DATA COLLECTION METHODS FOR INTERNATIONAL FREIGHT AND PASSENGER TRANSPORT IN THE ITALIAN BALANCE OF PAYMENTS

1. Why sample surveys?

The liberalisation of international transactions was completed in Italy in 1990. As a consequence, data sources traditionally used for balance of payments (BOP) statistics - i.e. bank settlements - have become less and less fit for the purpose of compiling some items, particularly international transport and travel. Further to the gradual liberalisation in the transport sector, the changeover to euro in the European Monetary Union in 2002 has made statistical information, especially for travel, more and more difficult to be derived via bank settlements.

Alternative solutions have been sought. The possible solutions are originated by two different streams of thought. The first one would prefer methods based on "best effort" estimates of macro variables affecting international travel and transport, the second one would largely rely on sample surveys. The latter appears generally to be more promising and effective, even if more complex and resource-absorbing.

In the European context, particularly under the auspices of Eurostat, the research of a common method of BOP data collection has involved Member States for a long time. For travel and passenger transport, there is now a general consensus about the recourse to sample surveys, as bank settlements actually are biased by the presence of an "exemption threshold", which is likely to be raised in the future. These latter systems turned out to be largely unsatisfactory because travel and transport involve a great number of small transactions under the threshold that would be unreported. As for merchandise transport, in the European context there is a significant view about methods based on "best effort" estimates of macro variables, but such methods do not fully succeed in supplying information about real "micro-aspects" of the transport market and they also appear not easy to carry out.

The Italian authority responsible for the compilation of the balance of payments (Ufficio Italiano dei Cambi – UIC), part of the Italian Central Bank, chose to rely on surveys. Survey based

collection methods have been adopted in Italy both for travel (since 1996) and transport (since 1998). The outcome has implied a more comprehensive knowledge of such phenomena and an increase in the degree of accuracy and ultimately in the quality of the statistical data produced.

The surveys have been outsourced by UIC to private market research companies. Those companies have been chosen among those who have the most considerable know-how in the respective area of interest. In detail, field work, data entry, data cleaning and grossing up of the results are carried out by the research companies. The UIC supervises these activities and co-operates in building up the sampling design and the questionnaires; UIC processes, analyses and disseminates final survey results.

The methodologies adopted by UIC are in full compliance with the standard of the International Monetary Fund 5° Manual on Balance of Payments (BOPM5). Actually the surveys supply considerable information beyond the minimum needs prescribed by IMF.

Relevant information about international transport of goods and passengers is processed and made available to users and to transport operators, as it is illustrated in the fourth section of this paper. The survey on international freight rates and on the shares of resident carriers is described in the second section, along with the survey on Italian international travel and passenger transport. The third section deals with the results used for balance of payments compilation. In the last section some general conclusions are drawn.

2. The survey methodologies

2.1. The surveys on international freight rates and on carrier residence

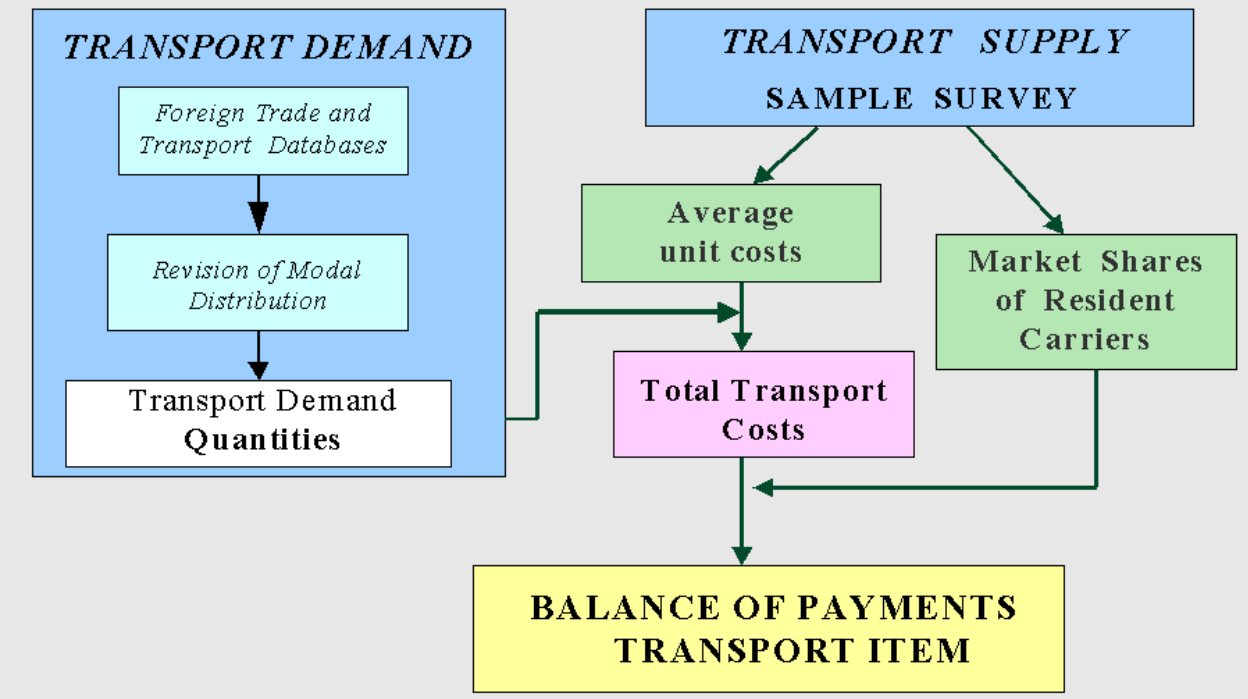
A two step approach is followed for merchandise transport as shown in Figure 1. In the first step, trade volumes, which represent the demand for transport services, are derived from foreign trade statistics, while freight rates, which account for the supply of transport services, are estimated by means of a sample survey. Subsequently, total transport costs are estimated multiplying volumes by freight rates. In the second step, total transport costs are broken down according to carriers' country of residence; transport costs are treated as BOP transactions when, generally speaking, the residence of the supplier of transport services is different from the residence of the user of such services. Otherwise, they are supposed to be irrelevant in the BOP scheme.

The methodology also uses a multi-modal transport model developed by the research company conducting the surveys. It was adopted by the Directorate General XV (Financial affairs and Internal Market) of the European Community and updated within the 4th Research Programme of the European Community. The model is based on a input-output structure by region and represents intermodality in a logical and flexible fashion. It starts from the origin-destination matrices of flows of goods and carries out modal splits. The model is focused on the European area and, consequently, on road and rail transport. It allows calculating distances and time ranges that are useful for the estimation of rail and road freight rates; in some cases, it helps integrating sample data.

The demand for transport services is substantially represented by imported and exported volumes. Unfortunately, foreign trade statistics overestimate road transport – as enterprises often know only the first (or the last) leg of the transportation chain, frequently the lorry – and consequently underestimate rail and sea transport. Such bias arises from the comparison with Italian and international transport databases [1)] Accordingly, from the demand side of transport services, our methodology includes a revision of the modal distribution of foreign trade volumes.

Figure 1

MERCHANDISE TRANSPORT METHODOLOGY



As for the supply side, since 1998 a sample survey is being conducted each year among transport enterprises, in order to gather information about average unit costs of international transport.

A sample survey is necessary because of the current lack of reliable and exhaustive international data. Only in the case of sea transport, some international magazines regularly publish data about freight tariffs, generally in the form of price indexes. The "Drewry Monthly" (Drewry), the "Shipping Statistics and Market Review" (ISL) and "Shipping review and Outlook" (Clarksons) are regularly used, in order to compare and in some cases to integrate, data available through samples.

UIC chose to interview transport enterprises instead of manufacturing enterprises, as the latter often are not aware of transport costs, especially when they export with f.o.b. (and similar) terms of delivery or import with c.i.f. (and similar) terms of delivery.

Transport businesses are asked to provide information about the operations they carry out more frequently, defined as "standard consignments" (SCs). The main aim is to achieve an estimate of the average unit cost of each possible SC. A "standard consignment" is defined by four variables that mainly affect tariffs:

- The type of merchandise (classified according to 1-digit NST/R).
- The mode of transport (four modes – air, sea, rail and road).
- The type of load: a) for sea: general cargo, container, liquid or solid bulk; b) for rail: bulk or container; c) for road: full or partial load; d) for air: 300 or 1000 kg.
- The distance (or the geographical areas of origin/destination).

In some cases other variables may be relevant, like the direction of flows when geographical areas are characterized by relevant unbalances of flows between export and import. The number of possible combinations of these variables is theoretically about several hundreds, but only a few of them are really important.

In order to get adequate information, transport enterprises are stratified into eight categories, according to their different characteristics and, consequently, on the basis of the number of SCs they are able to describe. The eight groups are: 1) road transporters; 2) multimodal operators; 3) ship brokers; 4) ship companies specialised in containers; 5) rail companies; 6) intermodal rail+road companies; 7) air companies; 8) air brokers.

The enterprises selected within each group are extracted from lists published by transport associations and/or transport specialised publications, which also report rankings based on turnover or number of employees. A further stratification of these eight sample groups is based on other variables like the turnover of the carriers and their geographical allocation.

The sample size is determined taking into account sampling error limits; for a benchmark year (2002), a sample of 124 transport enterprises and 1,721 "standard consignments" turned out to be consistent with a sampling error of 6.4% on the weighted average of all transport modes. Such size of error is to be valued as adequately low, considering the freight intrinsic variability. In the following table, the most important statistical indicators are reported for each mode of transport, relating to the 2002 survey.

Table 1. Merchandise transport survey (year 2002): relevant statistical indicators

Mode of transport	Number of interviewed operators	Number of standard consignments	Average weighted sampling error
Sea *Container*	33	294	7.5%
Sea *Bulk (liquid and solid)*	15	160	7.3%
Sea *General cargo*	10	81	9.3%
Air	11	442	7.0%
Road	45	618	4.4%
Rail *Container*	10	126	5.0%
Total	**124**	**1,721**	**6.4%**

A measure of the bias magnitude that non-sampling errors introduce in the final estimates is not currently available. However, non-sampling errors are kept under control thanks to several efforts made to limit their effect; for example, interviews are conducted face-to-face, interviewers are generally the same persons who design the questionnaires, missing answers to single questions are practically absent, enterprises refusing interview are substituted with other enterprises coming from the same sampling stratum, etcetera.

As for the frequency of the data collection, different standards are scheduled. For some modes of transport - air transport and, for sea transport, container and bulk (liquid and solid) - data are collected quarterly, due to a greater variability of freight rates. For the other transport

modes – road, rail and, for sea transport, general cargo – a lower tariff variability allows to conduct interviews only yearly.

Furthermore, the survey allows to estimate, in accordance with BOPM5 standards, the impact of auxiliary services (i.e. handling, loading/unloading operations, agents' commissions, etc.) on transport unit costs, in order to distinguish pure freight costs from "supporting, auxiliary and other services". Transport enterprises are asked not only about total freight rates for a specific SC, but also about the incidence of the auxiliary services, which varies according to transport modes.

In addition to the international freight rate survey, another survey on the market share of Italian and foreign transport enterprises is conducted yearly from 2002. In detail, it estimates the incidence of Italian carriers in sea and road transport. In fact, in case of rail transport, a situation close to monopoly is still predominant in Italy and Europe [2)], so that there has been no need to estimate the market share; as for air transport, an administrative data source from Airport Authorities is used.

For maritime transport a double strata sample is carried out. The statistical units are the international movements (arrivals and dispatches, but excluding transit trade) of ships in Italian ports. They are stratified firstly on the basis of shipping category (solid bulk, liquid bulk, container and general cargo) and secondly on the relevance of the sampled ports, according to traffic data supplied by Port Authorities. Subsequently, the attribution of residence to the shipping manager is carried out thanks to *Lloyd's Register – Fairplay Limited*, an international maritime register that reports such information. It is a difficult step because of the strong presence of dummy companies.

For road transport, the data collection is conducted within the survey on international travel. In detail, lorries are counted and registered at frontier borders on the basis of their dimension (two, three or more axes) and of the nationality of the number plate. Subsequently, sample data are weighted on the basis of frontier border importance, in terms of road merchandise transport and of average loads. Moreover, sample results are compared with those deriving from other two sample surveys. The first one, whose results are available only with a considerable lag, is conducted yearly by the Italian Institute of Statistics on Italian commercial vehicles; the second one is the Swiss database described above (see footnote 1), which is updated every five years.

A further estimate for BOP compilation concerns the transit trade made by Italian carriers, generally for shipping. In fact, sea transport is a highly competitive and world-wide business, where ships move according to market trends, independently of countries of origin and destination; the consequence is that Italian (and whatever nationality) ship managers carry out a great part of (frequently, most of) their activity completely outside national borders. Such activity is estimated from the difference between the global capacity of the fleet controlled by Italian ship managers and the tonnage and the turnover related to Italian exports and imports transported.

2.2. The survey on international tourism and passenger transport

The methodology used to calculate international tourism and passenger transport is based on an inbound/outbound frontier survey. In 1996 this survey has began to represent the main source for Italian BOP, replacing the previous system based on bank reports.

The survey, which runs continuously, is realized by means of two independent activities at Italian borders, carried out at the same time by different agents:

A) counting, to determine the grossing up of totals, i.e. the global number of visitors broken down by country of origin/destination;

B) face-to-face interviewing, to obtain information on travellers' individual expenditures and to determine their characteristics and behaviours.

Counting operations are deemed necessary, due to the unavailability of sufficient reliable and comprehensive information on the total of visitors at Italian borders from official sources, such as airlines, airport authorities, shipping companies, roads and highways authorities. Nonetheless, for the improvement of both the quality and the cost effectiveness of the survey, work is underway to increase the co-operation with such transport authorities [3)] and to strengthen the integration with other sources, notably credit card expenditure data and statistics from tour operators and travel agencies.

The survey covers both inbound and outbound flows at each type of border point (airports, seaports, road and rail crossings). The sample is stratified according to the direction of flows (inbound/outbound), the border point, the mode of transport, the day and the time of the collection, as shown in Table 2.

Table 2. International tourism survey: variables and stratification levels

VARIABLES	LEVELS
1. Direction	2 (towards Italy and towards abroad)
2. Mode of transport	4 (road, rail, air, sea)
3. Frontiers	53 (16 road, 7 rail, 20 airports, 10 ports)
4. Days of data collection	Number of month days (i.e. 31 for January)
5. Time ranges	3 (morning, afternoon, night)

During the 2002 survey, approximately 140,000 annual interviews and 1,300,000 counting operations were carried out. On the basis of the actual sample size, about 0.13% and 1.33% of travellers were, respectively, interviewed or counted.

Travellers are systematically chosen for counting at fixed intervals, with a sampling rate appropriately chosen on the basis of the expected intensity of traveller flows. The number of interviews to be carried out is predetermined according to a monthly plan. With the aim of verifying data, about 10% of the Italian travellers previously interviewed at borders are re-interviewed by phone.

In order to gather information on the expenditures actually carried out, travellers are always interviewed at the end of their stay abroad, i.e. non-residents are interviewed when leaving Italy, while residents are interviewed when coming back to Italy. About 60% of the interviewed travellers are foreign, while the remaining 40% are Italian. A structured questionnaire translated in fourteen languages is used and the average length of the interview is 7-8 minutes.

The survey provides monthly data, around a month after the end of the reference period. Travellers are asked to indicate their expenses, distinguishing between:

- accommodation (broken down by type of accommodation);

- eating (food and drinks);
- shopping (purchasing of goods in shops);
- purchases of other services (like visits of museums);
- international transportation (round trip) with the denomination and the residence of transport companies used.

Whenever the respondent is not able to make these distinctions (e.g. because the traveller has bought an all-inclusive package tour), the breakdown of the expenditure is estimated by modelling. It puts into relationship the route of a single trip (origin-destination) with the answers given by travellers with the same characteristics (who were able to break down the expenditures).

The interviews allow to know the amount and the type of expenditures made by travellers. Such amounts are multiplied by the inverse of the drawing probability, in order to obtain values relating to the universe of Italian and foreign travellers. This process is made first estimating average per capita expenditure amounts for each border point and partner country (i.e. the country of residence for foreign travellers and the visited country for Italian travellers), then multiplying them by the total flows of passengers counted at that border point (broken down by partner country).

Total expenditures for transportation constitute the international passenger transport costs and, consequently, the basis for the related BOP item; the other travellers' expenditures are necessary for the compilation of BOP travel item. International passenger transport credits are registered when foreign passengers use Italian carriers; debits arise when Italian travellers are transported by foreign carriers.

The (relative) sampling error, at the confidence level of 95%, was in the range 0.5 -1.5% for global quarterly expenditures. The sampling error increases marginally for quarterly data, at least in the case of EU countries, while it is significantly higher for bilateral data vis-à-vis individual 'small' countries, for which a relatively small number of interviews are conducted.

As regards non-sampling errors, a synthetic measure of the magnitude of the bias they introduce on the final estimates is not available. However, non-sampling errors are kept under control throughout the survey procedure by means of several indicators and efforts are made to limit their effect. The following techniques are implemented to this purpose:

- *measurement errors* - each question has undergone several tests during the pilot phase of the survey; moreover, the interviewers have been accurately instructed, during frequent briefing sessions, about the correct interpretation of the questionnaire;
- *missing answers* - the rate of refusal to the interview has been quite low (around 5%); for Italian travellers, the number of refusals has been reduced by subsequent telephone interview (see above). Missing answers to individual questions are rare (0.1 - 0.2 %); however, imputation techniques have been adopted in the verification phase in order to estimate part of these missing answers;
- *statistical coverage* - problems have possibly derived from the fact that not all the existing border points have been sampled. The high level of coverage of the sample has assured that this source of bias has not been particularly relevant. The coverage of the total flow of foreign visitors by the border points selected in the survey is the following: road = 90%, rail = 98%, airports = 95%, seaports = 91%.

3. Balance of payments compilation needs

The sample survey methodologies allow a compilation of Italian BOP that appears statistically satisfactory and fully in compliance with the fifth BOP Manual. Consequently, they considerably improve the quality of BOP data and reduce asymmetries – particularly in the case of transport item - with other EU countries' mirror data.

As for merchandise transport, the sample survey methodology was set up during the years 1997-1998. Previously, merchandise transport BOP items were estimated by the Bank of Italy and the core of the old methodology was based on the collection of data about trade volumes and freight rates and relied mainly on administrative sources. Such sources became no more available at the end of the eighties due to liberalisation processes; afterwards, the old methodology was carried on the basis of indicators derived from bank settlements.

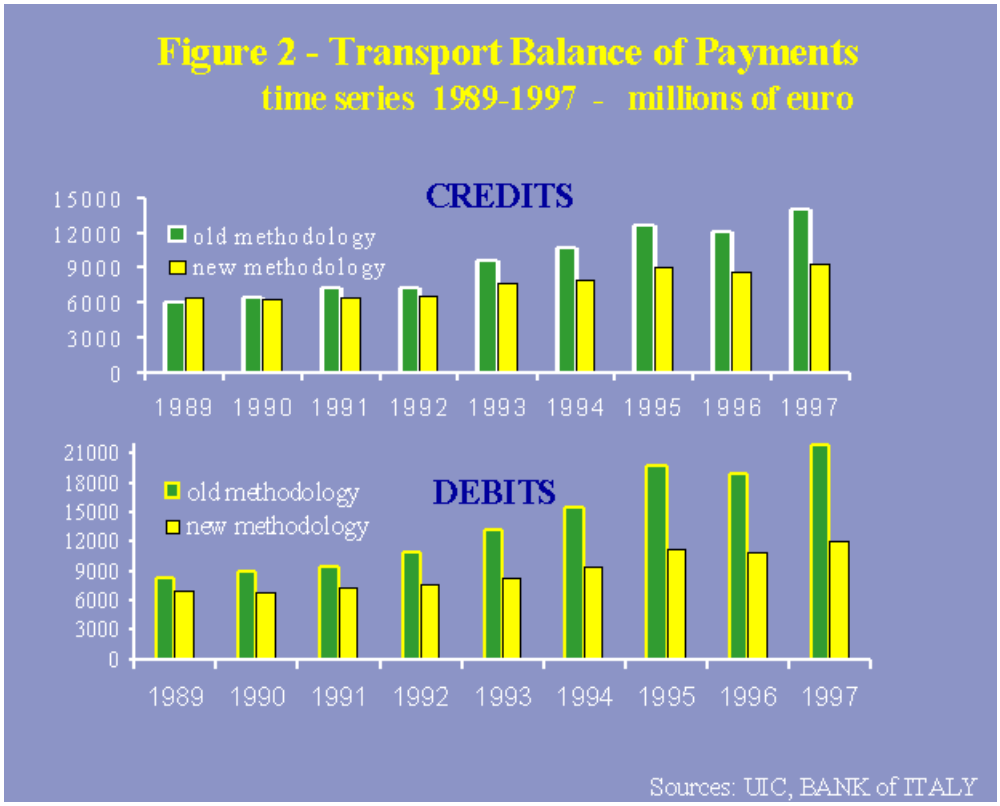
Figure 2 shows the main differences between the new and the old time series of BOP total transport credits and debits (including both freight and passenger). The comparison starts from 1989, as the new methodology was also used to revise time series from that year on.

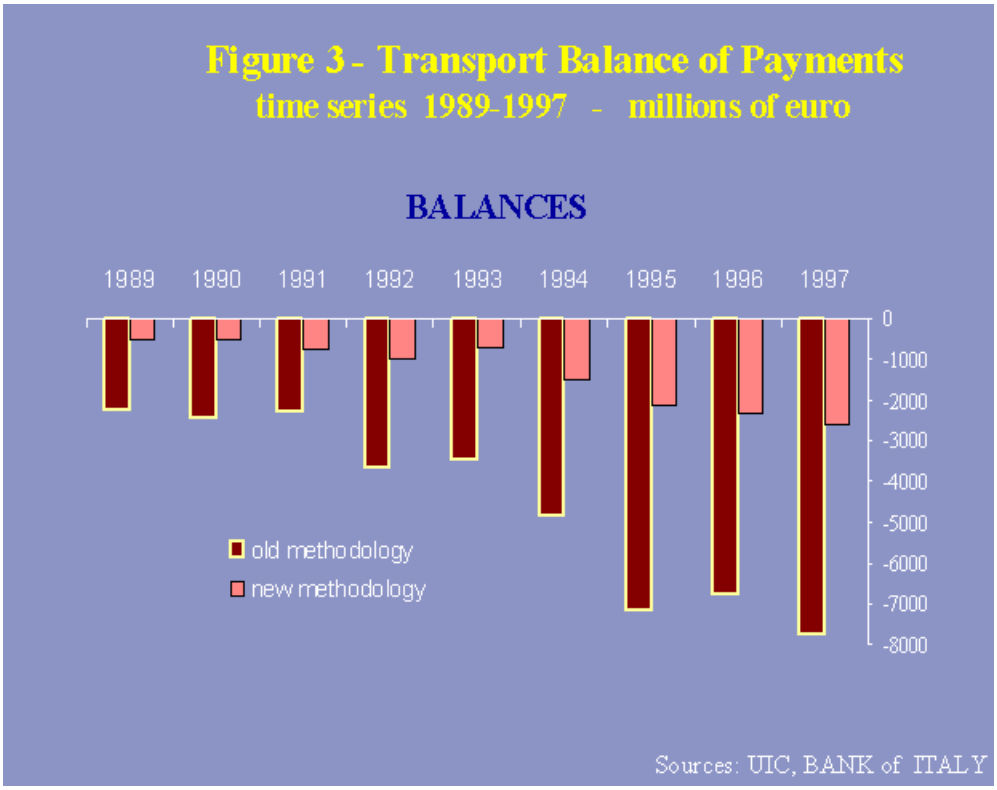
The old methodology for merchandise transport systematically overestimated both credits and, to a greater extent, debits; as a consequence, the transport negative balance resulted greatly overestimated, as it is shown in Figure 3.

In detail, estimates based on the old methodology missed the decrease of international merchandise transport costs, especially in the case of sea freight rates (see also the next paragraph).

On one hand, such phenomenon is correlated to structural changes in operational aspects, like the increase in container shipping (which is characterised by lower tariffs respect to general cargo) and the enhancement of ship dimensions and load capacities.

On the other hand, this trend appeared to be strictly bound to the liberalisation processes and the strengthening of competition, which have concerned to a certain extent the other modes of transport. At any rate, the abolition of administrative tariffs and the effects of the "new entrants" on market competition have caused freight rates to grow at a pace slower than that of consumer prices.





For analytical purposes, it seems useful to consider transport costs as a percentage of merchandise values, in order to eliminate the effect of inflation and exchange rate variations. As shown in Table 3, considering time series from 1989 to 2003, the incidence of transport costs on total merchandise values lowered for Italy from 5.1% to 3.2% in the case of exports and

from 6.5% to 4.7% in the case of imports. The incidence on import values is comparatively greater, as Italy is a great importer of raw materials, which generally have low average unit values. The above trend is confirmed even if the breakdown between freight and auxiliary services is taken into account.

In conclusion, the adoption of the new methodology has produced a significant improvement in Italian BOP data quality, for both gross flows and balances as well as for a correct distinction between freight and auxiliary services. Such approach is more related to market reality and has brought a relevant reduction of asymmetries with other countries BOP data, especially with the European partners.

Table 3. The incidence of international transport costs on merchandise values

YEAR	EXPORT			IMPORT		
	FREIGHT	AUXILIARY SERVICES	TOTAL	FREIGHT	AUXILIARY SERVICES	TOTAL
1989	3.2%	1.8%	5.1%	4.2%	2.3%	6.5%
1990	2.9%	1.6%	4.5%	3.8%	2.0%	5.8%
1991	3.0%	1.7%	4.7%	4.0%	2.1%	6.1%
1992	2.9%	1.6%	4.6%	3.8%	2.0%	5.8%
1993	3.0%	1.8%	4.8%	3.9%	2.1%	6.0%
1994	2.7%	1.6%	4.3%	3.9%	2.1%	6.0%
1995	2.6%	1.5%	4.1%	3.6%	2.0%	5.6%
1996	2.6%	1.5%	4.1%	3.4%	1.9%	5.3%
1997	2.6%	1.5%	4.1%	3.3%	1.8%	5.0%
1998	2.6%	1.6%	4.2%	3.2%	1.8%	5.0%
1999	2.7%	1.5%	4.1%	3.2%	1.6%	4.8%
2000	2.6%	1.3%	3.8%	3.5%	1.6%	5.1%
2001	2.2%	1.2%	3.4%	3.2%	1.5%	4.7%
2002	2.3%	1.1%	3.4%	3.2%	1.4%	4.6%
2003	2.3%	0.9%	3.2%	3.5%	1.2%	4.7%

As for passenger transport, the old methodology for travel was based on bank settlements and, for passenger transport, on an estimation procedure similar to the old one used for merchandise transport (i.e. number of passengers multiplied by average unit tariffs). Now, the sample survey supplies data for both these BOP items and the bank reporting system is used only for checking purposes.

Specific analyses have shown that the quality of Italy's BOP travel and passenger transport figures has increased after the introduction of the survey. Similarly to merchandise transport, the old methodology for passenger transport overestimated gross flows (see Figures 2 and 3), especially for air transport.

On the contrary, the new methodology demonstrated that travel gross flows were underestimated by the old system; as it was supposed, the bank reporting system was not able to provide accurate data on the many small transactions regarding international tourism. Moreover, the monthly distribution of expenditures turned out to be more affected by seasonality. As a consequence, the adoption of the sample survey system permitted, even in this case, to reduce strongly the asymmetries with other European countries both for travel and passenger transport.

Table 4 shows the quantitative dimensions of international transport costs by mode, broken down by freight and passenger and distinguishing also "pure" transport from auxiliary services. All costs are included, regardless of carrier nationality (as a consequence, they are different from BOP data).

Results show that costs for international freights are greater than those for passenger transport (respectively 20,633 and 12,783 millions of euro in 2003). Auxiliary services represent on average nearly 30% of total costs (28.9% for passengers and 29.9% for goods). For passengers, air transport represents 87.3% of the total; merchandise transport shows a less concentrated distribution, varying from sea transport (48.0%) to air (5.4%).

Table 4. Passenger and freight costs by mode of transport (year 2003) – millions of euro

MODE OF TRANSPORT	PASSENGER/ FREIGHT	"PURE" TRANSPORT COSTS	AUXILIARY SERVICES	TOTAL TRANSPORT COSTS	INCIDENCE
AIR	PASSENGER	7,811	3,347	11,158	87.3%
	FREIGHT	924	337	1,261	6.1%
SEA	PASSENGER	447	241	688	5.4%
	FREIGHT*	6,414	3,498	9,912	48.0%
ROAD	PASSENGER	153	29	182	1.4%
	FREIGHT*	5,123	2,012	7,135	34.6%
RAIL	PASSENGER	679	75	754	5.9%
	FREIGHT	2,006	318	2,324	11.3%
TOTAL	PASSENGER	9,091	3,692	12,783	100.0%
	FREIGHT	14,467	6,166	20,633	100.0%

*** For sea and road transport, freight costs exclude transit trade**

4. Beyond BOP compilation needs: from macro to micro analyses and uses

The additional information collected on international transport and travel through surveys represents an important "asset" that provides both researchers and businesses with empirical evidence for checking theoretical models, both at the macro and at the micro level.

In the previous section the main macro results have been presented. In this section, results and possible links with extra-BOP context are discussed. An attempt of showing "by-product" elements of interest for researchers and market operators is made; one example is represented by the "feed-backs", i.e. statistical data and analysis about international travels that are regularly published in the UIC web-site (http://www.uic.it).

As for merchandise transport, the UIC pursues the strategy of publishing the sample survey statistical results, which are necessary for the compilation of BOP items but cannot be derived from BOP figures. The UIC regularly supplies a brief summary of survey results to the transport operators who have been interviewed; such "feed-back" is also published in the web-site (http://www.uic.it) to make it available to researchers and other market participants.

Another example is the analysis of the freight rates time series. It has been already anticipated that in the nineties freight rates showed a declining trend. Table 5 shows sea freight indexes at US dollar current values, the currency used in the sea freight market. They are broken down by six types of load categories: solid bulk (distinguished in transport of grain and similar products and transport of coal and other dry raw materials), liquid bulk (distinguished in transport of crude oil and derivatives and transport of gas and chemical products), container and general cargo.

Table 6 shows the index of national currency exchange rate (Italian lira up to 1999 and euro from that year on) per 1 US dollar and the indexes of Italian consumer and production prices. Such indexes make possible to take into account exchange rate (for sea transport) and Italian price trends.

As for maritime transport, the effect of raising exchange rates tends to be offset by analogous price movements (especially consumer prices), so that it should be sufficient to consider the current value indexes.

It seems rather evident that in the nineties sea freight rates show on average declining trends. On the contrary, starting from 1999-2000 a strong recovery occurred for solid bulk - both freights of grain (and similar products) and freights of coal (and other raw materials) - and liquid bulk (especially oil). Such positive trends were likely heightened by the recent depreciation of US dollar. Conversely, in last years container and, to a lesser extent, general cargo tariffs remained on low levels.

As regards the other modes of transport, road freight rates tend to follow strictly consumer price trend, while rail tariffs show a declining trend in real terms. Air freight rates underline a positive tendency also in real terms, but the incidence of this mode of transport is small in monetary terms (5.4% of the total) and even much smaller if related to volume data (less than 1%).

Table 5. Sea freight indexes in US dollar current values (base year 1997=100)

YEARS	SOLID BULK (grain)	SOLID BULK (coal)	LIQUID BULK (oil)	LIQUID BULK (gas)	CONTAINER	GENERAL CARGO
1989	108.1	114.0	78.3	116.9	123.1	128.4
1990	101.9	105.0	80.7	127.7	118.2	115.7
1991	107.4	109.0	100.1	138.5	114.1	112.2
1992	95.0	97.0	69.5	90.5	119.0	100.9
1993	100.4	102.0	85.0	79.4	115.7	107.4
1994	100.0	103.0	85.5	117.9	110.8	111.8
1995	121.7	122.0	92.7	127.4	120.6	124.9
1996	99.6	99.0	99.4	97.6	116.0	98.3
1997	100.0	100.0	100.0	100.0	100.0	100.0
1998	96.6	101.8	99.9	114.7	100.0	96.3
1999	98.5	122.4	99.8	180.5	96.0	122.6
2000	112.8	190.4	151.2	212.1	105.2	110.3
2001	113.8	143.5	165.9	233.3	85.2	107.2
2002	139.7	152.3	138.3	162.9	88.0	108.9
2003	196.6	288.1	183.2	181.6	89.7	117.2

Table 6. Freight indexes for road, rail and air (national currency values), Italian consumer and production price indexes, exchange rate (national currency/US dollar) index0 (base year 1997=100)

YEARS	FREIGHT INDEXES			CONSUMER PRICE INDEX*	PRODUCTION PRICE INDEX*	EXCHANGE RATE INDEX
	ROAD	RAIL	AIR			
1989	78.7	106.1	70.2	69.7	76.1	80.6
1990	82.1	104.8	65.1	74.0	79.3	70.4
1991	85.5	102.6	72.5	78.7	81.9	72.9
1992	88.9	100.4	66.2	82.9	83.4	72.3
1993	92.4	100.8	79.2	86.4	86.6	92.3
1994	96.0	98.8	86.2	89.8	89.8	94.6
1995	97.8	101.6	86.6	94.6	96.9	95.6
1996	99.0	100.0	83.5	98.3	98.7	90.6
1997	100.0	100.0	100.0	100.0	100.0	100.0
1998	101.3	103.2	103.5	101.8	100.1	101.9
1999	102.7	106.5	94.0	103.4	99.9	106.8
2000	107.8	109.6	122.1	106.1	105.9	123.4
2001	108.5	110.0	127.2	109.0	107.9	127.0
2002	112.5	110.0	140.5	111.6	108.2	120.2
2003	116.3	111.0	139.1	114.4	109.9	100.5

***Source: Italian Institute for Statistics (ISTAT)**

Another result of the survey is the estimate of the shares of Italian carriers relating to the transportation of Italian imports and exports, broken down by mode of transport (see Figure 4). The trend of Italian carrier shares appears declining during the last fourteen years. In detail, at the present time Italian carriers do not manage to overcome the share of 35% for any mode of transport. The highest share is in road transport (32-34%), followed by air transport (nearly 25%) and sea transport (19%-21%).

In terms of feed-back flows, micro uses and analyses provide interesting, though rather different, views.

As an example, the relationship between geographical distance and freight rates may be taken up. This relationship does not appear systematically positive and linear, as expected. In fact, only in some cases a correlation turns out to be significant; Figure 5 shows road freight rates for imports and exports with Germany and the value of R^2 statistics (0.63) indicates that distance affects road transport tariffs.

Such relationship is - to a certain extent - confirmed for other geographical areas, but in many other cases, mainly sea and air transport, it appears quite weak, if not absent.

In Figures 6 and 7 two examples are showed. The first one concerns sea container freights for exports and imports with main partner areas (North America, Far East and Mediterranean area). The second one concerns air freights, again for exports and imports with main partner areas (North America, China, Japan and South Korea), broken down by standard weight load (300 kg and 1000 kg). In both cases there is a low linear correlation with distance, especially in the case of sea container freights (R^2=0.11, while R^2=0.26 for air freights).

Other variables appear to be much more important for these modes of transport. In detail, not only the direction of flows strongly affects freights in case of unbalance between import and export, but also the importance of the specific flow and the costs related to the use of airports and sea ports should be considered relevant. In fact, auxiliary services vary significantly from area to area or according to the number of intermediate ports or landings.

Fig. 4 - MARKET SHARES OF ITALIAN CARRIERS

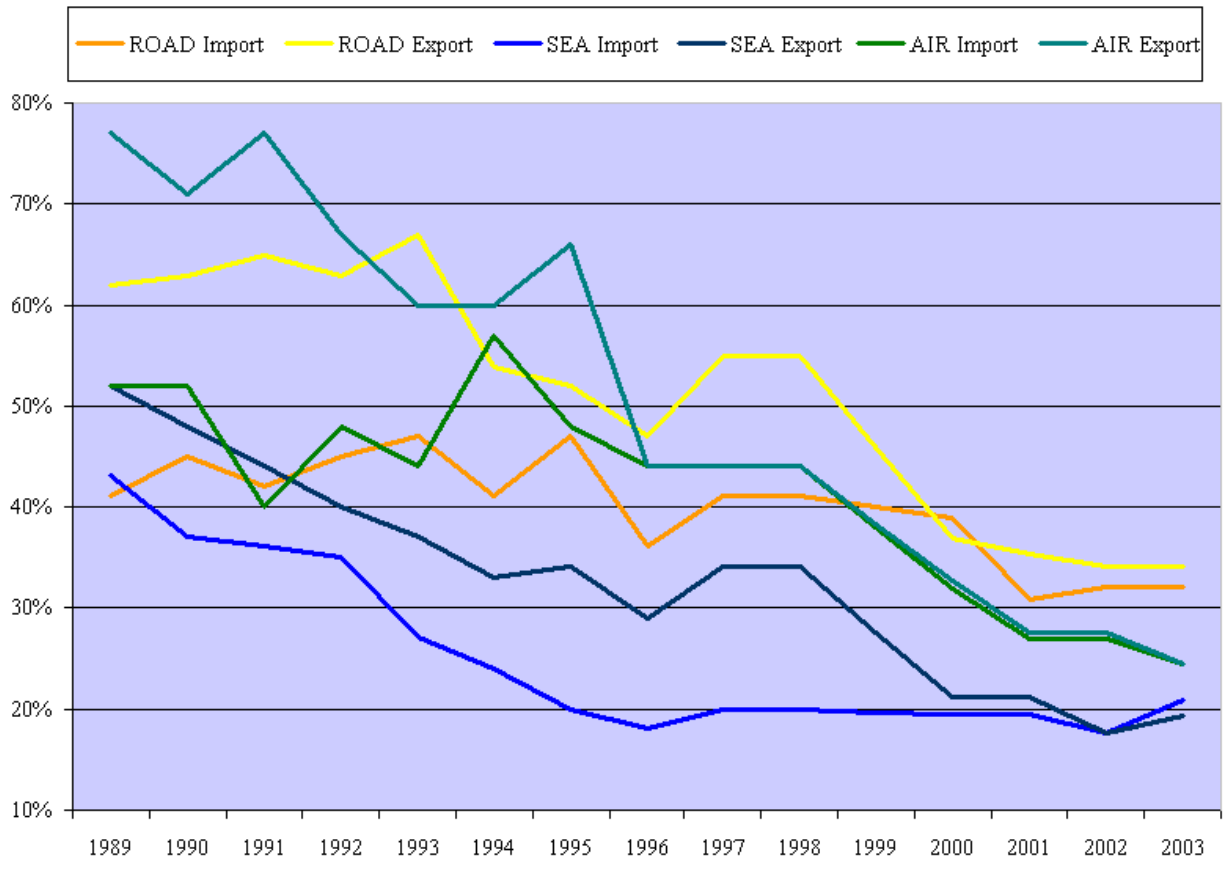


Fig. 5 - ROAD FREIGHTS - YEAR 2002
(Germany - import and export)

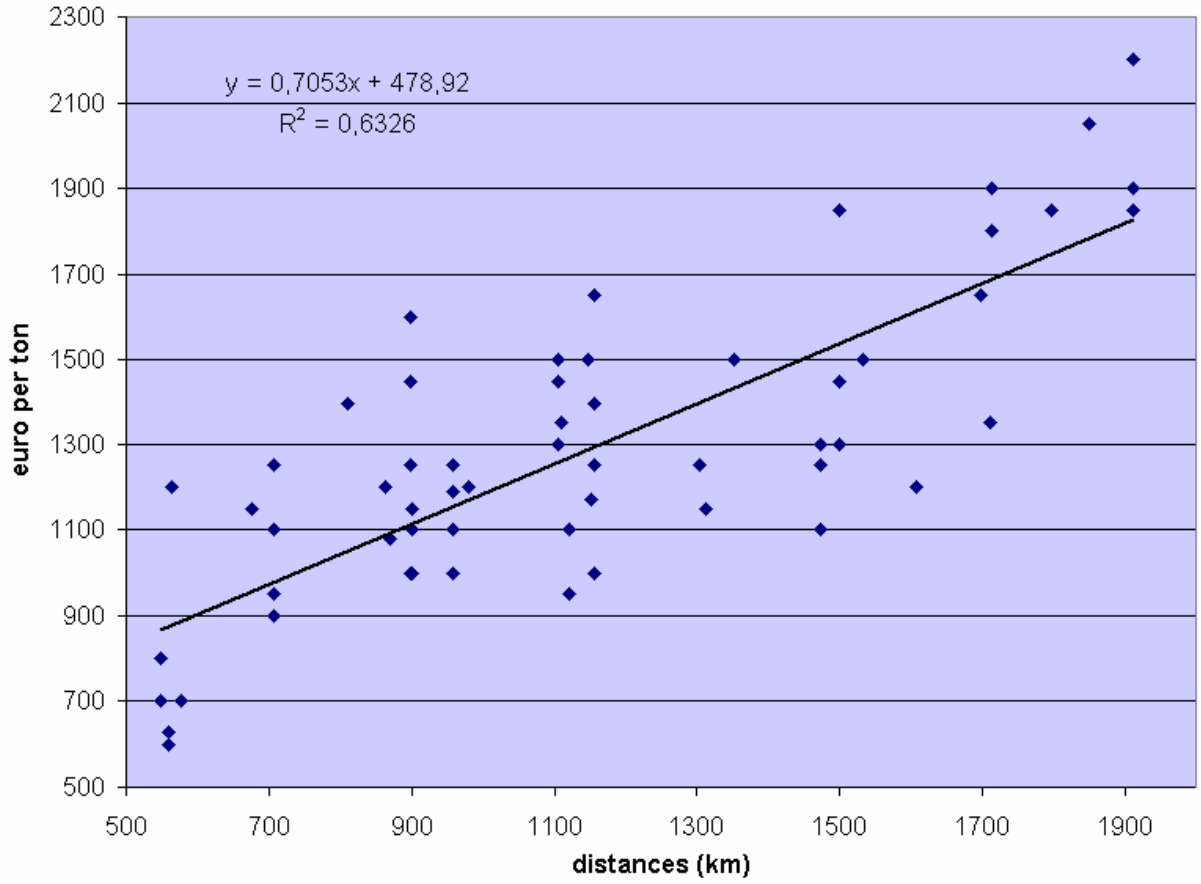


Fig. 6 - SEA CONTAINER FREIGHTS - YEAR 2002
(North America, Far East and Mediterranean - import and export)

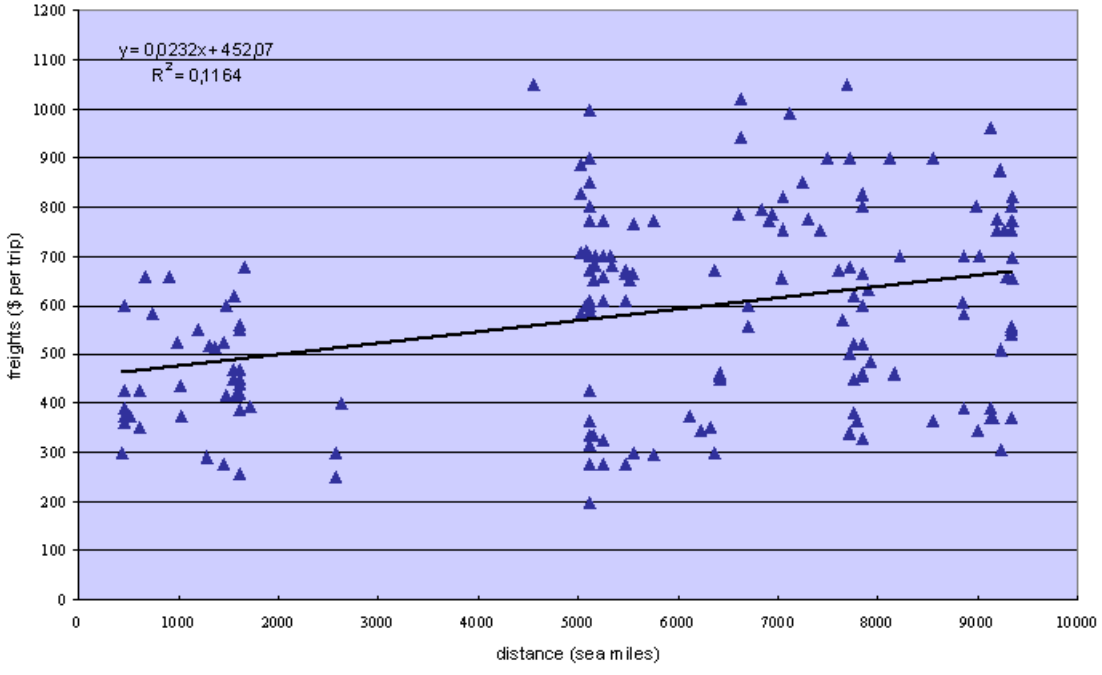
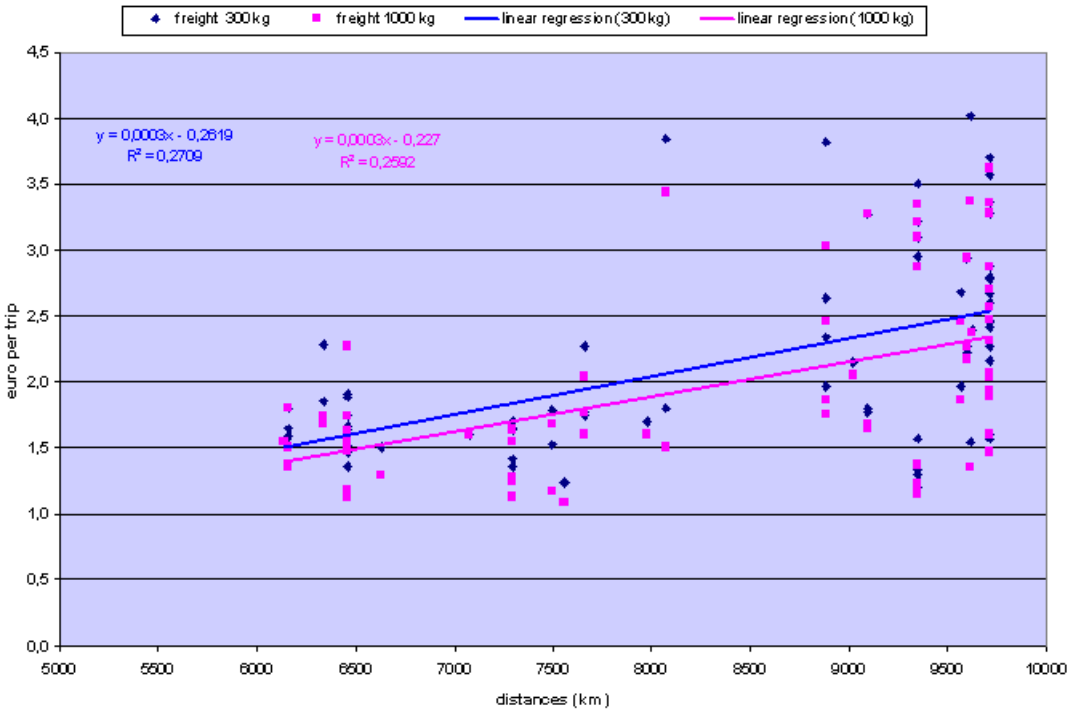


Fig. 7 AIR FREIGHTS - YEAR 2002
(North America, Japan, South Korea and China - import and export)



For passenger transport the analysis is concentrated on air transport, as it represents about 87% of total expenditures of Italian and foreign travellers (see Table 4).

Table 7 shows the time series - starting from 1989 - of the indexes of air ticket prices broken down by intra-EU and extra-EU countries, both in current and in price-adjusted values. It clearly appears that extra-EU ticket prices show a declining trend even in current values, particularly in the case of values adjusted for Italian consumer price index.

Such trend highlights the gradual but constant transformation of air passenger transport towards a sort of "commodity", i.e. characterized by low profit rates. To a lesser extent, even intra-EU fares show a declining tendency, with an acceleration in the last two years, partly due to the increasing diffusion in Italy of low-cost air companies, generally for short or medium distance flights.

The spread of low-cost flights is likely to continue and to produce a competitive pressure on traditional air companies towards the reduction of international ticket prices. Moreover, the crisis of air transport in the aftermath of September 2001 events has pushed air companies towards discount practices in the attempt of attracting passengers.

Table 7. Intra and extra-EU air fare indexes in current and price-adjusted values (base year 1997=100)

	AIR INTRA-EU current values	AIR EXTRA-EU current values	CONSUMER PRICE INDEX*	AIR INTRA-EU price-adjusted	AIR EXTRA-EU price-adjusted
1989	88.7	107.1	69.7	127.3	153.7
1990	90.4	107.8	74.0	122.3	145.8
1991	92.1	108.5	78.7	117.1	137.9
1992	93.8	109.2	82.9	113.1	131.6
1993	96.6	106.8	86.4	111.7	123.6
1994	99.3	104.4	89.8	110.6	116.3
1995	102.0	102.0	94.6	107.8	107.8
1996	101.0	101.0	98.3	102.7	102.7
1997	100.0	100.0	100.0	100.0	100.0
1998	102.3	99.6	101.8	100.5	97.9
1999	102.2	97.8	103.4	98.8	94.5
2000	102.9	101.2	106.1	97.0	95.4
2001	114.1	98.3	109.0	104.7	90.2
2002	108.0	100.9	111.6	96.8	90.4
2003	90.9	92.7	114.4	79.5	81.0

***Source: Italian Institute for Statistics (ISTAT)**

5. Conclusions

The sample survey methodologies have made possible the identification of the effects of the main phenomena involving the international transport sector in recent years: the decrease of (real) freight rates and passenger fares, the technical advancement of transport vehicles, the logistic rationalization and the increase in average unit values of goods.

The new collection methods should also allow capturing the foreseeable evolution of the sector. Expected innovations concern the further improvements in vehicle characteristics (i.e. fuel cells or hydrogen power) and in load capacity. Another possible development is a more dynamic growth of foreign trade with respect to world GDP, due to a wider globalisation of industry activity and consequent increase of travelled distances. A similar phenomenon may concern passenger transport, in connection with low-cost flight diffusion and in absence of international shocks.

The UIC provides statistical feed-backs both on a regular basis and in response to *ad hoc* requests, enhancing the relationships with respondents and going beyond balance of payments needs. A "virtuous circle" between data suppliers and the statistical authorities is working and may become an important tool of further data quality improvement.

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ABSTRACT

DATA COLLECTION METHODS FOR INTERNATIONAL FREIGHT AND PASSENGER TRANSPORT IN THE ITALIAN BALANCE OF PAYMENTS

In Italy data sources traditionally used for balance of payments statistics (i.e. bank settlements) became less adequate for compiling some items, particularly international transport and travel, due to the liberalisation of international transactions and the changeover to euro.

The possible solutions are referred to two streams of analysis. The first one implies methods based on "best effort" estimates of macro variables, the other one relies largely on sample surveys. The latter appears more promising, even if more complex and resource-absorbing.

Consequently, survey based collection methods have been adopted since a few years, obtaining a more comprehensive knowledge of the transport sector and increasing the degree of data accuracy. A survey for freight (transport enterprises interviewed to estimate freight rates and Italian carrier market shares) and a survey for travel (a frontier survey to collect data from travellers about tourist and international transport expenditures) are being regularly conducted.

Not only balance of payments compilation appears statistically satisfactory, but significant specific information is also collected. The Ufficio Italiano dei Cambi provides statistical feedbacks to enterprises and researchers, enhancing the relationships with respondents and going beyond balance of payments needs. A "virtuous circle" between data suppliers and the statistical authorities is working.

TOPIC AREA: DATA COLLECTION METHODS (D5)

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1) Sea and road merchandise transport statistics are published by the Italian Central Office of Statistics (ISTAT); the Swiss Transport Ministry supplies statistics concerning goods passing through the Alps (a database acknowledged by DGVII of the Commission of the European Community).

2) Starting from year 2003, a process of liberalisation for rail merchandise transport has begun in European Union and should be concluded within the end of 2006.

3)For example, in order to face problems arose with the implementation of Shengen agreement; in case of road borders with other Schengen participating countries, namely Austria and France, it is more difficult to approach travellers, due to the removal of passport controls.