (d)	17.305	1.219	17.565	30.892	16.575	34.933	2.873	121.363
Total demand (e)	18.950	345	15.993	30.857	12.891	39.793	2.536	121.363
Weight of diagonal on supply (f=a/d)	99,2	28,3	90,2	97,8	71,0	98,2	88,2	92,4
Weight of diagonal on demand (g=a/e)	90,6	100,0	99,1	97,9	91,2	86,2	100,0	92,4
Average weight [h=avg(f,g)]	94,7	44,1	94,5	97,9	79,8	91,8	93,8	92,4
Weight of highest supply (i=b/d)	9,5	-	0,8	1,1	3,0	12,8	-	5,8
Weight of highest demand (j=c/e)	6,5	171,2	1,6	1,2	34,6	1,2	6,0	6,2
Weight on global supply (k)	15,3	0,3	14,1	26,9	10,5	30,6	2,3	100,0
Weight on global demand (l)	14,3	1,0	14,5	25,5	13,7	28,8	2,4	100,0

Legenda

52.2 except 52.26	Food and beverages except tobacco
52.26	Tobacco
52.3	Pharmaceutical, medical products and cosmetics
52.41+52.42+52.43	Textiles, clothing, footwear
52.44+52.45	Household furniture, lighting, appliances
52.46+52.47+52.48	Other products
52.7	Repairs

Note

Compare note of table 4.1.

An intermediate, but still simple and user-friendly scheme is based on particular *ad hoc* aggregations of NACE classes, derived from the above mentioned remarks and in some way connectable to the CPC product classification (United Nations, 1998).

Data are shown in table 4.2, from which it's evident how the recourse to a classification with seven "branches" leads to a global specialisation index equal to 92,4%. Not easy problems remain alive, as the strong exchangeability of the retail activities carried out inside the classes belonging to the NACE group 52.4.

5. Conclusions and questions for the Voorburg Group

In the internal market framework we are facing a development toward new forms of distribution, less defined when compared to the ones considered by NACE (basically founded on the dualism between specialised and not specialised enterprises).

We guess that to analyse a very complex economic sector we need a set of alternative classifications, each aimed to put in evidence a particular behaviour of the population under study, possibly partially overlapping in order to render easier an attempt to reconvert each one into another at a higher level.

For what concerns retail trade, in the light of the results of some analyses yet discussed in previous papers (Anitori and Gismondi, quoted; Gismondi, 1998) we suggest to deeply reflect in order to propose additional classifications that, without replacing NACE at all (it's straightforward that NACE remains the basic reference point in each EU country) could improve our degree of knowledge on the retail trade sector and help us to adopt logical schemes more fitted with the definitions commonly adopted by retail enterprises.

Possible points to be discussed could be the following ones:

- the idea that a predominating activity really exists for any specialised enterprise;
- even if a predominating activity exists, the possibility to assign a predominating relevance to the evaluation of the consumption function that products are designed to satisfy rather than to the types of products themselves, choice that could imply a decreasing importance for the specialisation concept.

Some extreme consequences could be the following ones:

1. getting over the existing rule that uses as exclusive discriminant factors two single trading forms, namely specialised and not specialised retailers, trying to better evaluate new mixed types of retailing;
2. re-classifying some of the typologies using more detailed subdivisions only for those 4-digit headings where empirical evidence shows an imbalance in size confirmed by a high heterogeneity of turnover (as it happens in several 5-digits ATECO, the Italian version of NACE), and on this field EUROSTAT should play a central role in harmonising such subdivisions.

ABSTRACT

In this paper we first propose different ways of building-up and evaluating a classification, adding further details for the retail trade sector. Then we comment the real “core” exercise, based on a pilot study, recently carried out in Italy, by which retail trade turnover is analysed crossing the main activity of enterprises (evaluated with NACE Rev.1) and the type of product sold (evaluated with CPA), with a final attempt to compare CPA with CPC. Main results show that one of the milestones for both NACE and CPA, given by the dualism between “specialised” and “not specialised” activities, in many cases turns out to be rather misleading and less informative than alternative breakdowns more strictly concerned with reality. Reflections on this topic from the Voorburg Group have been steered as well.

RIASSUNTO

In questo *paper* vengono primariamente proposti diversi criteri con cui si può concepire e valutare una classificazione statistica, con particolare riguardo per il settore del commercio al dettaglio. Successivamente vengono sinteticamente illustrati i risultati di uno studio pilota condotto dall'ISTAT e relativo alla suddivisione del fatturato commerciale per attività prevalente delle imprese (valutata tramite la classificazione NACE Rev.1) e tipologia dei prodotti venduti (valutata tramite la classificazione CPA), con un tentativo finale di raccordo tra CPA e CPC. I principali risultati mostrano come uno dei concetti alla base delle classificazioni NACE e CPA, ossia la distinzione tra attività di vendita “specializzata” e “non specializzata” potrebbe risultare fuorviante e meno informativa rispetto a suddivisioni dell'attività più adeguate alla realtà in continua e rapida evoluzione. Si invitano i membri del Voorburg Group a reagire su tali aspetti.

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