

Industry

At the time of Italian unification, Italian industry was in a very under-developed phase. Difficulty in developing was combined with a scarcity of raw materials, the inadequacy of energy sources, the geophysical structure of the territory itself and the delay in economic integration of the various areas within the country. Despite these initial problems, Italy was the first country in southern Europe to achieve a stable level of industrialisation as early as the beginning of World War II.

Nonetheless, the transition from a prevalently agricultural society to an industrial country only really took place after the war, as the number of factory workers gradually overcame those involved in agriculture. Since then the industrial sector has seen extraordinary development, transforming the structure of Italian society, changing life-styles and causing wide swathes of the population to move and to change social roles.

On the one hand Italy has shared the typical evolution of the main industrialised economies, while on the other it has maintained some specific structural features. In particular, a strong wave of productive decentralisation and the development of industrial and especially manufacturing districts were set in motion in the 1970s, as Italy began the process of expanding the service industry, placing it since then at second place in Europe as to value added and number of industrial workers, immediately after Germany. Italy's economic structure was therefore strongly marked by the historical evolution of its industrial system and the particular structure that distinguish it, in particular, the number of small industrial enterprises that operate within the national territory. In order to provide a complete overview of this development and its features, this chapter refers to the census data on local units and workers, some of the historical data on industrial production volume and, for more recent years, industrial production indices.

The general economic censuses conducted by Istat since 1927 represent the main source of information on local units and number of workers in enterprises. Due to the low level of reliability and comparability of census data before World War II, the time series presented here run from 1951 up to the most recent census in 2011.

Industrial production volume figures, instead, collected as early as 1861, are taken from various Institutions, Ministries and Trade Associations and are reported here until 1985 with reference to the main productive sectors, more for historical interest than for their statistical value.

Lastly, industrial production indices are available with coherent time series for the period between 1990 to 2015.

The economic censuses - local units and persons employed

The first experiences in the field of business surveys can be traced to 1870 and 1874, when the first industrial survey was conducted in the form of a series of local surveys with the collaboration of the Chambers of Commerce and Parliamentary Enquiry Committee, revealing that part of Italy consisting of factories and textile mills, industrial manufacturers and workers. Later, for the fiftieth anniversary of Italian unification in 1911, the *Ministero dell'agricoltura, dell'industria e del commercio* (Ministry of Agriculture, Industry and Trade) conducted the first *Censimento degli opifici e delle imprese industriali* (Census of Mills and Industrial Enterprises), making it possible to estimate Italy's level of industrialisation.

On October 1927, one year after its foundation, the Central Statistical Institute carried out the first General Census of Industry and Trade, which was to be repeated every ten years¹.

The 1927 Census covered transport, communications, finance, insurance and part of the service industry in addition to industrial and commercial activities. The next census underwent few changes and was conducted in stages between 1937 and 1939 until Italy's entry in World War II. Nonetheless, censuses

¹ The name remained unchanged up until 1971 Census, when it was changed to *Censimento dell'industria, del commercio, dei servizi e dell'artigianato* (General Census of Industry, Trade, Services and Craft Trades) in 1981, and *Censimento dell'industria e dei servizi* (General Census of Industry and Services) from 1991 onwards.

only began to produce reliable and comparable data after the war, when they began to be conducted on a regular basis from 1951 to the most recent in 2011.

The various censuses were characterised by a gradual and constant improvement in survey techniques and methods, also thanks to the ever increasing attention paid to the process of integration and harmonisation by the Eu and international organisations in general.

The survey unit for censuses of productive activities is the local unit, while the unit of analysis is formed by enterprises, extended to include public and non-profit institutions in 1981. The definition of local unit has changed over time, and since 2001 it has been defined as the physical location in which economic and legal units (enterprises or institutions) perform one or more economic activities.

The definition of enterprise, which has remained substantially unchanged since 1951 to 2011, includes professional activities that come under the general concept of “entrepreneurship”; an entrepreneur may be a natural person (craftsman or professional set up as a sole proprietorship) or a legal entity (legally formed companies such as partnerships or corporations, cooperatives or consortia, etc.).

Public entities with economic purposes, i.e. those performing public services and, despite State ownership (direct or indirect, depending on the legal and organisational changes occurred to the public organisation over the decades in question) participating in the market are classed as enterprises and, therefore, covered by the survey. For example, these include the Post Office, the *Banca d'Italia*, the *Ferrovie dello Stato* (Italian State Railways) and all the Governmental management committees and companies owned by municipalities, provinces and regions, etc.

The surveys conducted between 1951 to 2011 provided an exhaustive coverage of mining, manufacturing, energy, gas, water and construction activities, in addition to commerce and hotels, transport and communications, finance and insurance businesses. In subsequent censuses the number of economic activities has been gradually extended to the point of including all non-agricultural activities by 1981. The 1981 census in particular represented a genuine turning point with respect to the past, covering nearly all productive activities including, for the first time, public administration, public institutions and non-profit organisations (known as non-profit institutions since 2001), education and healthcare².

In 1991 census the concept of institution was defined in a more precise and comprehensive manner, while the field of observation was extended to social services, services to businesses and households, which had previously not been surveyed (1951) or limited to specific categories (since 1971, for example, only waste collection services and health and hygiene services in general have been included in the range of social services).

Lastly, in 2001 an important innovation was introduced in data collection operations; these were previously (from 1951 to 1991) conducted using a “door-to-door” technique, involving surveyors visiting all the local units identified in the area assigned to them. The results were therefore affected by underestimation for the types of units difficult to identify using the survey technique in use up to that date. The 8th General Census of Industry and Services, however, could rely on an auxiliary base archive containing the lists of local units to be surveyed complete with their characteristics (legal form, activity, location, etc.). This new approach, based on the use of administrative sources, allowed for the so-called “non-evident” activities to be included, i.e. those not immediately identifiable by traditional methods. This made the comparison between census data from 2001 and previous surveys extremely complex, as it is impossible to draw a clear distinction between the differences due to real changes in the economic structure of the country and those attributable to changing methodologies and definitions. These changes were of particular importance regarding: manufacturers and construction companies (exclusively for micro craft enterprises and the self-employed performing travelling or home-based activities); salesmen; professionals; seasonal tourism activities; transport (exclusively for micro sole proprietorships); services, exclusively for productive units within other larger productive units (for example, security, cleaning or canteen services, internal banking services within Ministries or large companies); consultants or contractors who work for third parties. In short, all subjects and activities that are not run by offices, shop, laboratory or traditional type of establishment and that have seen considerable expansion in recent decades.

In order to make results comparable, in 2005 a reconstruction was performed for all 1951-2001 data according to the classification of economic activities applied for 1951 Census (with wider aggregations than the others) and relating data to the present territorial borders. More precisely, it was necessary to normalise the classification systems of economic activities (which are subject to periodical changes, also

² All the economic censuses considered (from 1951 to 2001) excluded activities performed in extra-territorial locations (diplomatic posts, extra-territorial organisations and entities, etc.) or by religious organisations when relating directly to religious practices (religious services in churches, synagogues, monasteries, etc.); domestic services to households and cohabitation by butlers, chauffeurs, nannies, etc., in addition to agricultural activities in the primary sector.

due to international regulations), legal status of enterprises, field of observation and municipal, provincial and regional borders.

The equalisation of the field of observation in the various censuses is one of the most complex operations in the process of presenting data in time series. For example, before presenting the information certain elements are eliminated, such as economic activities that were never surveyed. Nonetheless, these are part of the real economy, and particular attention must therefore be paid to interpreting data; the economic structure resulting from the adjustments necessary to compare data over time, in fact, is not the same situation recorded by each census. In other words, the universality and completeness of censuses only remain valid for the activities covered by all censuses.

The 2011 Establishment Census - Business Survey was carried out, for the first time, as a "virtual" census i.e. by using directly the Statistical register of active enterprises (named Asia); this register has been enriched with additional administrative information treated with the aim to extend its content with regard to the employment of enterprises and related local units.

The time series presented here cover local units and workers by sector of economic activity for the period between 1951 to 2011. The comparison was performed using 1951 census field of observation, therefore eliminating activities covered only by subsequent censuses. Results for the first two censuses, in 1927 and 1937, are not included due to comparability and data reliability issues.

All series also show disaggregated regional figures for the period between 1981 to 2011.

Warnings for time series comparisons

- In 2005, 1951-2001 time series was reconstructed and data were harmonised using 1951 Census classification of economic activities, taking into account the changes that took place in the various decades both in terms of definitions, survey methodologies and techniques used for the different censuses.
- Between 1951 and 1991 the definition of local unit has undergone the following changes:
 - 1951: establishment or group of establishments located in a given point of the territory where enterprises materially perform the activities resulting in the production of goods or provision of services; therefore, the same enterprise may have one or more local units;
 - 1961: establishment or group of establishments located in a given point where the production or sale of goods or the provision of services takes place;
 - 1971 and 1981: establishment or group of establishments located in a given position, in which one or more economic activities are performed;
 - 1991: a place of any type (establishment, laboratory, shop, workshop, restaurant, hotel, bar, office, agency, warehouse, professional office, dwelling, school, hospital, customs office, tax office, administrative office, etc.) in which goods are produced or services are provided or organised, whether destined for sale or otherwise.
- Between 1951 and 1991 the definition of enterprise or company has undergone the following changes:
 - 1951: economic and legal unit formed of the organisation of productive factors for the production of goods and services, run by an entrepreneur carrying the associated risks;
 - 1961 and 1971: economic and legal entity organised for the production or sale of goods or the provision of services;
 - 1981-1991: organisation of an economic activity performed in a professional capacity for the production or exchange of goods or services, i.e. economic and legal entity organised for the production or sale of goods or the provision of services.
- Since 2011 onwards census data have been obtained exclusively from the Statistical register of active enterprises (Asia); in order to increase the quality and enlarge the amount of disseminated information, relevant innovations have been introduced, both in definitions and methodologies, to updating the Register and estimating the enterprise characteristics. With reference to the activity status of an enterprise, the new methodology has moved from the previous one based on a probabilistic approach towards a deterministic method based on signals of actual activity on the market such as the presence of employment or the declaration of a significant level of turnover. With reference to employment, an enhancement in terms of more and more detailed variables (employment and demographic) has been possible thanks to the availability of an informative structure deriving from the integration of new administrative sources and containing microdata about the relationships between the person (worker) and the enterprise where he/she works

(available from the new Statistical register of enterprises' occupation (Asia - Employment). This structure has allowed a better estimation of the persons employed in terms of number of employees and self-employed and of other types of workers used in the enterprise such as freelancers and temporary workers. A relevant innovation has concerned the overall revision of the definition and operational rules for the identification of the self-employment component. According to the new adopted definition and method some types of enterprises (i.e. limited liability companies) cannot have self-employed. The Asia Register production process is yearly carried out by the integration of many administrative sources allowing to obtain the needed informative structure to produce such detailed information; it represents the statistical official source on the structure of enterprises and business demography.

Enterprises, local units and employed persons in non-census years: the data of the Statistical register of active enterprises (Asia)

The Statistical register of active enterprises (Asia - Enterprises), the Statistical register of enterprises' occupation (Asia - Employment) and the Statistical register of local units (Asia - LU) provide the structure of the population of enterprises, local units and their employment. The showed tables represent local units and employed persons by sector of economic activity and by region for the years 2012 and 2013. While census data are point values (generally related to 31/12 of the reference year), the data presented are annual averages. Register data are made up of those enterprises that have been active during the year and employment is measured in terms of total jobs on a yearly average, calculated on the basis of the presence of the worker in the reference week.

Industrial production surveys

In 1960 Istat began to develop a survey dedicated to the production of data on the main economic phenomena relating to Italian industry, leading to the launch of the first survey of the sector in 1959.

The survey was initially limited to certain industrial sectors and the local units of large companies that already collaborated with Istat for the collection of short-term data. The first survey collected information on approximately 11,000 local units, and served to estimate the cost structure for the various industrial sectors, the transfers of raw materials and semi-finished products between sectors and other quantitative elements used for constructing the matrix of the Italian economy. The survey covered the following specific aspects: quantity and value of the manufactured products, storage duration of the products, quantity and value of raw and auxiliary materials used in production, quantity and value of new equipment and machinery, amount and type of activity of the equipment and machinery installed, number of employed persons, days, hours of work and labour costs. The first tests highlighted the need to reduce the questionnaire, which made it impossible to have accurate and rapid data. As a result, Istat eliminated the questions on equipment and machinery used for production – which were subsequently included in specific surveys – and drew up regulations for the correct compilation and acquisition of the information. The survey was conducted until the reference year 1964, and was continually improved especially in relation to the identification of the local units to be surveyed, which was facilitated by the availability of data from both 1961 Census and other sources of information. The information gathered, although contributing to the calculation of characteristic and indispensable indicators for the construction of input-output tables³, in addition to estimates of the large national accounts aggregates, were not sufficiently reliable to be published in their absolute value. Since 1965, further simplification of survey forms allowed for data to be obtained on the volume of industrial production with a greater degree of reliability and rapidity. Since 1983⁴ data were collected using an open paper form, with a single form used for all economic sectors, without any listing of the products of interest. However, products could be identified and reported on the form along with their code by respondents using a goods inventory attached to the form that was sent according to the local unit's economic sector of reference. This method made it possible to manage the data checking phase in a more efficient and effective manner, in addition to the processing phase using an automatic procedure for all the activities surveyed, ensuring similar treatment

³ Such as, for example, the average product value, the ratio between the product value and that of the raw and auxiliary materials used, the ratio between the production value and labour cost, etc.

⁴ Since 1983 the *Rilevazione annuale della produzione industriale* (Annual survey statistics by product - Prodcum) was combined with the Gross domestic product survey of enterprises with at least 20 employees, covering the main items in the economic income statement.

for different sectors of activity which had been difficult to achieve in the past, when a range of different surveys each with its own characteristics used to be performed. This allowed to publish data on an annual basis until the mid-1990s. Until this date the survey had covered enterprises dedicated to industrial transformation with at least 20 employees, registered in the *Schedario delle imprese per le rilevazioni ordinarie* (Sirio - Inventory of enterprises for ordinary surveys). The data published annually by Istat have not been reconstructed and a coherent time series is therefore not available.

Information on the volumes of some industrial products has been also collected over time by public and private Institutions⁵ and published by Istat in the previous *Sommari di statistiche storiche* ([Historical statistics summaries](#)), for the period between 1861 to 1985. This information does not provide a coherent reconstruction of the development of the Italian industrial system; however, for the purposes of completing the historical overview of the statistics in the sector, this chapter does present some parts of the material collected over the years, with specific reference to the food, textiles and transport industries. From 1996 onwards, the figures were collected through the *Rilevazione annuale della produzione industriale* (Annual survey statistics by product - Prodcum), which provides coherent statistics on the manufacture and sale of a vast range of products, processed according to Eu methods, concepts, definitions and classifications and in line with Prodcum Guidelines⁶. This survey was conducted on all the local productive units (establishments) of industrial enterprises with at least 20 employees and on a representative sample of smaller enterprises, using a random sampling method and stratified elementary unit selection⁷.

Overall, approximately 65,000 units were involved, relating to about 45,000 enterprises taken from the Statistical register of active enterprises (Asia) and the Statistical register of local units (Asia – Local units); the units of analysis were formed by energy and industrial products and are part of a list harmonised at European level (Prodcum list)⁸. Since reference year 2009, the questionnaire is compiled directly online, with a connection to the [Indata](#) system⁹ allowing for a secure exchange of information. The data are grossed-up using the information recorded from the statistical units that took part in the survey. These describe production levels expressed in quantity and products sold expressed in quantity and value for each goods item, and are available on Istat website with the maximum available detail. This information is not presented in this volume due to the brevity of the time series of reference and the huge amount of Prodcum products (about 4,000 in 2010).

Warnings for time series comparisons

- Territorial borders have changed according to the historical period: the figures refer to 1871 borders from 1871 to 1918; to 1924 borders from 1919 to 1945; to 1985 borders from 1946 onwards.
- In relation to the production volume for the food and drinks industry, the figures for the years between 1871 and 1950 refer to the fiscal year, which does not necessarily coincide with the calendar year; in particular, for the years between 1931 to 1950 the fiscal year began on 1st July. From 1951 onwards, the figures refer to the calendar year.

⁵ According to the historical moment and the type of product data have been collected by: *Corpo delle miniere* (Mining Association); the Ministry of Industry, Trade and Craft Trades; the Independent Committee for Chemical and Pharmaceutical Industries; the Steel Industry Association; the Ministry of Shipping; the Ministry of Infrastructure and Transport; the National association of Automobile Industries (Anfia); the General Directorate of Customs and Indirect Taxation at the Ministry of Economics and Finance; the *Società anonima regia cointeressata dei tabacchi* (Royal Tobacco-Producers Association); the State Monopolies Administration; the Italian Association of Silk Industry and Commerce; the Italian Cotton Institute and the Italian Cotton Association, etc. Some of these figures cover the census between 1861 to 1985.

⁶ (Eec) Council Regulation no. 3924/1991 dated 19th December 1991 on structural surveys of industrial production. In principle, the following areas should be surveyed: products manufactured by the enterprise either on their own behalf or for third parties; products (manufactured on their own behalf or for third parties on provision of uninvoiced raw materials) sold during the reference period. The finishing, reparation or maintenance activities along with mounting and installation activities, known as industrial services, are also included. Products purchased and resold by the enterprise without undergoing any transformation and goods produced abroad for the enterprise are not included.

⁷ Enterprises with two or more local production units receive a number of questionnaires, each one addressed to the local unit to which it refers. However, to facilitate the work of smaller enterprises (less than 20 employees) with production activities in more than one location, a reduced single form is available to be filled out with information regarding the enterprise's activities as a whole. The survey also covers craft trade enterprises. The form must also be filled out even if the enterprise cannot find the code identifying its own type of product: in this case the products are indicated by entering a description of the products manufactured during the year.

⁸ Note that the Prodcum list has been adapted to the new NACE Rev.2 Classification of economic activities that came into force on 1st January 2008.

⁹ The data acquisition site.

The industrial production index

The industrial production index is one of the main indicators of a country's economic activity and measures the variation over time in the physical volume of production created by industry excluding the construction sector. Its evolution describes the sector's economic cycle and the index is used to evaluate the short term development of Gross Domestic Product (Gdp) as a whole. In the context of short-term statistics, it represents the reference indicator for estimating economic growth and, above all, for identifying turning points within a single economic cycle.

The index is calculated using the results of the monthly survey on industrial production conducted by Istat among enterprises on an irregular basis since 1928, and at regular intervals after World War II. In recent years, the methods used have evolved in line with Eu Regulations; this has resulted in significant discontinuity of time series, and the index values presented here therefore only run since 1990.

European Regulation no. 1165/1998/EC on short-term statistics requires that every five years Member States shall rebase the indices using as base years the years ending with a 0 or a 5 to take into account the evolution of the economic system. With effect since January 2013 the indices have been calculated with reference to base year 2010. A reconstruction procedure for 1990-2009 time series has been adopted using the standard approach based on splicing coefficients.

This survey, which records the variation in production volume of goods within a representative basket of products chosen in line with the Prodcom Classification, is performed monthly and covers a panel of approximately 4,100 enterprises which communicate data on just over 8,000 monthly production flows, generally expressed in terms of physical quantities. The survey unit is formed of active enterprises with more than 20 employees working in the Italian territory and their local units, both extracted from the Statistical Register of Active Enterprises (Asia). The industrial products represent the units of analysis and have to be traceable to specific economic activities¹⁰.

In addition to this information other statistical sources are used to estimate the production trends for specific industrial sectors, especially in relation to the mining and energy sectors. In particular, the hydrocarbon mineral and geothermal offices in the *Ministero dello sviluppo economico* (Ministry of Economic Development) provide data on the energetic mineral mining industry, in addition to figures on the distribution of methane gas, while regional authorities provide figures on the extraction of non-energetic minerals; Terna (the National HV electricity grid operator) records electricity production figures. Elementary indices for some industrial products, however, are calculated using the following sources: Istat monthly statistics on slaughtered livestock; iron- and steel industry data from trade associations. All figures from other external bodies and institutions are aggregated and totalled for each sector of reference.

This allows for the calculation of index numbers for product items that are in turn grouped by economic activity using the *Laspeyres* formula. In order to improve the significance of the index and take account of changes in the quality of industrial products over time, part of production (approximately 7.9%) is recorded by hours worked: the related elementary product indices are calculated using productivity coefficients estimated using short term aggregates (turnover index and hours worked). For a larger share (with a weight of approximately 9.5%), the activity is measured using production value deflated by a production price index.

Survey results are used to calculate production indices for 581 types of product; economic activity indices are calculated by aggregation (using the Italian Ateco 2007 economic activity classification system), as well as the general index and indices for the Main industrial groupings (Mig)¹¹.

In addition to original indices (the so-called "crude indices"), production index adjusted for calendar effects and seasonally adjusted industrial production indices are also published.

In compliance with the guidelines on seasonal adjustments issued by the European statistics system, correction and adjustments are obtained using the Tramo-Seats procedure¹². Industrial production indices

¹⁰ In order to grant this traceability, industrial products are considered in terms of Units of homogeneous production (Uhp) or, if the enterprise has more than one local unit, in terms of homogeneous local production unit (Hlpu).

¹¹ As set out in Commission Regulation no. 656/2007/EC (dated 14th June 2007), which modifies Commission Regulation no. 586/2001/EC (dated 26th March 2001) implementing the definition of Main Industrial Groupings (Mig). Both refer to Council Regulation no. 1165/1998/EC (dated 19th May 1998) on short-term statistics.

¹² This is a model-based procedure, i.e. based on the identification of a particular statistical model for each time series analysed; this incorporates the progress made in recent years in the so-called "modern analysis of time series" and offers a wide range of statistical tools for evaluating the quality of the seasonal adjustments made. This procedure is composed of two parts. The first part (Tramo) is dedicated to eliminating from the time series in question the so-called deterministic effects caused by the different number of working days in the various reference periods, the presence of "mobile holidays" (such as Easter) and outliers. Tramo also identifies and estimates the Arima model for the time series observed. The second part of the procedure (Seats) performs the actual seasonal adjustments for the original series, using the Arima model and the deterministic effects identified by Tramo.

are corrected and seasonally adjusted for each sector of economic activity, main grouping and for the general index; therefore aggregated indices are not calculated starting from the disaggregated, corrected and seasonally adjusted data. Consumer good indices are an exception, being corrected for calendar effects and seasonally adjusted separately for the durable and non-durable goods components, thus obtaining a total by weighted average. The statistical models used for seasonally adjustments and correction are revised at the beginning of every year, to ensure they are suitable to correctly represent the performance of each time series.

In the tables presented here, the index, presented as annual average, was calculated with base 2010=100 for the period between 1990 to 2015.