Eurostat/OECD 2018 questionnaire on the methodology underlying labour input data in national accounts

Country: Italy
Date: April 2018

PartII: Methods

1. Employment in persons

Question 1.1: **Please describe the architecture of your estimation method for employment in persons. Please include details of differences in methods and data sources that may exist at different points in the time series (e.g. a break in the series) or due to the timing of the estimate (e.g. flash estimate, regular estimate or annual data). Please also provide links to articles that may be relevant.**

The estimation model for all annual labour input measures is linked to the availability of sources of information during the year. National accounts data are released twice per year (hereafter year t), at the end of February and at the end of September. The complete data set for labour input estimates is available in time for the 30th of September release.

If no significant adjustment to the year t-4 is deemed necessary, in the release of February of year t a definitive estimate is published for the year t-3, while a provisional estimate for the year t-2 and a first estimate for the year t-1 are compiled, both through a simplified approach based on quarterly estimates (QNA). Then, in the September (of year t) release data are revised for the year t-2, drawing upon the statistical sources that have become available and again for the year t-1, updating the QNA-based simplified approach.

A table that shows sources of information referred to employment routine revisions is reported below.

Timetable of labour input routine revisions according to available sources of information

Aggregates	Reference year	March of year t	September of year t
	t-3	Small and medium enterprises: no changes; Large enterprises: final results of the census survey on economic accounts of large enterprises (SCI). Final data from the annual account of General Government employees compensation.	No changes
Employment	t-2	LFS data. Provisional data from Business Register (ASIA). Data on domestic personnel and agricultural workers and provisional data on the self-employed from the Social security Institute (INPS). Provisional data from the annual account of General Government employees compensation. Data from the Ministry of Education. Multi purpose survey. Quarterly data on hours worked. Updated data on hours compensated by the Wage Supplementation Fund.	LFS integrated with administrative database at the micro level (from Social security Institute data on employees and the self-employed). Final data from Business register (ASIA). Small and medium enterprises: final results of the database on Structural business statistics (Frame-SBS); Large enterprises: final results of the survey on local units of large enterprises (IULGI). Tax register of the Ministry of Finance, individual permits for non EU citizens from Ministry of the interior, Municipal Register Lists and other administrative data related to employment. Register of circulating vehicles.
	t-1	First release based on quarterly data. Provisional data on General Government personnel from annual estimates provided by State General Accounting Department.	Second release based on quarterly data

The estimation approach to persons employed disseminated on September is based on the availability of a complete set of source of information. It is mainly based on the micro integration of information of two relevant databases; one on labour demand (database on employers) and one on labour supply (database on workers).

The approach has been implemented for the first time on September 2014 starting from the reference year 2011. Since 2011, estimates are updated every year with the same approach. The back-cast values for time series 1995-2010 have been calculated with the growth rates of the previous time series.

The methodology for estimating labour input incorporates innovations and changes connected both to the evolution of the available information, increasingly represented by administrative sources, and to the production processes that exploit data integration techniques at the micro level.

The set of integrated sources (statistical and administrative ones) is produced annually allowing to estimating persons employed, jobs, hours worked and FTEUs according to ESA definitions and classifications. In particular this set of integrated sources is designed in a way to produce annually two main databases:

1) the first one including data on declared jobs collected from employers operating on the economic territory (so called database on employers);

2) the second one including data on declared and undeclared workers engaged by resident production units (database on workers).

In the table below a detailed list of the sources of information used to build the two databases that represent the main statistical and administrative sources of information for the labour input estimation process is reported.

Table 1 . Sources used for the compilation of the two databases on employment

Sources on employers	Sources on workers
Employees:	**Employees:**
Asia Enterprises Business Register	Labour Force Survey
Asia Legal-Units Register	Multipurpose survey on households: aspects of daily life
Updated Census of public institutions 2011	Tax Register
Updated Census of non -profit institutions 2011	National archive of residence permits
Updated General Agricultural Census 2010	Archive on employees in private sector - National Social Security Institute
Annual account of General Government employees compensation	Archive of employees in agriculture - National Social Security Institute
Survey on financial statement of large enterprises (SCI)	Archive of employees in the entertainment industry - National Social Security Institute
Survey on local units of large enterprises (IULGI)	Archive of employees in the public sector - National Social Security Institute
Archive of domestic work relationship - National Social Security Institute	Archive of domestic work relationship - National Social Security Institute
	Archive of Italian journalists pension fund
Self-employed:	
Asia Enterprises Business Register	**Self-employed:**
Asia Legal-Units Register	Labour Force Survey
Updated General Agricultural Census 2010	Tax Register
Survey on financial statement of large enterprises (SCI)	National archive of residence permits
Survey on local units of large enterprises (IULGI)	Archive of separate management - National Social Security Institute
Archive of separate management - National Social Security Institute	Archive of Italian journalists pension fund
	Archive of self-employed agriculture - National Social Security Institute

The database on employers is based on sources providing information on declared jobs of employees and self-employed in annual average for each production unit. The database covers all the institutional units included in the ESA production boundary: enterprises, public and private institutions, households. In particular, the database is obtained integrating the business register (ASIA register of active enterprises), with units excluded from its coverage but included in the ESA production boundary. Integration is made at the level of institutional unit (identified by a fiscal code).

The database on workers is developed integrating statistical and administrative sources for each person staying and working on the economic territory. The LFS integrated with administrative files (LFS_ADMIN hereafter) is the main **internal source on workers**, in terms of coverage and richness of information. Integration at micro level of survey data with administrative files is made every year through an innovative process based on micro linkage techniques and statistical models. This process identifies all the jobs of each individual included in the survey sample, merging information on labour collected through the survey questionnaire (occupational status and detailed characteristics of the main and secondary jobs covered) with information on social contributions paid for each job resulting from administrative files. Consistency between jobs declared in the survey and those resulting from administrative files is checked.

Results of micro-linkage highlight the existence of bias in the measure of employment in all sources, i.e. possible under-coverage of the Labour Force survey and possible over-coverage of administrative files. In particular, the latter concerns cases of payments of social contributions when labour input is not actually provided: "weak signals" in administrative files, like short period jobs or low remuneration paid, for persons declaring themselves "not employed" or "not active" in the LFS. On the other hand, under-coverage of the survey concerns cases of people omitting to declare jobs actually carried out, for which significant signals are present in administrative files.

A probabilistic model has been developed in order to measure and correct statistically this bias. The validation process is based on a probabilistic model which combines information collected by the survey

and administrative information on the same individual in order to validate or cancel administrative signals. Once administrative signals are validated, the estimation model assumes the existence of significant administrative signals as indicator of employment also for those persons declaring themselves not employed or not active in the survey. This latter assumption caused the re-classification of a relevant amount of persons resulting "not employed" or "not active" in the survey as employed in national accounts estimates. LFS_ADMIN database is the result of such an integration process. Combining information of the survey with administrative signals, it allows to classify each job as "declared" when a validated administrative signal is linked to it (i.e. social contributions are paid for it) or as "undeclared" in case of absence of validated administrative signals . The procedure allows to identify **declared** and **undeclared** persons employed and jobs (in annual average) in the same data source and to calculate for each job the corresponding amount of hours worked as recorded by the survey.
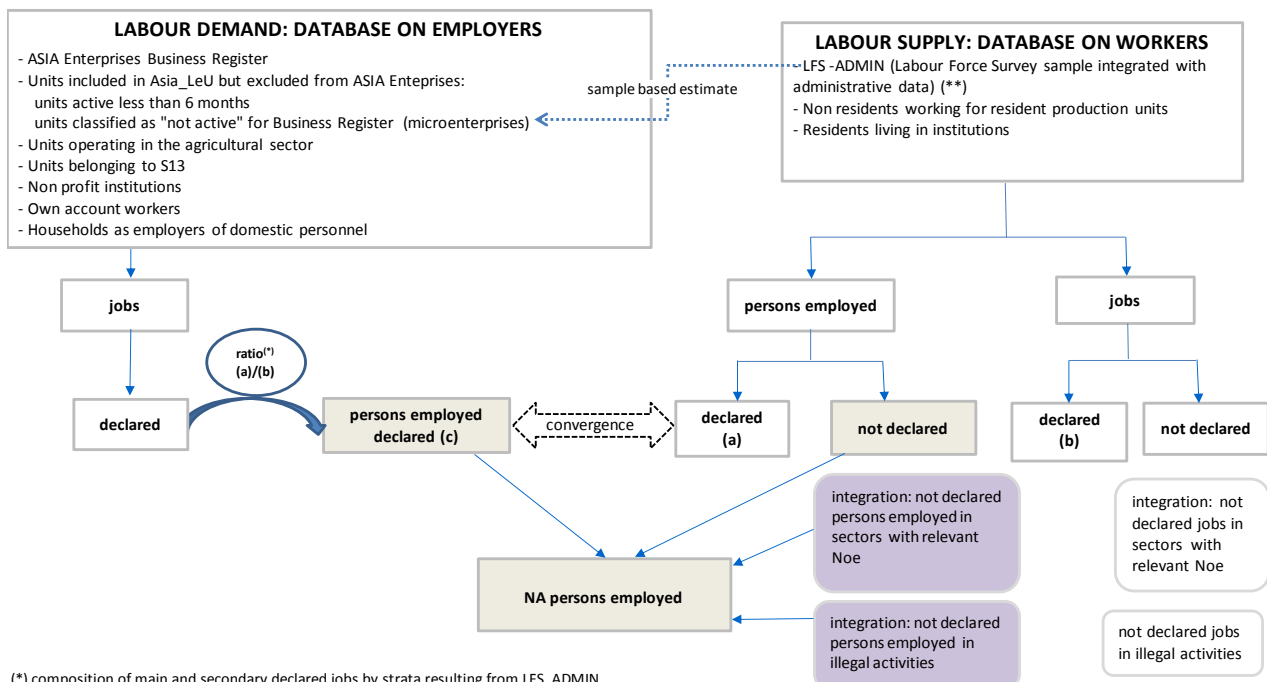
The LFS_Admin database excludes, by definition, some components not covered by the sample survey. In particular, estimates are integrated to include at the employed persons living in institutions and the non-resident workers engaged in resident production units.

Persons employed are estimated using different sources of information: the database on employers for declared persons employed; the database on workers for undeclared component of labour input; persons employed referred to components of the unobserved economy (estimated with indirect methods).

The estimation process of persons employed can be summarized in the following sequential steps (see Chart 1):

1) Estimation of **declared jobs.** Declared jobs result directly from the database on employers. In order to account for over-estimation of administrative files the estimate of jobs derived from administrative sources is corrected using coefficients resulting from the validation process of administrative signals according to the LFS_ADMIN. In 2011, the above adjustment caused the correction of 2.7% of potential jobs; the correction has been referred mainly to employment engaged in the agricultural sector, in the activities of households as employers of domestic personnel and employment involved inself-employed activities.

2) The estimation of **declared persons employed** (i.e. unique or main job) is derived applying the share between main and secondary declared jobs (resulting from LFS_ADMIN by strata) to the number of adjusted declared jobs.

3) Estimation of **undeclared persons employed and jobs.** It is obtained directly from the database on workers, summing up undeclared jobs identified by LFS_ADMIN (with sample weights) and those of non-resident foreigners (legally and illegally staying in the country).

4) In some sectors as land transports, hotels, restaurants and catering, activities of households as employers of domestic personnel, where the phenomenon of undeclared workers is relevant, an amount of additional <u>main</u> and <u>secondary jobs</u> are estimated and added to the total amount of undeclared jobs; the above component is obtained, using specific indirect methods (the comparison between demand and supply).

5) Finally the amount of persons engaged in illegal activities is added to undeclared **persons employed and jobs**. In the above case, the labour input is estimated using indirect methods starting from the estimates of the value added in the corresponding economic activities and comparing it to an average value per job position. Employed persons in illegal activities are classified as self-employed and integrated into their own sectors of illegal activities: wholesale and retail (for drugs and contraband) and other personal services (for prostitution).

Chart 1 – Employment estimation process

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LABOUR DEMAND: DATABASE ON EMPLOYERS

- ASIA Enterprises Business Register
- Units included in Asia_LeU but excluded from ASIA Enteprises:
  units active less than 6 months
  units classified as "not active" for Business Register (microenterprises)
- Units operating in the agricultural sector
- Units belonging to S13
- Non profit institutions
- Own account workers
- Households as employers of domestic personnel

LABOUR SUPPLY: DATABASE ON WORKERS

- LFS -ADMIN (Labour Force Survey sample integrated with administrative data) (**)
- Non residents working for resident production units
- Residents living in institutions

sample based estimate

jobs

persons employed

jobs

ratio(*) (a)/(b)

declared

persons employed declared (c)

convergence

declared (a)

not declared

declared (b)

not declared

NA persons employed

integration: not declared persons employed in sectors with relevant Noe

integration: not declared jobs in sectors with relevant Noe

integration: not declared persons employed in illegal activities

not declared jobs in illegal activities

(*) composition of main and secondary declared jobs by strata resulting from LFS_ADMIN.
(**) Methodology for the compilation of LFS_ADMIN has been developed by a Working Group of experts of the NSI. Preliminary analysis and the methodology is described in AA.VV., (2015) "Soluzioni metodologiche per l'utilizzo integrato delle fonti statistiche per le stime dell'occupazione", Istat Working Papers, N.19

Chart 1 shows that the two databases cover different components of employment which overlap with respect to the declared component (employees and self-employed), while undeclared one is covered only by the database on workers. Since there is a statistical convergence between the two measures of declared persons employed (Chart 1, items (a) and (c)), we use an "additive" approach summing up declared persons employed from the database on employers (a detailed and exhaustive source whose classifications are consistent with national accounts aggregation criteria) and undeclared persons employed from the database on workers. The same approach is used for jobs. Statistical convergence between these two different measures of declared employment is checked yearly as it is a basic requirement of the estimation process.

Question 1.2: **What is the main original source for employment in the national accounts (e.g. administrative source, labour force survey, business survey, other)? Briefly describe this source, its coverage (including over time, range of businesses/households covered, etc.), its availability and whether it is in terms of jobs and/or persons.**

Please specify the sources used for different parts of employment (in particular if sources differ between employees and self-employed, and/or between industries, firms of different size, etc.). If sources differ, please provide a clear distinction when answering the questions that follow.

See answer to Question 1.1.

Question 1.3: **Please describe how estimates of annual figures based on higher frequency data (e.g. weekly, monthly, quarterly) are derived. Please also specify, if relevant, how annual figures are derived if survey information is less periodic (e.g. every 5 years)?**

Being the LFS a survey on a continuous base, the annual averages of jobs and persons employed are obtained as the arithmetical mean of the quarters.

The annual averages of per capita worked hours per job in are obtained as:

[weekly hours/7*365]

The annual averages of per capita worked hours per strata j are obtained as:

$\sum_j$ [weekly hours $_j$ /7*365] * (survey quarterly weights$_j$/4) / $\sum_j$ survey quarterly weights$_j$/4

Question 1.4: **Please describe the adjustments made to pass from jobs to the concept of persons (if the original source is in terms of jobs).**

As specified in the answer to Question 1.1, declared persons employed are derived from the the database on employers, adjusted using a ratio by strata of the composition of main and secondary declared jobs resulting from LFS_ADMIN.

Estimation of undeclared persons employed is obtained directly from the database on workers, summing up undeclared main jobs identified in LFS_ADMIN and those of non-resident foreigners (legally and illegally staying in the country) plus adjustments.

Question 1.5: **Please describe the adjustments made to correct for coverage of the economic territory (see ESA §11.17-11.19)? This refers specifically to residents working for non-resident units abroad non-residents working in resident units. If relevant, please also describe adjustments for military (including conscripts, where applicable) and other collective households not covered by your main source.**

Non-residents working for resident units

Non-residents working for resident production units can be divided in two sub-groups: those who have a permission to stay and work in the country, with a declared and/or a undeclared job; those without a legal permission to stay in the country and that, by definition, can only perform undeclared jobs.

-   For people who have a permission to stay in the country and perform a declared work, no adjustments are needed because declared workers are derived from labour demand side (database on employers) and therefore they are included.
-   For people who have a permission to stay in the country and perform an undeclared work, adjustments have been made. The estimate originates from the amount of declared work performed from non-residents workers legally present (estimated but not added because included, see above), using a coexistence ratio of declared and undeclared work (for main and secondary jobs) calculated for foreign residents in LFS-ADMIN. The main steps of the methodology are:
    1) To extract a list of persons legally present in the country but not recorded in the resident population through two different administrative sources:
    • Micro data on extra-EU citizens who have a permission to stay in the country (National archive of residence permits);
    • List of EU citizens obtained selecting from the tax register foreign persons[1] owing a fiscal code who are not in the resident population or in the list of non-residents with a permission to stay in the country: they are assumed to live in the country.
    2) The integrated list of non-resident persons is linked at micro level, with administrative files on social contributions in order to identify and measure the annual average[2] of declared jobs performed

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[1] The Tax Register does not record the country of residence, therefore country of birth is used as a proxy to identify foreigners.

[2] The annual average is calculated using information on the duration of the job reported in the administrative files with different levels of accuracy depending on the source.

by non-residents, distinguishing main jobs from secondary ones, and classifying each job according to the characteristics of the employer (estimate on labour supply side).

3) A further assumption is made, supposing that non-residents can perform undeclared works as residents do and that they behave like foreign residents. So undeclared jobs of non-residents are obtained using the same proportion of declared and undeclared jobs calculated for foreign residents in LFS_ADMIN database; (ratios are obtained considering five stratification variables: the status in employment (employee, self-employed), citizenship (4 continents), gender, age-class, territory where the work is performed (first level NUTS classification).

- As regards foreigners illegally staying in the country, the estimation of jobs can be based only on indirect sources of information. For this category of workers jobs equal persons employed.

The estimate is yearly provided using available sources of information such as: data elaborated by private research institutes monitoring the immigration phenomenon, data provided by the Ministry of Interior on illegal in-flows and out-flows of foreigners, specific Decrees promulgated in order to control in-flows, eventual regularization measures. In 2011, the estimate was based on the number of demands presented by workers illegally present on the territory in order to regularize their position, according to an exceptional regularization law (legislative decree n.109 dated 16 July 2012 for the regularization of jobs illegally performed by extra-EU citizens). Details provided by the Ministry of Interior allowed to classify persons employed by region of the workplace and by economic activity (using the collective agreements on labour applied to jobs as a proxy).

Residents working for non-resident units abroad

Data are obtained from the LFS. In this way, it is possible to exclude the above component from labour input estimates according to the domestic concept.

Question 1.6: **Which adjustments are made for the unobserved economy (e.g. producers that deliberately do not register, individuals providing their labour that are not required to register, illegal workers, etc.)?**

The most important estimate of employees and self-employed labour input involved in the NOE is obtained directly from the LFS-ADMIN source (see answer to Question 1.1). Specific Items/Industries where 'ad hoc integrations' have been made for NOE are the following:

1. Households as employers for domestic work (Nace rev 2 cod 97):
   - The «Multipurpose survey on households: aspects of daily life» contains specific questions about the use of domestic work in household. The survey allows to measure the total amount of labour input engaged by households.

2, Accommodation and food service activities (Nace rev 2 cod 55, 56)
   - Comparison between supply aggregates estimated net of integration and demand aggregates showed a gap on the supply side. This gap has been partially explained assuming the existence of a part of production not directly measurable and obtained using labour input which also cannot be measured directly. For this reason this part of employment is estimated indirectly assuming the excess of demand as an estimate of the non-observed production and estimating the underlying labour applying average per capita production values of not declared job directly measured. Jobs integrated are classified as secondary undeclared jobs.

3 Land transports of passengers and goods (Nace rev 2 cod 493, 494)
   - The National archive on circulating vehicles (ACI) allows to estimate indirectly the number of potential jobs using information on the number of specific types of vehicles used for the carriage of goods and passengers by road;

- The undeclared jobs integrated are those that exceed the total jobs directly estimated in this industry (declared and undeclared). Jobs integrated are classified as primary and secondary undeclared jobs.

4 Illegal activities: please see point 5) answer to the Question 1.1. For this category of workers no secondary jobs are estimated.

5 Construction activities of households for their own use: for this NOE category, the labour input estimate is based on annual hours worked by own account workers for own final consumption in construction activities. Jobs and hours worked are estimated using information collected by the "Time Use Survey" (available every 4 years) interviewing family members involved in the activity of "Construction and major maintenance in their own dwelling. Jobs integrated are classified as secondary declared job self-employed jobs.

6 Agricultural activities of households for their own use: for this NOE category, the labour input estimate is based on the updating of Census data integrated with the annual estimate of agricultural production for own use. The integration of jobs is attributed to declared self-employed involved in secondary activities.

7 Units resulting "not active in the year" and without employees (unstructured microenterprises): these units are excluded from ASIA-Enterprises but some of them may result "active" when the self-employed engaged by a specific unit is classified as employed in the unit itself by Labour Force Survey integrated with administrative archive (LFS_ADMIN database that will be described below). The estimation of self-employed jobs engaged in these units is not obtained summing up jobs from an exhaustive list of units but is sample-based. In particular, it is obtained integrating three different sources of information: an internal source on employers referred each legal institutional unit (ASIA-LeU register), the LFS and the complete set of administrative files on social contribution (LFS_Admin). The integration process allows to estimate jobs to be included in national accounts estimates: firstly self-employed responding to the LFS and for whom a significant amount of social contributions is paid are identified; secondly in the corresponding group a further selection is made, identifying among them only the production units who are recorded as owners of units listed in ASIA-LeU register; finally, production units not identified in other employers sources are accounted. The final estimate is obtained grossing up main and secondary jobs of the selected pool of workers using the labour force sample weights.

8 Non-residents that perform undeclared work in the country: please see answer to the Question 1.5.

Question 1.7: **Which, if any, other adjustments are made (e.g. inclusion of resident workers below the age threshold, prisoners, adjustments made to account for statistical deficiencies in the source data, etc.)?**

No other adjustments are made

Question 1.8: **In cases where Labour Force Survey data have not been used as the main source (even if only for some activities or groups of workers), please explain why. Are LFS data used for adjustments or cross-checking? Are differences monitored?**

Declared jobs and persons are obtained from the database on employers which is based on administrative sources of information (see Chart 1). The database is complete and well detailed also in terms of classifications (demographic and economic characteristics). It is available with a lag of one year and half.

Declared jobs are obtained directly summing up jobs in annual average, adjusted using coefficients resulting from the validation process of administrative signals from LSF_ADMIN.

Declared persons employed are derived from declared jobs through ratios calculated using the composition of main and secondary declared jobs resulting from LFS_ADMIN by strata.

LFS is an important source for estimating not declared employment by position and industry.

LFS is also used for provided labour input estimates in the provisional year (t-1) disseminated on September of each year.

2. Hours worked

Question 2.1: **Please describe the architecture of your estimation method for hours worked. Please include details of differences in methods and data sources that may exist at different points in the time series (e.g. a break in the series). Please also provide links to articles that may be relevant.**

Estimates referred to year t-3 and t-2

Total hours worked are estimated multiplying per capita hours worked recorded in the LFS_ADMIN database (Labour force survey sample integrated with admin data) per different type of jobs (main and secondary jobs) .

Per capita data and jobs are identified by domain of estimation. The number of domains is influenced by sample constrains and reflects those labour characteristics which are relevant for "hours worked" such as: the economic activity of the production units, its size and legal status, employment status of the worker and kind of job, i.e. main or secondary works and declared and undeclared status. In the LFS_ADMIN, the per capita of hours actually worked for declared employees is subjected to specific quality controls using other sources as business surveys (annual and quarterly), temporary layoff hours providec by the National Institute of Social Security (INPS).

Employee domains:
Declared main jobs from enterprises by economic activity and size classes
Declared main jobs from NPISH by economic activity
Declared secondary jobs by economic activity
Not declared main jobs by economic activity
Not declared secondary jobs by economic activity

Self-employed domains:
Declared main jobs from enterprises by economic activity
Declared secondary jobs from enterprises by economic activity
Declared main jobs of entrepreneurs and own-account workers by economic activity
Declared secondary jobs of entrepreneurs and own-account workers by economic activity
Jobs of family workers
Not declared main jobs by economic activity
Not declared secondary jobs by economic activity

Different approaches are used for specific typologies of employment: self-employed in micro enterprises and employees in the General Government Sector (S13).

The amount of hours worked by self-employed in micro-enterprises is obtained directly from the LFS_ADMIN: no per capita values are used but directly the sample total amount. The identification of the above group of workers is described at point 7, answer to Question 1.6.

Estimates of hours actually worked in the General Government Sector (S13) have been elaborated adopting a method by component. According to this method, the contractual number of hours are the benchmark; then the components which are not worked are deleted out and a measure of extra hours actually worked is

added. Sources of information permit to define estimates for each professional category in each collective bargaining area. The main source is the survey of a department of the Ministry of Economy (Survey 'Conto annuale del Personale' della Ragioneria Generale dello Stato).

Estimates of hours have been made starting from the total amount of contractual number of hours worked of full time workers, for each professional category in each collective bargaining area (hours theoretically workable corresponds to the weekly hours workable by contract multiplied by 52 weeks in a year and by the number of jobs). This amount represents the hours that employees should work without any absence during the year. Survey information allows adjusting this amount from:
- number of hours corresponding to the holidays occurring during the year;
- number of hours not worked because of vacations or illness, strikes, leaves (paid or not);
- hours not worked for part-time employment;
- overtime hours to add.

Estimates referred to year t-1
Estimates of the total number of hours worked (declared nd undeclared) mainly derives from a quarterly forecast of this aggregate, using an infra-annual indicator of per capita hours worked derived from different sources (Labour Force Survey, and short-term business surveys) which provides indications on the dynamics for the reference year. The two forecasting methods underlying the quarterly models are those of Chow-Lin and Fernandez depending on economic activity and type of employment (employees and self-employed).

the annual estimates of the hours are obtained by annualizing the product of the per capita at quarterly level with the corresponding jobs once the information on per capita has been extrapolated.

The above estimate, which constitutes a constraint for total employment (declared and undeclared), is validated comparing it with a more robust estimate related only to the declared component of employment (at 38 economic sectors) for which ad hoc indicators (even if provisional) are available. Any inconsistencies on the dynamics of the residual part of hours worked by undeclared employment are highlighted and smoothed out.

Question 2.2: **What is the main original source for hours worked in the national accounts (e.g. administrative source, Labour Force Survey, Business survey)? Briefly describe this source, its coverage and its ability to reflect the definition of hours worked (see ESA §11.27-11.31). In particular, does it capture a 'usual' hours, 'actual' hours, or some other concept?**

Please specify the sources used for different parts of the employed population (in particular if sources differ between employees and self-employed, and/or between industries, firms of different size, etc.). If sources differ, please provide a clear distinction when answering the questions that follow.

The main information source on per-capita data is the LFS that is a continuous survey since 2004 (i.e. since 2004 the reference period covers all the weeks in the year).

Differently to businesses surveys, household surveys, allow identifying hours worked in main and secondary jobs separately. Moreover, with the integration of LFS_Admin is possible to identify hours worked separately for declared and not declared jobs too.

Even if business surveys are supposed to be more precise, they have some disadvantages: do not give information on self-employed; do not cover all activities (e.g. agriculture, Public administration, etc.); do not report labour concealed for fiscal reasons. Moreover, businesses surveyed tend to report hours paid instead of hours worked.

Household surveys overcome all these problems. However, the main reason that has led to the use of hours worked measured by the survey is that they presumably contain any type of worked hours: paid, unpaid, declared and not declared. Even for declared jobs the average per capita obtained from the survey is

inclusive of all the hours carried out by the job, declared and undeclared, i.e. hours worked more than those declared to the tax and social security authorities and that may be unpaid or irregularly paid.

On their side, they tend to report hours usually worked.

For the above reason, the statistical methodology of integration of LFS with administrative archives includes a process for the adjustment of the LFS "hours worked" using details on each job derived from structural information related to the interviewee and from administrative data. Adjustment is aimed at the correction of bias of this variable in the survey, mainly due to higher levels of hours declared omitting days-off, holidays and illness because of the time-lag between the reference week and the week of the interview.

Question 2.3: **Please describe the adjustments made to transform the original source to adapt it to the concept of working hours as defined in national accounts? Please, describe each adjustment separately. These adjustments might include:**

As indicated in answer to Question 2.1, the calculation of the total hours worked is based on the per capita average calculate by jobs strata obtained from the LFS_ADMIN micro data. Per capita are obtained through an estimation process that starts from the <u>weekly</u> worked hours recorded by the Labor Force Survey and operates a statistical treatment aimed to correct the main distortions that characterize hours worked in the survey. The Istat working group on this issue, which developed the methodology for integrating survey micro data with administrative sources, highlighted the existence of overestimation effects in the weekly hours actually worked, which are concentrated around standard weekly hours (20, 35, 40 hours). This type of distortion can be lead to various items that have been neutralize which different methods listed below.

- Accounting for holidays and annual leave: no adjustment

A first cause of overestimation of hours worked by the survey is linked to the 'memory effect' connected to the presence of holidays in the reference week of the interview. Starting from the first quarter of 2013 in the LFS questionnaire, a specific 'warning' was introduced linked to the question about hours actually worked in order to remind to the interviewee of the presence of specific events in the reference week.

The effect that these events can produce on the measure of worked hours has been evaluated by analysing the impact of the introduction of the 'warning' on the series of the survey. The analysis showed a slight reduction in the hours worked in the quarters in which the warning was active, but it was considered that the entity was not such as to justify the inclusion of a corrective of the overestimation in the quarters in which it was not placed. Moreover, the presence of the warning should allow preventing errors due to the memory effect.

- Accounting for sickness leave

As regards the effect due to the presence of sickness leave, taking advantage of the auxiliary information obtained from the administrative archives (in particular those of employees), a correction method has been implemented which concerns only jobs for which social contributions are paid.

- Accounting for strikes and temporary lay-offs: adjustment not necessary
- Accounting for paid but unreported overtime: adjustment not necessary
- Accounting for unpaid overtime: adjustment not necessary
- Others adjustments:

Another item that produces a distortion in the LFS hours worked is the existence of a small share of proxy interviews. In these cases a family member provides information and presumably reports usual worked hours instead of actual worked ones. To neutralize this 'proxy effect', correction coefficients by domain were used, obtained from the ratio between the hours declared in the direct interviews and the hours

declared in the proxy interviews; the domains have been identified taking into account gender, citizenship, age, job position, sector of employment, geographical distribution.

One more specific adjustment is applied to correct the possible overestimation of hours in the main job position in those cases in which the interviewee has more than one job, since some analysis has shown a propensity to accumulate on the main activity also the hours worked in the secondary jobs, especially for self-employed.
Another adjustment is applied to distribute on all multiple jobs the worked hours that the survey collects with a single question for all the multiple activities together.

The last adjustment for the production of estimates on per capita hours worked on the basis of LFS_ADMIN micro data, is the introduction of a model for statistical imputation by donor, identified with a 'sequential hot deck' technique that uses information on the hours worked and on the characteristics of the worker obtained both from the survey and from the administrative sources.
This type of adjustment is necessary for those job positions that refer to individuals who declare themselves unoccupied in the LFS survey, but who have social contributions paid or who have an undeclared job assigned by the estimation process. For these jobs the survey does not provide information on the hours worked because they are registered as unoccupied persons and therefore it is necessary to make an estimate.

Question 2.4: **Is a specific adjustment made to account for under- or over-reporting in the source data? Please specify if these adjustments are made for employees and/or self-employed workers.**

Adjustments are described in question 2.3.

Question 2.5: **If an adjustment is made for the number of persons employed in relation to the unobserved economy, what assumption is made regarding the hours worked by these persons?**

With reference to the adjustments of points 1-8 answer to Question 1.6

- adjustments of points 1, 2, 3, 8:
  for these categories the general assumption is that they have the same LFS_Admin per capita hours worked of jobs in the same domains (economic activity, main/secondary job, employees/self-employed, declared/not declared).
- adjustment of point 4:
  the per capita used is an average of first and second job per capita of not declared self-employed in the corresponding economic activity
- adjustment of point 5:
  the per capita used is derived from the Time use survey.
- adjustment of point 6:
  the per capita used is derived from the General Agricultural Census 2010.
- adjustment of point 7:
  hours worked are obtained grossing up hours worked of the selected group of workers (main and secondary self-employed jobs) using LFS sample weights.

Question 2.6: **Which other adjustments, if any, are made?**

No other adjustments are made.

Question 2.7: **If necessary, please describe any additional calculations needed to derive total hours worked and average hours worked from the sources and adjustments specified above. This includes, but is not limited to, adjustments made to align the coverage of hours worked with that of employment in persons (i.e. the coverage produced by the process followed in section 1).**

No other adjustment is made.

Part II: Other work in this area

3. Differences between national accounts and Labour Force Survey estimates

Question 3.1: **To what extent do you consider your Labour Force Survey an accurate tool for the measurement of employment and hours worked? Please describe any issues or shortcomings of which you may be aware.**

Our LFS can be considered an accurate tool able to provide measures of employees and self-employed in terms of persons and hours worked on a continuous basis. LFS is fundamental for quarterly and monthly data on national accounts labour input.

Question 3.2: **If the Labour Force Survey is not the primary source of data used to derive your estimates of employment in <u>persons hours worked</u>: Are you able to quantify, even approximately, what the difference would be between your current national accounts estimates and those you would obtain if you did use the Labour Force Survey data as your primary source?**

The LFS is the primary source for per capita hours worked.

> *Question 3.2.1:* **Where differences between these estimates exist, can you provide a brief assessment of the source of these differences**?
>
> At the annual level differences are mainly due to conceptual adjustments referred to different coverage.

4. Flash estimates of employment in persons

Question 4.1: **Are you currently producing flash estimates of employment (t+30 or t+45)? If so, please describe briefly the methodology, coverage and sources. If you are not producing a flash estimate, do you have plans to start doing so in the future?**

Flash estimates on employment t+45 are produced and transmitted as confidential to Eurostat. We are planning to produce employment t+30 on a regular basis in the next future. At the moment we are involved in a Eurostat Task Force 'early employment flash estimates' that is working on this topic.

Question 4.2: **Please provide information on the quality of the estimates (e.g. revision analysis).**

Results referred of two test quarters of year 2017 have been analysed in the Eurostat Task Force 'early employment flash estimates'. The results of the first estimation round can be considered as very promising.

5. Other data produced (Optional)

Question 5.1: **Do you have plans in the near future to improve or expand the content of national accounts labour input data (e.g. improved alignment with national accounts concepts, extension of the time series, increased industry detail, etc.)?**

In the next future, plans are to reconcile our information with other products that are going to be implemented in Istat, in particular the Individuals and Households Register, the Labour Register and the Wages and Salaries Register. The above products will be able to provide us all the information that we need to link a person employed with every labour relationships.

Question 5.2: **Do you produce labour input data other than that already discussed, for example quality adjusted labour input or labour input in terms of full-time equivalents? If so, please provide details and/or links to these data.**

At the moment, we don't provide adjusted labour input data.

Question 5.3: **Do you produce productivity statistics (e.g. labour productivity for the total economy, further breakdowns of labour productivity, capital productivity, multi-factor productivity, etc.)? If so, please provide details and/or links with regards to these data.**

Yes, we do. See the Report at the following website: summary http://www.istat.it/en/archive/205543 (full text in Italian only http://www.istat.it/it/archivio/205540)
Detailed and regularly updated data are available in the Istat data warehouse I.stat at the following address: http://dati.istat.it/?lang=en (National accounts/Productivity measures).

Question 5.4: **If there is any other work that you produce currently, or are looking to produce in the future, in the areas or labour input or productivity, please use the space below to inform us about this work.**

A special focus is referred to the undeclared labour input in a specific report on the Non-observed economy at the following address: http://www.istat.it/it/archivio/204357