MEASURING EMPLOYMENT THROUGH SURVEYS: PROBLEMS OF CURRENT LFS AND POSSIBLE SOLUTIONS

S. Campostrini, M. Gandolfo, P. Gennari, A. Giraldo

2000.5

Dipartimento di Scienze Statistiche
Università degli Studi
Via S. Francesco, 33
35121 Padova

Marzo 2000

MEASURING EMPLOYMENT THROUGH SURVEYS: PROBLEMS OF CURRENT LFS AND POSSIBLE SOLUTIONS

Stefano Campostrini*, Marina Gandolfo°, Pietro Gennari°, Anna Giraldo*

*** Department of Statistics, University of Padua**

° Labour Force Department, ISTAT

1. Introduction

In Italy hidden economy represents one of the main concern for statisticians, given the role that small firms, self-employment and, more generally, the informal sector play in the Italian economy.

Since 1987 Istat has developed within the System of National Accounts new methodologies to estimate the size of unrecorded GDP and of the implicit irregular employment. This is a mixed methodology based on the comparison of alternative data sources, special surveys on activities likely to be hidden, and estimation procedures to detect non observable activities[1]. However, the core of irregular employment is measured by the comparison of estimates of employment coming from the demand side (Census of industry and enterprise surveys) and the supply side (Census of population and labour force survey) at a rather detailed level (branch and region).

National Accounts estimates of the hidden economy, therefore, rely heavily on the LFS accuracy in measuring employment and its sector characteristics. Often the reliability of LFS estimates has been questioned in the public debate.

In this paper we discuss the main difficulties of LFS in measuring irregular employment and present the possible solutions that have been studied over the past 2 years. In particular, two possible lines of action have been envisaged: the redesign of the LFS and a parallel "time use survey" to integrate the estimate of employment based on the new LFS.

2. Problems of the current LFS

One of the baseline pillars of the measurement of hidden economy elaborated within the National Accounts framework is the reliability of the estimates of employment taken from the LFS.

If part of the workers, regular or irregular, conceal their labour status in the survey and the irregular employed (working in a firm without a regular contract) are wrongly classified as unemployed or inactive, employment rate is underestimated,

[1] Ref. M.Calzaroni, 1998

unemployment rate is overestimated and the overall size of the unrecorded GDP is downward biased.

One additional problem comes from the misclassification of employment by industry. This non-sampling error is quite common in the LFS due to the lacking description of the economic activity of the local unit given by the respondents and to the difficulties for the interviewers in interpreting and coding this information[2]. The misclassification of the employment by industry gives rise to an over-estimation of the size of hidden economy for 2 different reasons, even if the overall level of employment is the same in both data sources: in some industries LFS estimates will be bigger than enterprise survey estimates, and then the irregular worker component comes out; on the other hand, in some other industries enterprise survey estimates will be bigger than LFS estimates, and then the secondary job component emerges. The deeper is the degree of detail, the more likely the size of GDP will be upward biased.

In the following paragraphs we will discuss the main factors that affects the reliability of the LFS estimates of employment. Each factor cannot be considered independently, but reinforce the others in a circular process.

2.1. Sample design and sampling frame

The sampling frame from which the Italian sample is taken is the Population Registers of the local municipalities. Only the population recorded as living in private households is covered.

This list doesn't include non-nationals that are not recorded in the Registers, even if they live and work in the country. The exclusion from the sample of this component of the population yields to an under-estimation of total employment and of the size of hidden economy since most the non-national workers are irregular. With the recent huge increase in Italy of the flows of immigrants this bias is going to get bigger and bigger in the near future.

Another problem linked to the use of the Population Registers is the coverage error due to the use of non up-to-date frames. Taking into account that the sample is drawn only

[2] At present the information on the industrial classification of people's jobs is collected through an open question: once the interview is finished, the interviewer has to code this information at a 2 digit level on the basis of the description given by the respondent.

once a year and that the longitudinal structure of the sample entails 4 interviews of the same unit over a 6 quarter period, a household can remain in the sample up to over two years. Therefore the households that move over the territory, even on a local area basis, are likely to be under-represented in the sample drawn from the Population Registers as they are untraceable at their old addresses. This phenomenon is magnified by the substitution of the non contactable families.

Bias in the estimate of the level of employment are likely to arise to the extent there is a linkage between labour status and mobility.

2.2 *Organization of the field work and characteristics of the interviewers*

The LFS is carried out in one single week of each quarter on a face-to-face basis. This means that the field staff must be huge (more than 2500 interviewers), spread all over the country (1400 municipalities are involved) and employed on very unstable premises. These reasons together with the strict regulation of employment relationship in the public sector has led ISTAT to leave the organization of the field work to the statistical offices of the municipalities. As a consequence, nearly 70% of the field staff is formed by civil servants that carry out the interviews as a secondary job; moreover, most of them are quite old and have a low level of education. The possibilities of selecting the interviewers and of monitoring the field work by ISTAT are rather limited. This can lead to a bad quality in the data collected.

In addition to that, the field staff comprise a substantial part of policeman that may increase reticence of the interviewees to declare casual or temporary jobs, often carried out on irregular basis.

2.3 *Questionnaire*

One of the weaknesses of the current questionnaire is the opening question on main activity. This question implies a subjective answer about the self-perception of the interviewed which often doesn't correspond to his/her real labour status. In other words, some interviewees that are employed (frequently in a marginal or temporary job) consider themselves as inactive, preferring to define themselves as student, housewives or retired. This phenomenon could occur also in the case of people with double activities (e.g. employed in education) that have to choose which is the "main" status to declare.

From 1977 onward the LFS questionnaire includes a separate question, with which the interviewee is asked whether he is currently working, independently from the self-defined status. This innovation has had a very limited impact on the estimates of the level of employment: the aggregate of "non declared employed" indeed represents little more than 1% of the overall employment. The reason is likely to be found in the reluctance of the interviewees to contradict the answer given to the precedent question.

2.4 *Proxy interviews*

The LFS seeks information about all the individuals older than 14 years living in the household sampled for the survey. In order to maximise response in the tight fieldwork period and reduce the cost of recall interview, interviewers are allowed to accept information by proxy for those household members not present when the interview takes place. About 40% of LFS responses are collected by proxy, not taking into account single families; this value largely increases considering young people (of both gender) and males in the middle age range.

The proxy responses have a greater effect on the accuracy of some variables than others: it is also possible that, in the aggregate, positive and negative errors will balance out. Nevertheless, it is likely that proxy responses can produce an under-estimation of the employment, in particular when the non-respondent is a young people and the proxy is one of his/her parents: in this case it is possible that the adults don't consider their sons as employed if they hold a temporary job or an irregular work.

2.5 *Reticence of interviewees*

Both journalists and academics are deeply suspicious of statistics derived from household surveys in general, and the LFS in particular. If there are incentives to give untruthful answer, statistics which depend on these are often considered to be biased. The reasons for respondents to hide their real labour status is the worry of a tax inspection or the possibility to receive some kind of benefits from the government by defining themselves as unemployed. This attitude is stronger in the regions (like in South of Italy) where citizens don't thrust the action of the State. In South of Italy this situation is partly confirmed by high unemployment rates in contrast with a low flexibility in accepting non-standard job offers by the unemployed. On the other hand, direct surveys recently carried out in Campania, have discovered a high number of firms non compliant with laws and regulations for their employees.

3. The redesign of the LFS

Istat has recently undertaken a comprehensive project in order to fulfill the requirements of the new Regulation on the organization of the EU LFS, adopted in 1998, and, at the same time, to overcome most of the limits of the current LFS in giving an exaustive picture of the underground economy.

A dual approach has been developed: on one side, a project to redesign LFS changing the frequency of the survey, the sampling plan, the organization of the field work, the data collection techniques and the questionnaire is under study; on the other side, a supplementary survey[3], carried out on an annual basis, with a "time-use approach" has been proposed, in case the reticence of the interviewees will prove to affect significantly the measurement of employment.

In this paragraph we will discuss the project of the new LFS (Target survey) and the experimental plan that has been undertaken in order to assess the impact of each of the innovations on the estimates of employment.

The main changes envisaged in the design of the new LFS are:

- the switch from a single reference week to a continuous survey: this means that interviews will be carried out every week of the quarter;
- a new sampling design: apart from some big cities adopting a proper continuous framework, each sampled municipality will be associated to a reference week and all the municipalities in each stratum will be allocated to the 13 weeks of a quarter. In this way the same municipality will be covered in the same week each quarter;
- the adoption of a new data collection system: households will be interviewed face to face with the help of personal computers at their first inclusion in the survey and by telephone, if possible, in the recall interviews using networked desktop

[3] This project is carried out in collaboration with the Univeristy of Padova.

microcomputer. Households not contactable by telephone will be visited again at their address;

- a new organisation of the field work: face to face interviews will be carried out by a limited number of professional interviewers regularly monitored by regional supervisors; telephone interviews will be carried out by a specialised company in a centralised Telephone unit, with close supervisory control over the quality of interviews.
- the redesign of the questionnaire; the elimination of the opening question on main activity; adoption of a probing approach with a clear definition of the time reference; introduction of multiple questions to include persons with a job but not at work in the reference week and unpaid family worker; introduction of hints on casual jobs, and on the distinction between paid work and voluntary work.

In order to test the impact of these changes an experimental programme, which entails a set of pilot surveys, has been drawn by the Labour Force Department. This programme has been developed taking into account Istat's financial and human resource budget constraint.

3.1 *Target Pilot Survey*

The aim of the Target pilot survey is to test the new questionnaire, the effect of the interviewer on the quality of data and the new data collection techniques (Computer Assisted Personal Interview and Computer Assisted Telephone Interview).

The pilot survey takes place in three cities (Milano, Firenze, Napoli) on three independent samples (Sample A, B, C). The following table presents the size of each sample.

Tab. 3.1 – Target sample size

	Sample A N° households	Sample B N° households	Sample C N° households
Milano	295	354	354
Firenze	307	368	368
Napoli	274	329	329
Total	876	1051	1051

The three samples follow different survey organizations:

Sample A: it follows actual Labour Force survey and is used to do comparisons with the other samples;

Sample B: it follows a different organization; first a face-to-face interview with the new questionnaire in paper by municipality interviewers, then in the second and third phase telephone reinterviews by professional interviewers with the new questionnaire reduced;

Sample C: it follows the same organization of sample B but by a CAPI technique.

The first interview was done in June 1999 (I phase) and the second interview to the same households in October 1999 (II phase). The methods of collecting data are described in table 3.2

Tab.3.2 Target pilot survey. Organization of collection process

		Sample A	**Sample B**	**Sample C**
I Phase	June 1999	• Current LFS Questionnaire • PAPI[4] technique • Municipality interviewers	• New Questionnaire • PAPI technique • Municipality interviewers	• New Questionnaire • PAPI technique • Municipality interviewers
II Phase	October 1999	• Current LFS Questionnaire • PAPI technique • Municipality interviewers	• New Questionnaire reduced[5] • CATI technique • Professional interviewers	• New Questionnaire reduced • CAPI technique • Professional interviewers
III Phase	October 2000	• Current LFS Questionnaire • PAPI technique • Municipality interviewers	• New Questionnaire reduced • CATI technique • Professional interviewers	• New Questionnaire reduced • CAPI technique • Professional interviewers

[4] PAPI= face to face interview with Paper questionnaire

[5] in the II and III phase for the sample B and C we use new questionnaire reduced (from 119 to 83 questions) to confirm or not the situation collected in june.

Furthermore for each sample proxy answers were not allowed; this means that the interviewers have to return in the families to collect data about all members of the household. Considering the importance of no-proxy answer and the necessity of the having phone number of households to do the re-interviews, the municipality interviewers have been paid much more than in the current survey.

3.2 The new questionnaire

In the new questionnaire used in the pilot survey there are a series of innovative changes and integrations compared with the current Labour Force questionnaire and it is the result of a long period of study during which different questionnaires and experiences in the Labour Force survey of the main developed countries have been compared (United States, Canada, United Kingdom, France, Germany, Spain).

The new questionnaire is designed considering the main changes in the Italian labour market; on one hand the recent introduction of different type of contracts through "Pacchetto Treu" and on the other hand the demand by companies of more flexible jobs have carried on a wide diffusion of temporary jobs, independent contracts and part-time contracts.

The main changes of the questionnaire concern:

- the opening question on main status is dropped and the labour status of the interviewee is detected through three filter questions that intend to identify different categories of employed:

  "Last week did you do one or more hours of work, for pay or profit, even in occasional or seasonal jobs, with or without contract?"

  "Even if you haven't worked last week (for one of the following reason: maternity, holidays, illness, part-time, etc.), do you have a job from which you earn money?"

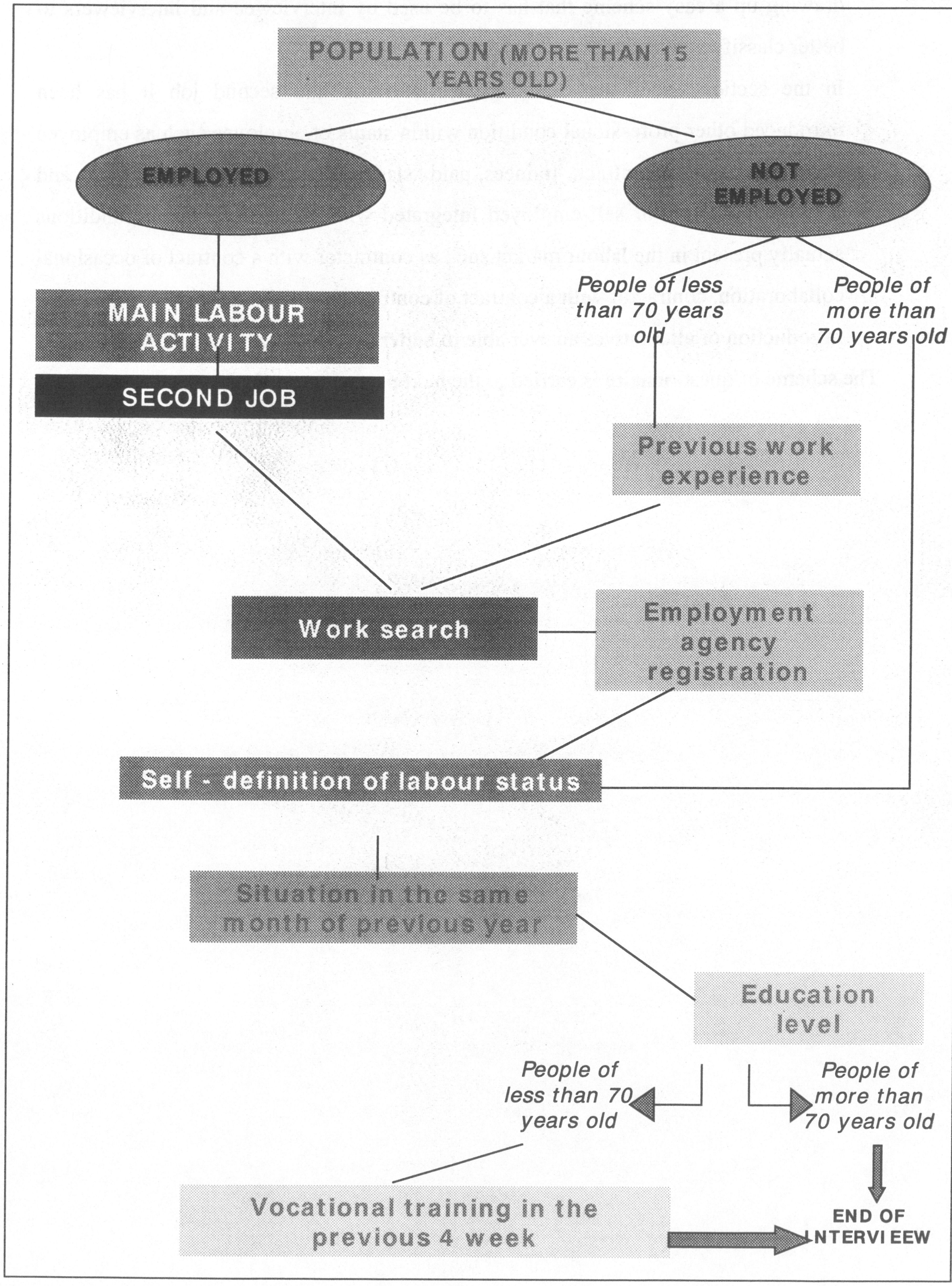
  "Last week have you done one or more hours of work, even without being paid, in a business of a family member or of a relative (voluntary service is excluded)?"

Only respondents who answer "no" to all the three questions are considered not employed and skip to the job search questions.

- The classification of employment by industry and of professions has been improved drawing up a easy scheme that has to be used by interviewee and interviewers to better classify and to find the right code;
- In the section about the characteristics of main and second job it has been introduced other professional condition within status of employee such as employee with (or without) a contract, trainees, paid "stageires", social works (lsu, lpu), and professional status of self-employed integrated with other professional conditions actually present in the labour market such as contractor with a contract of occasional collaboration, contractor with a contract of continuous collaboration;
- Introduction of alternatives answer able to better describe permanency of the jobs;

The scheme of questionnaire is carried to the next page (Figure 1).

Fig. 1 - Scheme of the new questionnaire



3.3 Marche Pilot survey

The Marche pilot survey has the purpose of testing the same questionnaire used in Target, in which there are added some direct and specific questions, that are supposed to be sensitive, to identify irregular contracts and underground-economy indicators.

The main integration in this questionnaire is the introduction of questions about:

referring to the main and second job and previous job experience:

- regular or not regular work contract for employees by the question "do you have a regular contract?";
- regularity of self-employed work by the question: "For your activity: do you invoice and/or does the employer pay for you (the tax) deduction of 20%?"
- public or private previdential contribution by the question "For your activity: does your employer pay your public contribution (and or) do you pay contribution to a professional order (and or) do you pay integrative private contribution"?;

independently of labour status :

- "Independently of your labour status do you receive a pension?".

The aim of this pilot survey is to test also the effect of more qualified interviewers selected from the professional training school for interviewers set up by Regione Marche. Anyway a specific training on LFS and new questionnaire has been done to all interviewers.

The pilot survey takes place in several municipalities of the Marche region on a sample of 1,391 households.

The first interview was done in October 1999 (I phase) and the second interview to the same households will take place in the middle of February 2000 (II phase).

The Questionnaire used is the same as the Target survey, integrated with several direct questions to identify irregular and underground employment. PAPI technique.

Proxy responses are not allowed.

4. A supplementary pilot survey on time use

The second approach single out by Istat to detect irregular employment is trough a supplementary survey. Here we discuss the project of a Pilot Survey, parallel to the LFS, that tries, within a time use framework, to measure the participation to work in a more accurate way, and, to some extent, to detect hidden work. We will briefly discuss some general problems linked to the measurement of employment to present the rationale and the methods used in drawing the Pilot Survey, as well as its design[6].

4.1. How time use approach overpass some problems of LFS

In the LFS approach to the measure of employment, many factors may influence the quality of the data. Given the internationally accepted definition of "work" (ILO, 1983), many aspect must be taken in account. Among them, a particular role is given by the good formulation of the questions to measure labour force participation and the cognitive aspects related to the comprehension of the concept of work by the interviewees (and/or by the interviewer) (Dupré *et al.*, 1990) and the self-perception of the respondents. The perception of the word "work" is influenced by social and cultural factors. More an activity is not "standard", more the interviewee doesn't feel him/herself as employed. An imprecise measurement of the number of employees can also results from the decision of the individuals to hide their condition. An employed person who had performed a hidden work activity can declare to be unemployed or even to be not in the labour force. The effect of all these factors on the estimation of labour force participation is difficult to evaluate (a tentative was done in US by McDonald, 1984).

These three problems of LFS (translation of the definition of work in appropriate questions, comprehension/self-perception and reticence) are, to some extent, overpass by a time use approach. The condition of employed is not based on a declaration of the respondent, as in the LFS questionnaire, but on a recognition of the character of work of some of the activities detected in the time use interview. In this way, we should be potentially able to collect information about those jobs that are usually difficult to find in standard LFS interviews.

---

[6] A more detailed description of the Pilot Survey can be found in Campostrini *et al.* (1999).

The time use approach has several advantages in measuring employment. The classification of a person as employed or not employed is done moving from the analytic description of all activities done during the day, and it is largely independent by interviewee's (and interviewer's) perception of what is "job". Moreover, the attention paid to the activity done during the day and not to the working condition, should eliminate (or minimise) reticence problems.

The importance of a time use approach for the measurement of employment, unemployment and under-employment was recognised by the 13[th] International Conference of Labour Statisticians in 1982[7] and it has been also recommended by the ILO (Mata-Grenwood, 1993; Hoffmann e Mata, 1998).

In spite of the large interest to time use surveys for measuring employment, there are no experience that, at the moment, we can acknowledge. Time use surveys have been instead largely used to measure informal economy (Stinson, 1997; Luttikhuizen e Oudhof, 1987).

4.2. The design of the Pilot Survey

The design of the pilot survey on time use has been kept as much as possible similar to the LFS[8]. We decided to maintain some characteristics unchanged, avoiding introducing too many experimental factors and limiting uncontrolled factors. Introducing too many aspects under experimentation in the study could confuse the real effect of each one, confounding comparisons between Pilot Survey and LFS.

Of LFS we kept: (i) the frame and the sampling design; (ii) the modality of data collection (face-to-face, although with a CAPI system); (iii) the classification of jobs and of sectors of economic activities.

For other two aspects, we maintained only a partial similarity with LFS. The reasons can be found in the complexity and sensibility of the survey instrument. For the pilot survey we decided to use trained interviewers, of a higher educational level (graduate or university student), and to change the weak rules of LFS referred to proxy respondents

[7] "In order to provide improved and more detailed information on employment, unemployment and underemployment and for other purposes such as identifying multiple activities and marginal activities, attempts should be made to collect periodically statistics on time use" (ILO, 1983, paragraph 32).

[8] A detailed exposition of survey design of RTFL is in Barcaroli et al. (1993).

into more strict ones. More control in the conduction of the survey (supervisors, rigid rules for contacts and substitutions) is also provided.

The sample is divided in two parts: half of the sample is composed by "fresh" families, i.e. never interviewed, and half comes from the families of the sample of LFS that had left the sample (they have been interviewed for the fourth time the preceding week). The major pro of this choice is the possibility for a direct comparison among the results of LFS and those of the Pilot Survey. The only con is that the second half comes from a selected sample. Table 4.1 reports the sample size of the sample in the three municipalities[9] chosen for the Pilot Survey.

Tab. 4.1 Pilot Survey sample size.

	LFS N° of households	Pilot Survey N° of households	Pilot Survey N° of individuals
Treviso	756	378	824
Prato	400	200	400
Benevento	408	204	402
TOTAL	1.564	782	1.626

A crucial point of a time use survey is the division of the sampling units in the days of the week that must be equally represented. There could be two opposite solutions: the respondent is free to choose the day to be interviewed, or all the respondents are assigned to a prefixed day. In the first case, there could be a big problem of self-selectivity; the latter solution could cause a large number of proxy interviews. In the LFS, the sampling unit is the family and all the members are interviewed. This sampling design brings further complications for a time use survey. For reducing the risk of self-selectivity, on one hand, and the numbers of proxy interview on the other, we decided to adopt a mix strategy. 5/7 of the sample will be interviewed on a day from Tuesday to Saturday (referring to Monday - Friday), 1/7 of the sample on Monday (referring to the day of Sunday) and 1/7 on Sunday (referring to Saturday). This strategy is a "mix one" since it combines two requirements: for 5/7 of the sample is given a relative freedom in the choice of the day to be interviewed (the interviewer must try to distribute evenly the interview during all the working days, while only 2/7 of the sample is constricted with some rigidity.

4.3. The questionnaire

The approach chosen for the time use survey is a retrospective daily diary, usually called 'yesterday interview'. The yesterday interview is a personal interview in which the respondent, guided by the interviewer, recalls all the activity, in temporal order, done the day before.

The questionnaire is composed by three parts: a daily diary, a socio-economic section and a weekly diary (for a scheme see Figure 1). The daily diary starts at 4.00 a.m. (we choose 4.00 am because at that time most of the people are sleeping) and it recall all the activities of the previous day, starting with the first activity. Every activity, apart from sleeping and personal care, is better described by some probing questions. These probing questions ('where were you', 'with whom', 'for whom/for what purpose', 'where you doing something else during that time?') help respondents to remember but also reduce reticence[10] (in describing analytically an event is quite difficult to lie) and help the interviewer in identifying working activities. In this way, the classification of a person as employed or not employed is largely independent by interviewee's perception of what is "job". The identification (classification) of an activity as "working activity" is thus done according to an interviewer evaluation, based on defined criteria and controlled by mechanism internal to the questionnaire[11].

If, after the probing questions, the interviewer has still some doubts about the kind of activity, can record this in one of five classes of borderline activities: coadjutant, volunteers-assistance, study-work, bricolage, and housework. A question concerning the payment received for the activity (posed in different ways for each type of borderline activity) can help in solving the problem of classification. The sensitive task of the interviewer is thus to follow different tracks, comprehending and distinguishing all the

---

[9] The choice of the municipalities is done on the basis of their different characteristics in terms of labour market.

[10] The accent posed on the activity done during the day and not to the working condition contribute to reduce reticence problems too.

non-standard situations. For this reasons we have required good training and a higher educational level.

The second part of the questionnaire collects some socio-economic information about respondents. In this section, we define the professional profile of the individual starting from the working activities detected in the daily diary. These activities are probably quite different one from the others, and the first objective is to recognise if they are all referred to a single job or the respondent is employed in more than one job[12]. For every job, the usual questions of the LFS are posed, helping the comparability between the two surveys.

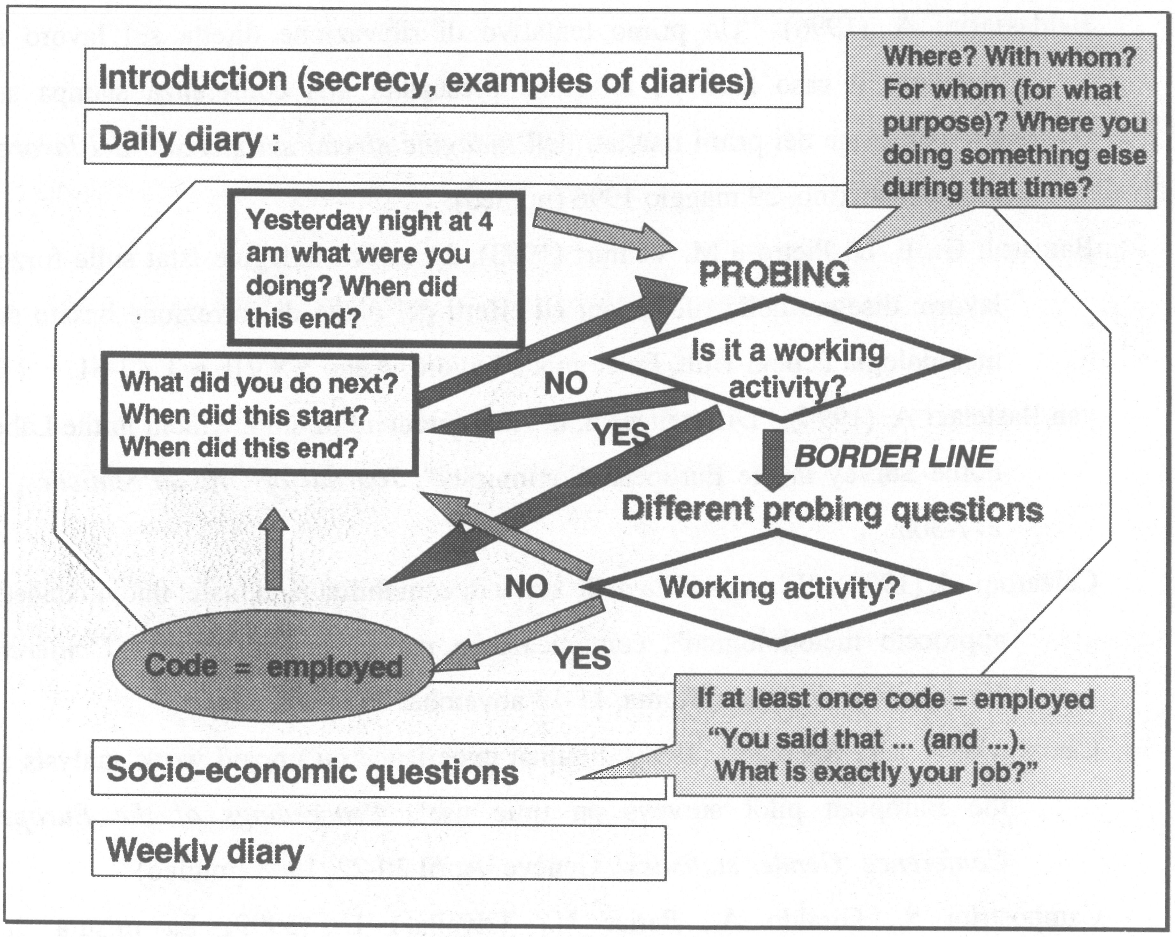
The third part of the questionnaire is the weekly diary. By means of a short series of questions, we try to understand if the day in which we collect information is a standard one or it is referred to a week unusual for the respondent. This diary allows detecting also employed persons who, in the reference day, haven't work at all. This is especially the case when the reference day is Saturday or Sunday. In this section the definition of 'employed' for people not already so classified earlier in the questionnaire, is the same as in the LFS.

---

[11] The CAPI system helps in managing the skip patterns and the numerous controls.

[12] This is a way to discover second job.

Fig. 2 - Scheme of the questionnaire



References

Alessandrini L. (a cura di) (1978), *Lavoro irregolare e lavoro nero*, Bologna, Il Mulino.

Baldassarini A. (1996), "Un primo tentativo di rilevazione diretta sul lavoro non regolare: il caso Sicilia", relazione presentata alla conferenza stampa sulla presentazione dei primi risultati dell'*Indagine diretta sul mercato del lavoro in Sicilia*, Palermo, 29 maggio 1996 (mimeo).

Barcaroli G., E. Di Pietro e M. Venturi (1993), La nuova indagine Istat sulle forze di lavoro: disegno delle rilevazioni ed effetti del piano di correzione basato sulla metodologia Fellegi-Holt, Economia e Lavoro, Anno XXVII, n.3, 47-61.

van Bastelaer A. (1994), "Differences in the measurement of employment in the Labour Force Survey in the European Community", *Journal of Official Statistics*, 10, 277-305.

Calzaroni M. (1998), "L'esaustività delle stime di contabilità nazionale: nuovi concetti e approccio metodologico", comunicazione presentata alla *Quarta Conferenza Nazionale di Statistica*, Roma, 11-13 novembre 1998 (mimeo).

Camporese R. e L. Sabbatini (1998), "Italian experience on unpaid work analysis and the European pilot surveys on time use", *Proceedings of the European Conference 'Gender statistics'*, Genève, April 20-22, 1998 (mimeo)

Campostrini S., Giraldo A., Parise N., Trivellato U. (1999) La misura della partecipazione al lavoro in Italia: presupposti e problemi metodologici di un approccio "time use", Gruppo di ricerca "Lavoro e disoccupazione: questioni di misura e di analisi", Working Paper n.14.

Dupré M.T., R. Hussmanns and F. Mehran (1990), "The concepts and boundary of economic activity for the measurement of the economically active population", in R. Turvey (ed.), Developments in international labour statistics, London, Pinter Publishers, 106-125.

Feige E.L. (ed.) (1989), The underground economies. Tax evasion and information distortion, Cambridge (Mass.), Cambridge University Press.

Hoffmann E. (1990), "Accounting for time in labour force surveys", in R. Turvey (ed.), Developments in international labour statistics, London, Pinter Publishers, 151-164.

Hoffmann E. e A. Mata (1998), Measuring working time: an alternative approach to classifying time use, Genève, International Labour Office.

ILO (1983), "Resolutions concerning statistics of the economically active populations, employment, unemployment and underemployment", Bulletin of Labour Statistics, No.3, pp. xi-xvi.

Istat (1993a), Time use methodology: toward consensus, Note e Relazioni, n. 3, Roma, Istat.

Kazemier B. and R. van Eck (1992), "Survey investigations of the hidden economy. Some methodological results", *Journal of Economic Psychology*, 13, 569-587.

Juster F. T. and F.P. Stafford (1991), "The allocation of time: empirical findings, behavioral models and problems of measurement", Journal of Economic Literature, Vol. XXIX, 471-522.

Luttikhuizen R.and J. Oudhof (1987), "Informal economy, a time use approach", paper presented at the 20th Conference of the International Association for Research in Income and Wealth, Rocca di Papa, 23-24 Agosto 1987 (mimeo).

Lyberg I. (1989), "Sampling, nonresponse, and measurment issues in the 1984-85 Swedish Bime Budget Survey", in US Bureau of the Census (ed.), Fifth Annual Research Conference, 210-234.

Mata-Greenwood A. (1993), "Time use surveys: their role in labor force statistics", in Istat, Time use methodology: toward consensus, Note e Relazioni, n. 3, Roma, Istat, 389-391.

McDonald R.J. (1984), "The 'underground economy' and BLS statistical data", *Monthly Labor Review*, 107, 4-18.

Meldolesi L. (1996), "L'elevata mobilità del lavoro nel Mezzogiorno della speranza", in G. Galli (a cura di) *La mobilità della società italiana.* SIPI, Roma.

Rettore E., N. Torelli e U. Trivellato (1993a), "La stima della partecipazione al lavoro e dell'occupazione tramite l'indagine sulle famiglie", in U. Trivellato (a cura di), *Norme e metodi sul mercato del lavoro. Vol. I*, Documenti CNEL n.28, Roma, CNEL, 145-179.

Rossi F. (1997), "Disoccupazione, offerta di lavoro e lavoro sommerso", in S. De Nardis e G. Galli (a cura di), *La disoccupazione italiana*, Rapporto del Centro Studi Confindustria, Bologna, Il Mulino, 31-89.

Siesto V. (1988), "I problemi di misurazione dell'economia sommersa", in Società

Italiana di Statistica, *Atti della XXXIV Riunione Scientifica*, Siena, Nuova Immagine Editrice, vol.1, 87-110.

Stinson L. L. (1997), “”Using a time use approach to measure the frequency and duration of non-market labor: problems and solutions”, paper presented at the Conference ‘Time use, non market work, and family well-being’, Washington, November 20-21, 1997 (mimeo).

Zavanella B. (1999), “Nuove possibilità di stima del lavoro sommerso attraverso l’uso congiunto di censimenti e registri”, comunicazione presentata al *Convegno della Società Italiana di Statistica: Verso i censimenti del 2000*, Udine, 7-9 giugno 1999 (mimeo).