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# The intermediate costs matrix construction in the Italian input-output table of 1992

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# The intermediate costs matrix construction in the Italian 1992 input-output table.

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**Abstract**: This paper discusses the problems of intermediate cost structure estimates and the reliability of current surveys in compiling the Italian input-output table of 1992. It illustrates the methodologies adopted to overcome the lack of statistics used.

**Keywords**: reliability, surveys, sec95.

## 1. The reliability of surveys to outline the costs of industrial and services enterprises

Usually, surveys on the costs of industrial and services enterprises are neglected because there are no EEC Council Regulations making them compulsory within the EU, such as the survey on annual industrial production or the survey on enterprises accounts. Moreover, the surveys on the costs of industrial and services enterprises are carried out by the department of statistics on industrial activities on behalf of National Accounts, in other words for this department they are only secondary statistics and added work.
Thus, the size of sample tends to be reduced, and cannot represent adequately the whole productive structure of a country's economy, or attempts are made to use methodologies or assessments from experts to limit the burden of this survey.
To outline the structure of costs of 874 economic activities, by 5 worker classes, examining 10 sample units for each specific stratum, and assuming that the non-response rate is 60%, not less than 43,700 enterprises, bodies or services companies should be surveyed.
The size of this sample is considered too large to produce statistical data that do not have primary importance from the viewpoint of EEC Council regulations.
Therefore, we cannot talk about the reliability of surveys to outline the costs of industrial and services enterprises if the number of surveyed units is markedly decreased and the design of questionnaires is less complex because there are less questions, not to mention non-responses.
Moreover, note should be taken of the contradictory behaviour of EUROSTAT, which requests in SEC95 surveys at local unit level and at the same time

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recommends that the burden of surveys on enterprises should be lightened. In this case it is not possible to follow this recommendation.

## 2. Issues related to the revision of questionnaires.

The most common difficulties found in almost every economic activity are listed below.

Different accounting units (billion, million, thousand lire, tons, quintals, etc.) used by the departments of one single enterprise when compiling the different sections of the form (administration, stock management, industrial accounts, etc.). Outliers data were compared with average unit figures, average per capita quantities and average per capita values of corresponding product codes and were then replaced with their average figures if their ratios were not included in the mean range plus/minus three times the standard error. In several production branches, the biggest errors arose from the comparison of per capita values of specific goods and services used which exceeded the per capita figures of labour costs. In this way, it was easy to identify figures expressed using different units of measurement.

The correct coding of economic activities representing industrial processing carried out by third parties (they are often not detailed or not adequately described) to be classified using the 1991 classification of economic activities. Expenditure on this type of processing is about 20% of total expenditure on intermediate costs. For example, in the manufacture of clothing, different types of processing can be made by third parties, such as: weaving supplied textile fibres, assembling semi-finished goods, buttons and zips, ironing, packing, catalogues with pictures (the latter represent rather high expenditure), etc.

Recording a total expenditure figure for maintenance carried out by third parties (machinery, lifts and goods lifts, air conditioning and heating systems, equipment, furniture, telephone exchange, closed circuit surveillance system, etc.) or made in-house. Materials are included in the latter (electrical and electronic components, separate fittings of machinery, paints and other chemicals, refractory and ceramic products, sand paper and glass paper, tools). Operating expenses of electronic data processing centres (forms, magnetic tapes and cassettes, toner, printer belts, stationery, white coats). Stationery and other expenses (pens, pencils, paper for photocopiers and printers, printer and typewriter ribbons, toner, floppy disk, accounting books, files, glue). Cleaning materials expenses (detergents, cloths, brooms, etc.). Food expenses of schools which are often entered under the heading of other foodstuffs.

Lastly, the presumed difficulty of some artisans and professionals to disaggregate expenses included in rents (expenses due to joint-ownership, electricity, gas and water supply, heating, stair cleaning, maintenance).

The total amount of above expenses was disaggregated by branch of origin, using a detailed analysis provided by several enterprises that helped us. They provided

their accounting records and processed data by type of expenditure made in their administrative office (see enclosed tables).

## 3. Methodological approaches adopted to assess costs that could not be directly surveyed.

Sea transport and Education are the two most complex instances.

Shipping lines did not provide a detailed list of their operating costs, i.e. small ship-owners entered in their accounting books a total figure that included maintenance expenses for their ships, the only difference made (in some cases) being between on deck and below deck maintenance and repairs.

The contacts established with FINCANTIERI (shipyard) were very useful as the company provided the percentage of repairs made at their shipyards: careening (40%); rudderstock (15%); engine (15%); metallic hull (10%); others (10%); onboard fittings: hatchway, banisters, decks; etc. (10%).

However, activities carried out at shipyards are seldom homogeneous, i.e., engine orders for maintenance are sometimes given to specific enterprises by shipyards and they are recorded as their costs, whereas, sometimes they are directly ordered by ship-owners, and thus they are the shipping line costs.

The maintenance and repairs of electronic equipment differ, since they are usually orders given by ship-owners to specialised enterprises, thus they are to be always recorded as shipping line costs.

The percentage of processing and products used in maintenance and repairs of ships has been calculated using data from FINCANTIERI, as well as the structure of costs of this branch: Ship building, repairs of ships and vessels, assuming that machinery and equipment wear out at the same rate.

The structure of costs of state schools was integrated with the survey on Local authorities, because state schools do not have autonomy regarding budget but are funded by Communes, Provinces, Regions and the State.

Communes transfer funds to nursery schools, primary and junior secondary schools; Provinces to senior secondary schools; Regions, besides funding vocational training courses, transfer money to Communes to pay for school canteens and pupil transport; the State pays wages to teachers (school caretakers are usually paid by Communes).

Expenses for electricity and gas supply, services (telephone, fax, RAI-TV, etc.), the maintenance of machinery and equipment, the maintenance of motor-vehicles, the maintenance of buildings, transport of pupils and examiners, school canteens, hotels, cafés and restaurants, rents paid for buildings, surveillance (doorkeepers of communal schools), cleaning services, laundry services (nursery schools), the training of teachers, were all assessed using the specific questionnaires for "Education" expenditure filled by the relevant Local authorities for each type of school.

Data were referred to total population differently, for senior secondary schools, questionnaires filled in by Provinces were used, for nursery schools, primary and junior secondary schools questionnaires filled in by Communes were used.

Per capita figures of the structure of costs were calculated, based on the number of surveyed pupils and students for each Local authority (Province or Commune), then, findings were referred to total population, considering the number of pupils attending state schools in Italy, for all Provinces and Communes.
Another example of imputation data, besides the two examples described above, regards lubricants. When their amount was not surveyed, it was calculated in the following way. First the total amount of fuel was divided by unit price, then the litres of used fuel were used to calculate the distance travelled in kilometres (15 km on average per each litre of fuel). Assuming one oil change every 10,000 kilometres (equal to 4 litres of lubricant) the amount of used lubricants was calculated using the number of oil changes and the price of one litre of lubricant. The value of estimated lubricants is 4.2% of fuel value.

## 4. Final remarks

The main problem this type of survey poses is the lack of a specific regulation, that guarantees transparency, establishing the harmonisation of expenditures by the 60 branches defined in the ESA95, on the basis of the first two digits of the NACE Rev. 1. An important chance that was not exploited was the European harmonisation of the balance sheets of enterprises. This approach would have decreased costs and reduced the statistical burden on enterprises, since all the bodies producing statistics would have gathered data from a single administrative source: the balance sheet of enterprises. Currently, there is a company recording on CD ROMs the balance sheets of public and private enterprises with a turnover of two billion lire and over.
Unfortunately, interest is centred on financial data and not on the knowledge of production processes, thus no future change can be expected.
This choice often determines policies characterised by cuts in expenditure or funding that do not consider the following elements: production processes, innovations, a better organisation of production factors to achieve marked savings and better performance in the different sectors of the Italian economy.
Now the scientific community has to decide whether to continue to proceed with estimates calculated in proportion to indirect statistical data, specific assessments made by experts, hypotheses and other tools not rooted in real life, or whether the structure of costs of an input-output table should be surveyed, using statistics based on harmonised definitions and recording rules that should be applied in every country.

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Annex 1

**Table 1:** *Percentage composition of expenses for maintenance and repairs of machinery and equipment in Industry*

| N. | I N D U S T R I E S | % |
|---|---|---|
| **34** | **Structural metal products, furnaces, tanks, burners** | **10.0** |
| **35** | **Fabricated metal products, except machinery and equipment** | **5.0** |
| **36** | **Machinery and equipment n.e.c.** | **33.6** |
| **40** | **Electrical motors and transformers** | **6.8** |
| **41** | **Electrical machinery and apparatus n.e.c.** | **15.0** |
| **43** | **Radio, television and communication equipment and apparatus** | **11.1** |
| **44** | **Radios, televisions, tape and videotape recorders** | **1.0** |
| **45** | **Precision instruments and control apparatus** | **10.0** |
| **52** | **Furniture** | **1.5** |
| **82** | **Maintenance of hardware and software** | **6.0** |
| | **TOTAL** | **100.0** |

**Table 2:** *Percentage composition of expenses for maintenance and repairs of machinery and equipment in Services*

| N. | I N D U S T R I E S | % |
|---|---|---|
| **34** | **Structural metal products, furnaces, tanks, burners** | **0.6** |
| **35** | **Fabricated metal products, except machinery and equipment** | **3.0** |
| **36** | **Machinery and equipment n.e.c.** | **5.5** |
| **41** | **Electrical machinery and apparatus n.e.c.** | **4.3** |
| **43** | **Radio, television and communication equipment and apparatus** | **4.7** |
| **45** | **Medical and precision instruments** | **4.0** |
| **66** | **Repair of personal and household goods** | **72.3** |
| **82** | **Maintenance of hardware and software** | **5.6** |
| | **TOTAL** | **100.0** |

**Table 3:** *Percentage composition of expenses for other foodstuffs*

| N. | I N D U S T R I E S | % |
|---|---|---|
| 1 | Agricultural products | 15.0 |
| 2 | Animal products | 4.3 |
| 4 | Fishing products | 4.5 |
| 7 | Meat products | 23.8 |
| 8 | Food products n.e.c. | 29.1 |
| 9 | Processing and preserving of fruit and vegetables | 1.9 |
| 10 | Dairy products | 13.9 |
| 11 | Grain mill products, starches and starch products | 4.4 |
| 13 | Beverages | 3.1 |
| | TOTAL | 100.0 |

**Table 4:** *Percentage composition of expenses for stationery*

| N. | I N D U S T R I E S | % |
|---|---|---|
| 14 | Textiles products | 1.6 |
| 20 | Paper and paper products | 35.0 |
| 24 | Secondary chemical products | 8.5 |
| 27 | Rubber products | 5.7 |
| 28 | Plastic products | 18.0 |
| 29 | Glass products | 0.2 |
| 35 | Metal products | 4.7 |
| 54 | Manufacturing n.e.c. | 26.3 |
| | TOTAL | 100.0 |

**Table 5:** *Percentage composition of expenses for cleaning materials*

| N. | I N D U S T R I E S | % |
|---|---|---|
| 15 | Textile articles | 0.5 |
| 20 | Paper and paper products | 6.0 |
| 25 | Cleaning preparations and toilet products | 61.0 |
| 28 | Plastic products | 10.0 |
| 54 | Manufacturing n.e.c. | 22.5 |

| | | |
|---|---|---|
| | **TOTAL** | **100.0** |

**Table 6:** *Percentage composition of expenses for electronic data processing centres*

| **N.** | **I N D U S T R I E S** | **%** | **%** |
|---|---|---|---|
| | **STATIONERY AND OFFICE ARTICLES** | **100.00** | **…** |
| | | | |
| **15** | **Textile articles** | **…** | **…** |
| **17** | **Leather goods** | **0.04** | **…** |
| **20** | **Paper and paper products** | **85.40** | **1.46** |
| **24** | **Secondary chemical products, floppy disk, magnetic cassettes and tapes** | **6.06** | **0.78** |
| **27** | **Rubber products** | **4.50** | **0.08** |
| **28** | **Plastic products** | **0.90** | **0.02** |
| **35** | **Metal products** | **0.20** | |
| **45** | **Precision instruments** | **…** | |
| **54** | **Manufacturing n.e.c.** | **2.90** | **0.05** |
| | | | |
| **82** | **COMPUTER AND RELATED ACTIVITIES** | **100.00** | |
| | | | |
| 82.1 | Advice, services, repair and maintenance | 40.00 | **38.96** |
| 82.3 | Leasing | 41.70 | **40.75** |
| 82.5 | Spares | 18.30 | **17.90** |
| | **TOTAL** | | **100.00** |