

NON-OBSERVED ECONOMY IN NATIONAL ACCOUNTS | YEARS 2019-2022

Non-observed economy over 200bn euro in 2022, stable as a percentage of GDP

In **2022**, **non-observed economy** increases by 17.6bn euro, rising by 9.6% with respect to 2021 (+8.4% the growth rate of GDP at current prices). **Underground economy** (net of illegal activities) is worth about **182bn euro**, +16.3bn euro compared to 2021, while **illegal activities** reach almost **20bn euro**.

Un-registered FTEs are **2,986mln**, stable with respect to 2021.

The estimates presented in this Report are consistent with the general revision of National Accounts released last September 23th and incorporate the related methodological innovations (see pages 8 and 9).

170bn euro

The value of underreporting and the employment of un-registered workers in 2022 (+14,1bn euro compared to 2021)

Stable at 8.5% the impact on GDP of the two components

+11,5%

The growth rate of the value added generated by underreporting with compared to the previous year

+0,1%

The increase in un-registered FTEs compared to 2021

Homogeneous increase (+0.1%) of un-registered employees and self-employed (+1.6k e +1.2k FTEs)

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Non-observed economy is growing in line with GDP

Non-observed economy refers to economic activities that cannot be directly observed and mainly includes the underground and illegal economy. Underground economy is composed of: (1) underreporting of value added, i.e., the value added that is concealed by intentional mis-declaration of turnover and/or costs; (2) the value added generated by the employment of un-registered workers; (3) a residual component including tips, un-declared rents paid to households and the effect of the balancing between estimates of supply and demand (which includes both purely statistical phenomena and underground activities that are not captured by standard estimation methods). Illegal economy includes both activities involving the production and sell of goods and services that are outside the rule of law, and activities involving legal goods and services but that are carried out without proper authorization. For EU countries, only drugs trafficking, prostitution services and smuggling of tobacco and alcohol have to be included within the National Accounts framework.

This Report presents the estimates that have been updated as part of the general revision of National Accounts released September 23th, 2024. In line with the approach followed for the National Accounts framework, point estimates have been performed for 2021 and 2022, while time series (reported in the statistical annex to the Report) have been back-casted. The main methodological innovations and their impact on the estimates of non-observed economy are reported at the end of the Report.

In 2022 the value added generated by non-observed economy is worth 201.6bn euro, increased by 9.6% compared to the preceding year (184.0bn). The impact of non-observed economy on GDP at current prices, raised by 8.4% compared to 2021, is essentially stable: 10.1%, from 10.0% in 2021 (0.7 percentage point lower than 10.8% observed in 2019, the year before the pandemic).

The growth of non-observed economy has been driven by the dynamics of underreporting, which increased by 10.4bn euro (+11.5%) compared to 2021. The value added generated by un-registered workers (+3,7bn euro, +5.6% with respect to 2021) and by illegal activities (+1,2bn euro, +6.7%) showed a slower growth.

The increase of more than 2bn euro in the value added related to the Other components is attributable to the dynamics of tips (that is linked to the growth of final consumption expenditure) and to the rise in un-declared rents received by households.

The relative dynamics of the different components confirmed a medium-run tendency towards a re-composition of the non-observed economy. In particular, a progressive downsizing of the contribution of the value added generated by the employment of un-registered workers has been observed (34.3% in 2022, decreasing from 35.6% in 2021 and 38.1% in 2019), while the weight of underreporting is increasing (currently 50.1%, rising from 49.2% in 2021 and 45.6% in 2019). Finally, the impact of illegal economy is almost stable (9.8% in 2022 compared to 10.1% in 2021).

COMPONENTS OF NON-OBSERVED ECONOMY

Years 2019-2022, Values in million euro at current prices, incidences on GDP in percentages

COMPONENTS	2019		2020		2021		2022	
	million euro	impact %	million euro	impact %	million euro	impact %	million euro	impact %
Underground economy	175,408	9.7	149,900	9.0	165,510	9.0	181,846	9.1
<i>Underreporting</i>	88,978	4.9	79,287	4.7	90,467	4.9	100,915	5.1
<i>Un-registered labour input</i>	74,206	4.1	60,047	3.6	65,509	3.6	69,189	3.5
<i>Other</i>	12,224	0.7	10,566	0.6	9,534	0.5	11,742	0.6
Illegal activities	19,610	1.1	17,556	1.1	18,531	1.0	19,774	1.0
Non-observed economy	195,017	10.8	167,456	10.0	184,041	10.0	201,620	10.1
Value Added	1,604,270	-	1,496,322	-	1,644,016	-	1,792,584	-
GDP	1,804,067	-	1,670,012	-	1,842,507	-	1,997,055	-

Increase of underground in Professional services, reduction in Construction

In 2022, underground economy is worth 181.8bn euro, increasing by 16.3bn compared to 2021. The contribution to GDP is essentially stable at 9.1% (9.0% the preceding year).

Underreporting is worth 100.9bn euro while the component connected with the employment of un-registered workers amounts to 69.2bn (they were 90.5bn and 65.5bn respectively in 2021). Other components are worth 11.7bn euro (9.5bn the preceding year).

The spread of underground economy is linked to the typology of the reference market for goods and services rather than to their typology. In order to capture this feature of the phenomenon in a more accurate way, a sectoral breakdown is used that allows to account for the functional specificity of the goods and services rather than for the technological features of the related production processes. In the classification adopted, manufacturing activities are clustered into Production of final consumption goods, Production of investment goods, Production of intermediate consumption goods (including also energy sector and water and waste management). Within tertiary industries, Professional services are considered separately from Other business services.

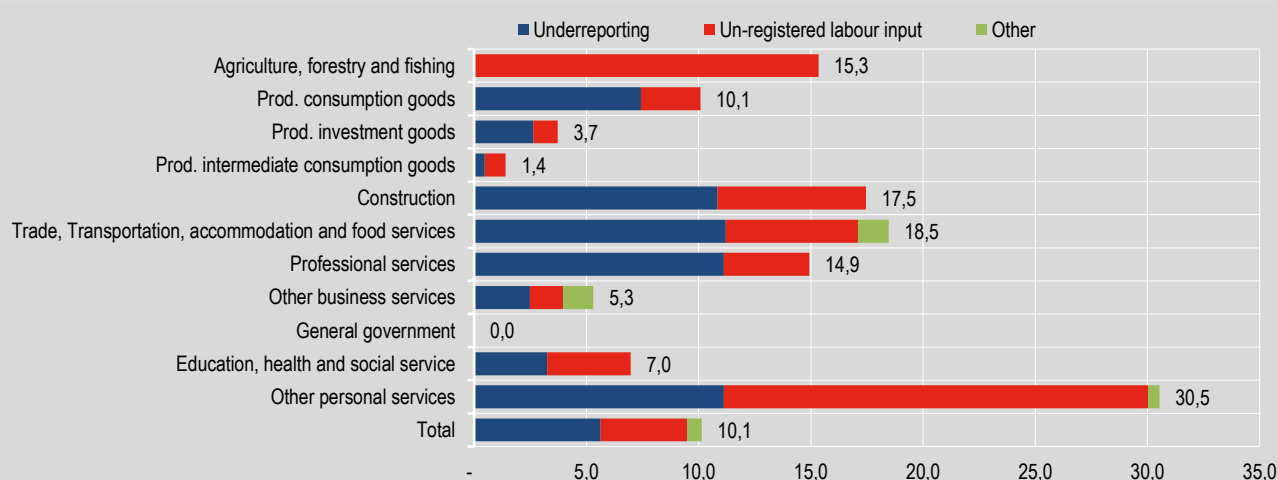
Industries showing the highest impact of underground economy are Other personal services (where it accounts for the 30.5% of the value added of the industry), Trade, transportation, accommodation and food services (18.5%), and Construction (17.5%). A lower contribution of underground economy is reported for Other business services (5.3%), Production of investment goods (3.7%) and Production of intermediate consumption goods (1.4%).

The stability of the impact of underground economy on total value added (10.1% in both 2022 and 2021) is the results of heterogeneous sectoral dynamics. Indeed, a decrease in the contribution of the underground economy is observed for Agriculture (-1.0 percentage points), Construction (-0.8), Production of final consumption goods (-0.6), and Other personal services (-0.5), while, conversely, an increase in the weight of the underground economy is reported for Education, healthcare and social services (+0.5 percentage points) and Professional services (+0.2).

Underreporting shows a significant contribution in Trade, transportation, accommodation and food services (11.2% of the total value added of the industry), Other personal services, and Professional services (11.1% in both industries). The phenomenon is instead less pervasive in Education, healthcare and social services (3.3%), Production of investment goods (2.6%) and Production of intermediate consumption goods (0.5%).

The value added generated by the employment of un-registered workers shows a higher impact in Other personal services (18.9% of the total value added of the industry), also due to the inclusion of domestic personnel employed by households. Conversely, the contribution of the phenomenon is more limited in manufacturing sectors (ranging from 0.9% to 2.7%), and Other business services (1.5%). Finally, in Agriculture, the underground value added, which is only connected with un-registered workers, represents 15.3% of total value added of the industry.

FIGURE 1. IMPACT OF THE COMPONENTS OF UNDERGROUND ECONOMY ON VALUE ADDED BY INDUSTRY
Year 2022, percentages



Un-registered labour input contributes the most to the reduction of underground economy

In the medium-run, the underground economy showed a progressive decline starting from the peak recorded in 2014, when it accounted for 11.5% of the GDP, 0.7 percentage points over the level of 2011, the first year of time series.

This decreasing dynamics has been characterised by different phases. Between 2014 and 2017 a slow decline has been observed, with the contribution of underground economy settled down to 10.7% of GDP. From 2017 to 2020, the shrinkage accelerated, further reducing the impact of the underground economy on GDP by 1.7 percentage points to 9.0%.

Considering the period between 2014 and 2022, the contribution to GDP of the underreporting lowered by 0.8 percentage points (from 5.9% to 5.1%), showing a contraction by almost 14%. The reduction was concentrated between 2017 and 2019, when its impact decreased to 4.9% from 5.6%.

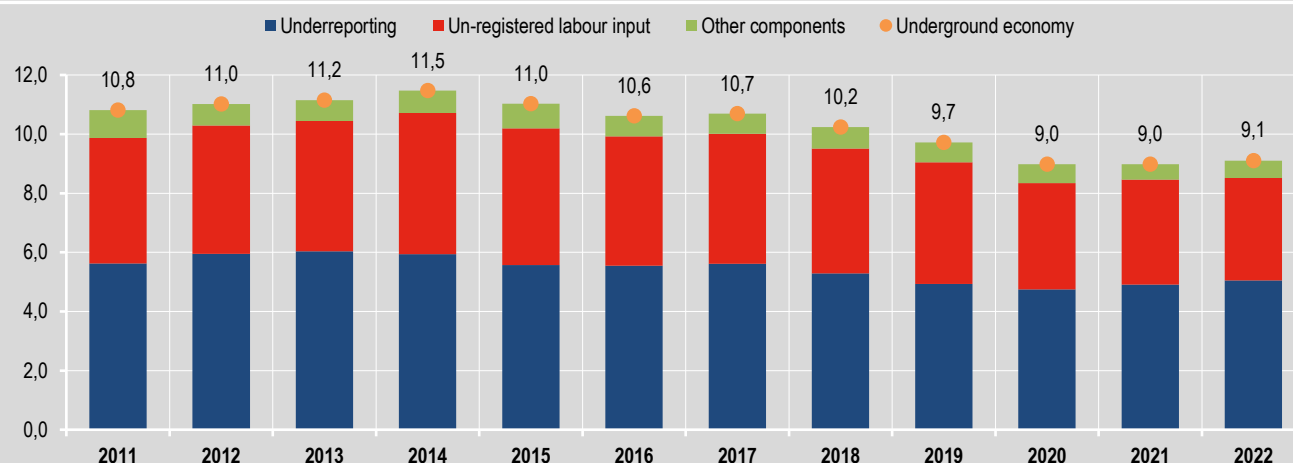
As for the value added from un-registered workers, the reduction of its contribution to GDP was smooth from 2014 and 2019, with a decrease in its impact of 0.7 percentage points (from 4.8% to 4.1%). The fall observed in 2020 lowered the impact of this component to 3.6%, a value that has been substantially confirmed in the following two years, positioning the phenomenon below the level registered in 2014, with a reduction of more than a quarter.

From a sectoral perspective, the reduction in the weight of underground economy between 2014 and 2022 has been stronger for Construction (where the contribution to value added has fallen by 6.0 percentage points), Trade, transportation, accommodation and food services (-5.5), and Other personal services (-4.9). During the same period, relevant reductions have been observed also for Agriculture (-3.3 percentage points), and Production of final consumption goods (-2.9).

The decline in the contribution of underreporting has driven the reduction in the impact of underground economy in Construction (where it lowered by 3.8 percentage points between 2014 and 2022), Trade, transportation, accommodation and food services (-3.2), and Production of final consumption goods (-1.9). During the same period, the dynamics of the value added generated by employing un-registered workers has driven the contraction of the contribution of underground economy in Other personal services (-2.9 percentage points), and Education, healthcare and social services (-2.7), further than in Agriculture (-3.3).

FIGURE 2. IMPACT OF THE COMPONENTS OF UNDERGROUND ECONOMY ON GDP

Years 2011-2022, percentages



The number of un-registered workers almost stable in 2022

The employment of un-registered workers – measured in terms of FTEs (Full Time Equivalent labour units – by Italian enterprises and households represents a specific characteristic of the Italian labour market. Job positions are defined as un-registered when they are carried out without compliance with the current regulations regarding taxation and social contributions, as well as those related to illegal activities, which are not directly observable.

In 2022, un-registered FTEs are 2.986mln, where 2.168mln un-registered FTEs are employees. Compared to 2021, the number of un-registered FTEs is almost stable, with an increase by +0.1% (slightly less than 3k FTEs).

Both un-registered employees and self-employed shown the same dynamics, with a growth rate of 0.1%, 1.6k and 1.2k FTEs respectively.

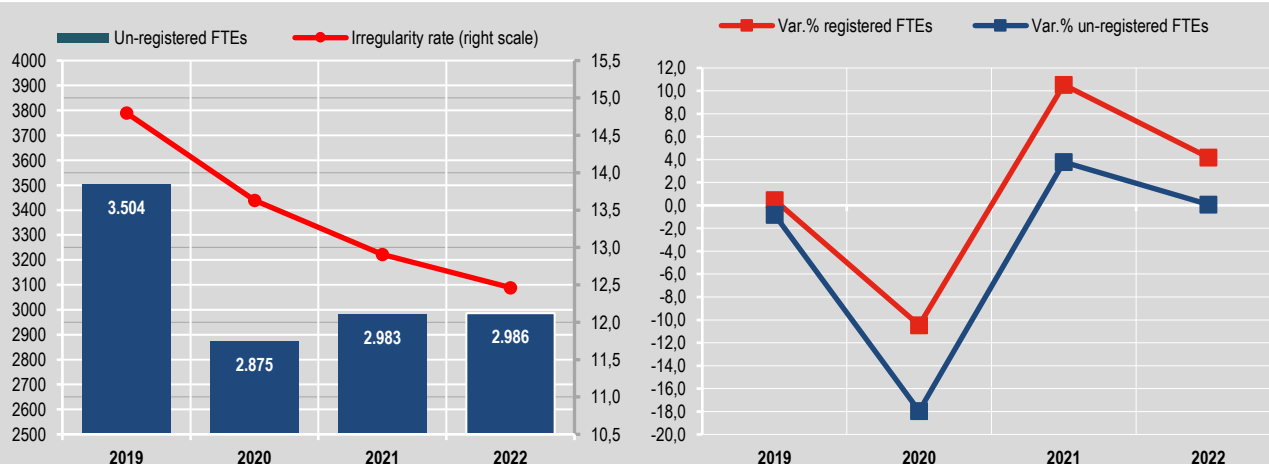
The rate of un-declared work, defined as the percentage of un-registered FTEs with respect to the total employment, decreased in the last year, lowering to 12.5% (12.9% in 2021). The reduction in the un-declared rate is due to the combined effect of the slow growth in the number of un-registered workers (+0.1%) and the relevant increase in the registered employment (+4.2% with respect to 2021, about 843k FTEs), driven by the component connected with declared employees (+4.6%), which account for over 75% of the whole growth of total employment (647k FTEs).

The rate of un-declared work for employees is confirmed to be higher than that for self-employed (12.7% and 11.8% respectively); however, a tendency towards the convergence between the two rates can be observed from 2018.

In the last year, a reduction by 0.5 percentage points is observed in the un-declared rate for employees, while the decrease for self-employed is 0.3 percentage points.

FIGURE 3. FULL TIME EQUIVALENT UNITS (FTEs) REGISTERED AND UN-REGISTERED

Years 2019-2022, values in thousands, percentages and percentage variations



Sectoral heterogeneity in the dynamics of un-registered workers

In 2022, a reduction in the impact of un-registered workers on total employment has been observed in all industries. The highest contractions have been registered in Other business services, and Education, healthcare and social services (-0.7 and -0.6 percentage points respectively). In both Construction and Other personal services a reduction by 0.5 percentage points has been observed.

Smaller reductions were observed in Agriculture, where the rate of un-declared work has lowered by 0.4 percentage points, Production of final consumption goods, Production of investment goods and Trade, transportation, accommodation and food services, where a reduction by 0.3 percentage points has been registered. Finally, Professional services has shown a reduction by 0.1 percentage points, while the rate is stable in Production of intermediate consumption goods.

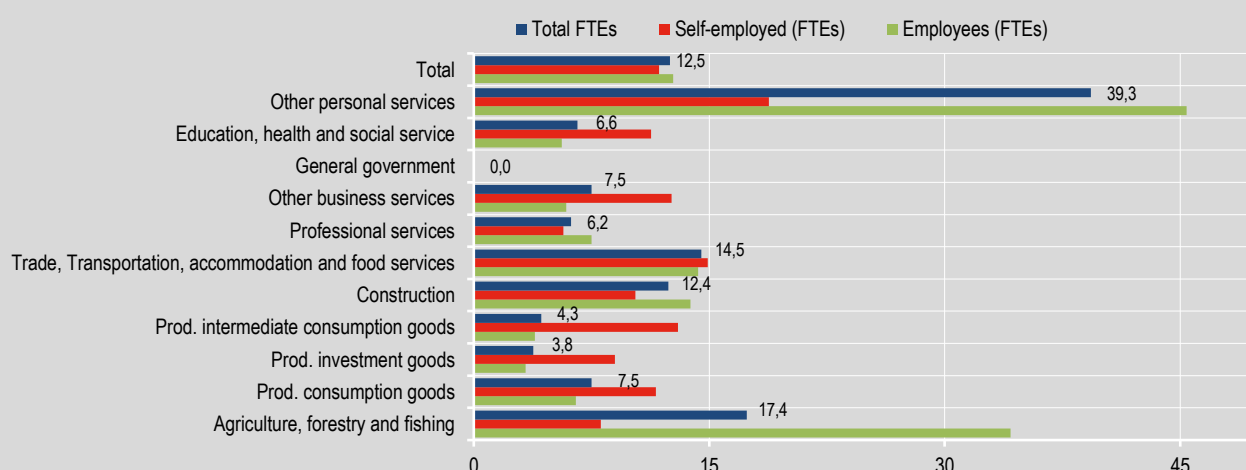
The rate of un-declared work in Trade, transportation, accommodation and food services has decreased by 0.3 percentage points, from 14.8% in 2021 to 14.5% in 2022, which represents the lowest value from the beginning of the time series. In this industry, which is strongly characterised by the presence of un-registered workers, the contraction is mainly due to the reduction shown by the component of employees (-0.4 percentage points), while the rate of un-declared work among self-employed increases by 0.1 percentage points.

The decrease of the impact of the phenomenon registered in Agriculture and Construction is almost entirely attributable to the dynamics of the component of un-registered employees (-0.9 and -0.7 percentage points respectively), while a less marked reduction has been observed for the component of un-registered self-employed (-0.3 percentage points in both industries).

Conversely, Production of final consumption goods, Production of investment goods, Education, health and social services, and Other personal services show a reduction in the rate of un-declared work, which can be mainly attributed to the component of the self-employed.

In general, the contribution of un-registered workers is more relevant in services (14.6%), especially in Other personal services (39.3%), where the demand for domestic personnel by households as employers is concentrated. The presence of un-registered workers is also relevant in Agriculture (17.4%), Construction (12.4%) and Trade, transportation, accommodation and food services (14.5%).

FIGURE 4. RATE OF UN-DECLARED LABOUR INPUT BY INDUSTRY AND PROFESSIONAL POSITION
Year 2022, percentages



Illegal economy almost reaches 20bn euro in 2022

The 2024 general revision of the National Accounts has also concerned the estimates of illegal economy, mainly for the period 2018-2022. No methodological innovations have been introduced in the context of illegal economy, but an update of information sources has been carried out, leading to an upward revision of the growth rate of illegal value added and final consumption expenditure between 2018 and 2021.

In 2022, illegal activities generated 19.8bn euro of value added, with a contribution of 1.1% on GDP. These figures include the value of induced activities, i.e., the value of legal goods and services used as intermediate inputs in illegal production processes. Compared to 2021, the value added of illegal economy has increased by 1.2bn euro, accelerating the positive dynamics already observed the preceding year (+6.7% versus +5.6%).

Final consumption expenditure related to illegal goods and services has increased by 1.6bn euro, settling down at 22.8bn euro, representing 1.9% of the total final consumption expenditure. The increment is mainly due to the update of the IPSAD (*Italian Population Survey on Alcohol and other Drugs* by CNR) which, for 2022, signaled an increment in the prevalence rate for heroine.

Referring to 2019-2022, illegal activities have shown an increase by 0.2bn euro in terms of value added and by 0.6bn in terms of final consumption expenditure, with an annual average growth rate of 0.3% and 0.8%, respectively. As a consequence, in 2022 the value of illegal economy has exceeded pre-pandemic levels.

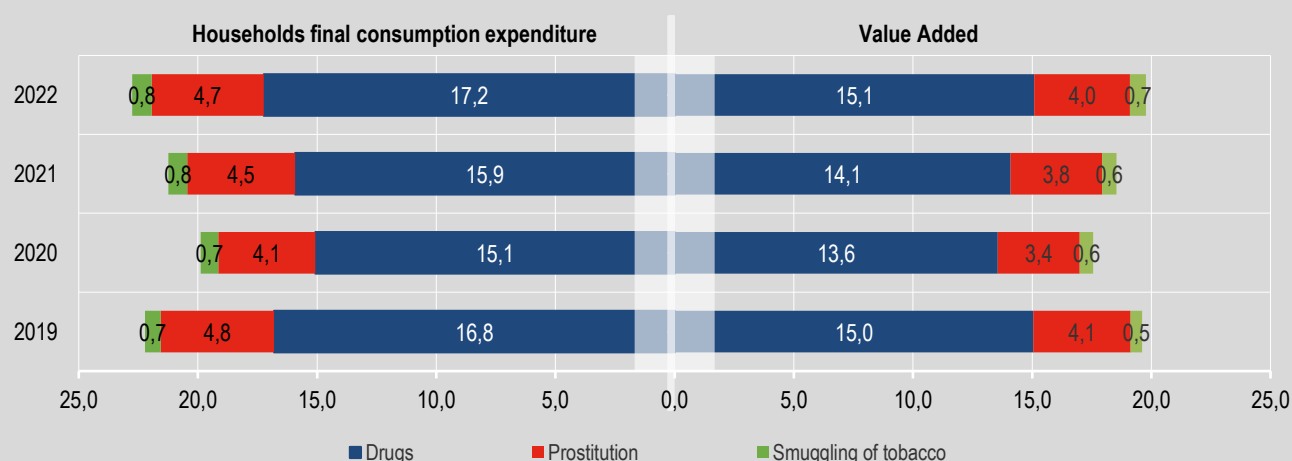
The growth of illegal activities in 2022 has been mainly determined by the dynamics of drugs trafficking: the related valued added amounts to 15.1bn euro (+1bn with respect to 2021), while the final consumption expenditure is worth 17.2bn euro (+1,3bn compared to 2021).

In the same period, prostitution services has registered an increase: in 2022 both the value added and the final consumption expenditures raised by 4.3% and 4.0% respectively, settling down to 4.0 e 4.7bn euro.

Tobacco smuggling remains marginal, representing a share – with respect of total illegal activities – of 3.4% of value added (0.7bn euro) and of 3.6% of final consumption expenditure (0.8bn euro).

During the 2019-2022, induced activities, mainly connected with transportation-related industries, stepped from a value added of 1.4bn euro to 1.6bn.

FIGURE 5. VALUE ADDED AND FINAL CONSUMPTION EXPENDITURE BY TYPOLOGY OF ILLEGAL ACTIVITY
Years 2019-2022, values in billion euro



Main revisions in measuring underreporting

In the context of the general revision of National Accounts released in September 2024, two relevant methodological innovations have been introduced in measuring underreporting with respect to the approach developed during the preceding general revision of 2019.

The first one relates to a reconfiguration of the statistical strata used by the models that measure underreporting for larger business units, which, while maintaining the statistical reliability of the results, allowed a more disaggregated analysis of Transportation and warehousing (separating them from Trade, accommodation and food services) and Business services (separating them from Personal services). This involved an improvement in the precision of estimates for those industries.

The second concerns the new definition of the target variable used in estimation models, which has been currently depurated by the effect of change in inventories. This innovation permitted to both measure the over-estimation of change in inventories resulting from firms' balance sheets and improve the reliability of estimates of underreporting for business units operating in industries characterized by a higher impact of stock rotation.

Point revisions with respect to the preceding release of 2023 can be observed considering 2021, the benchmark year for the new time series, for which figures are comparable. Looking at levels, underreporting has been revised downwards by slightly less than 1bn euro, with an almost stable impact on total value added that remained (-0.1 percentage points).

However, the characteristics of the innovations introduced led to a relevant sectoral heterogeneity of revisions.

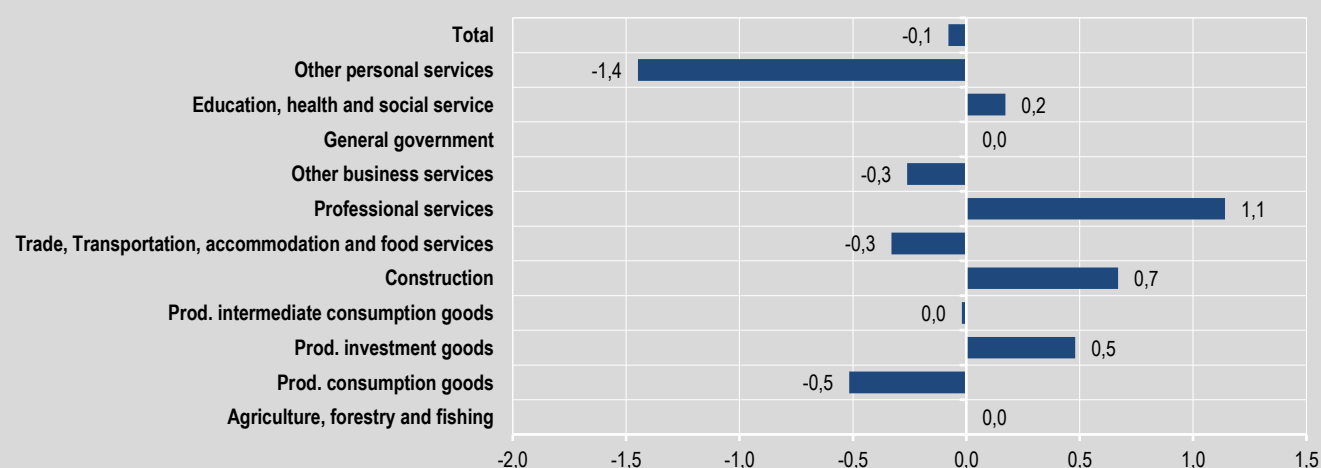
The reduction in the impact of underreporting in Other personal services (-1.4 percentage points) and the increase in its weight in Professional services (+1.1) are mainly connected with the current disjoint estimation of the two industries, which allowed to correct a preceding over (under) estimation of the phenomenon.

The reconfiguration of statistical strata also generated the downward revision of the contribution of underreporting in Trade, transportation, accommodation and food services (-0.3 percentage points). In particular, such result summarizes a reduction in the weight of underreporting in Trade, accommodation and food services and an increase in Transportation.

The increase in the contribution of underreporting to the value added of Construction (+0.7 percentage points) and Production of investment goods (+0.5), as well as its reduction in Production of final consumption goods (-0.5), are mainly connected with the new treatment of change in inventories, which allowed to correct a preceding under (over) estimation of their role in the generation of underground value added.

FIGURE 6. REVISION IN THE IMPACT OF UNDERREPORTING ON SECTORAL VALUE ADDED

Year 2021 (Benchmark 2024 vs. Benchmark 2019), percentage points



Main revision in measuring un-registered workers

In the context of the general revision of National Accounts released in September 2024, innovations in the estimation of un-registered workers have been introduced.

As for the component connected with un-registered employees, the main innovation concerned the separate estimates of the so-called “cash in hand” paid hours or “grey hours-worked”, i.e., the undeclared hours-worked by registered employees. Previously, this component was measured together with the hours-worked by registered jobs and did not contribute to the valuation of the underground value added. In the estimates produced by the new approach un-registered FTEs derived from grey hours-worked represent about 12% of un-registered employees measured in terms of FTEs.

A further innovation concerned the sector of domestic personnel employed by households, where the treatment of ‘casual’ jobs has been improved, correcting an over-estimation of un-registered FTEs.

As for un-registered self-employed, the main innovation is related to the improvement of the estimates of the component of the registered employment which is characterised by individuals carrying out activities that are below the threshold for social contributions. This also allowed to correct the bias generated by the erroneous classification of these positions in the preceding version of the estimates.

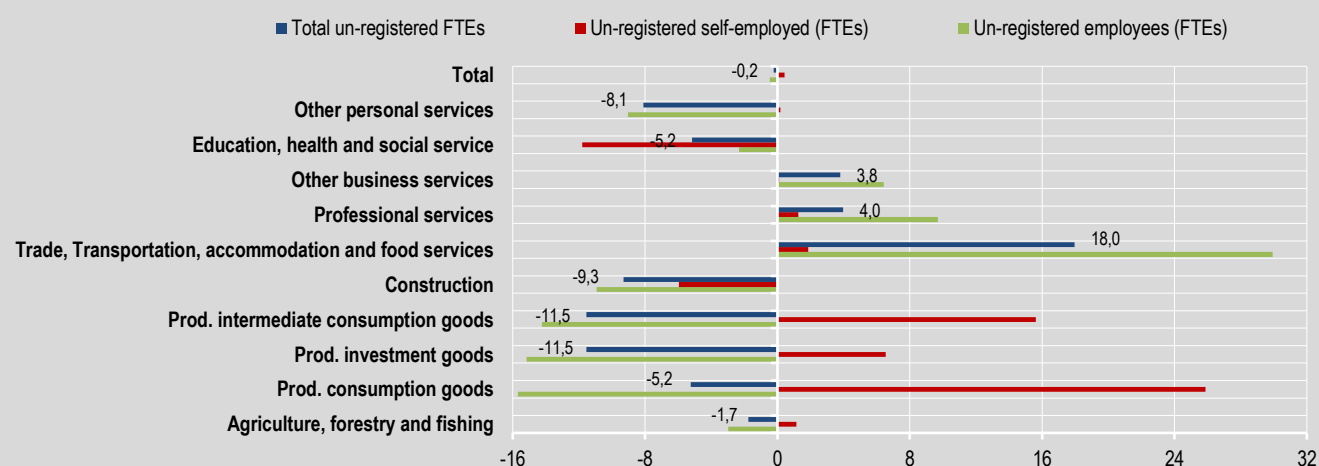
Considering the benchmark year 2021, these innovations generated a modest revision in the number of un-registered FTEs, (-0.2%), summarizing heterogeneous effects across professional profiles and sectors. In particular, the revision of un-registered employees in terms of FTEs has been -0.5%, while it has been +0.4% for un-registered self-employed.

More specifically, for un-registered employees a relevant upward revision (about +30%, 118k FTEs) for Trade, transportation, accommodation and food services has been observed, which is connected with the effect of the inclusion of grey hours-worked, while in Other personal services a downward revision has been registered (-9.0%, -88k FTEs), due to the new approach in the treatment of the domestic personnel employed by households.

For the component connected with un-registered self-employed, the effects of methodological innovations are more heterogeneous and cannot be traced back to the given modification in the procedures. The revisions show a sectoral re-composition, mainly due to the improvement of check and editing tasks focused on the assignment of the classification by economic activity.

FIGURE 7. REVISION IN UN-REGISTERED FULL TIME EQUIVALENT UNITS (FTEs)

Year 2021 (Benchmark 2024 vs. Benchmark 2019), percentages



Glossary

Economic activity: an activity involving the production of goods or services, which takes place when resources such as labour, plant and raw materials contribute to the production of goods or the provision of services. An economic activity is characterised by the use of factors of production, a production process and one or more resulting products (goods or services). For the production of statistical information, economic activities are classified according to an international nomenclature, known at European level as Nace Rev. 2 (for the Ateco 2007 classification).

Illegal activities: activities involving illegal goods and services or, though involving legal goods and services, are carried out without authorization. For EU countries, three illegal activities have to be included in National Accounts: drugs trafficking, prostitution services, smuggling of tobacco and alcohol.

Non-observed economy (NOE): activities which, for different motivations, cannot be directly observed for statistical purposes. The components of NOE are (1) underground economy, (2) illegal economy, (3) informal economy and statistical underground.

Underground economy: includes all activities that are voluntarily concealed to tax, social security and statistical authorities. It is generated by misreporting both turnover and/or costs of business units (so as to generate an underreporting of value added) and employment of un-registered workers. Other components are: (1) tips received by employees in some sector; (2) reconciling of independent estimates of supply and demand; (3) un-declared rents received by households.

Gross domestic product at market prices (Gdp): final result of the production activity of resident producer units. It can be defined in three ways: as the sum of gross value added of all industries plus taxes and less subsidies on products; as the sum of the final uses of goods and services units (final consumption and gross capital formation), minus the value of imports of goods and services. It also corresponds to the sum of primary income distributed by resident producer units to the production factors.

Household final consumption expenditure: consists of expenditures incurred by households on individual goods and services for the direct satisfaction of individual needs. A distinction is made between: • domestic final consumption expenditure, incurred on the economic territory of resident and non-resident units; • national final consumption expenditure, incurred by resident households on the economic territory and abroad.

Rate of un-declared work: the percentage ratio between the undeclared kind of employment and the corresponding total amount.

Full time equivalents (FTEs): is an employment measure obtained by transformation of part-time and multiple jobs into full-time equivalent units. FTEs are net of hours paid for by CIG (Wage Supplementation Fund).

Value added at basic prices: the production value of goods and services less the purchases of goods and services consumed in the production process, where the production is evaluated at basic prices, i.e. net of taxes on products and including subsidies on products. Intermediate consumption is evaluated at purchasing prices. Value added is the sum of primary incomes distributed by resident producer units and of the consumption of fixed capital.

Methodology

Introduction

Non-Observed Economy (NOE) includes economic activities that are hidden to direct statistical observation. Considering the different components of NOE in National Accounts permits to meet the exhaustiveness principle in the representation of economic flows and contributes to improve the estimates of Gross Domestic Product (GDP) and Gross National Income (GNI). Furthermore, exhaustiveness of National Accounts measures guarantees comparability in time and with other Countries.

NOE consists of four components:

(1) *Underground economy* includes economic activities that are voluntarily hidden to fiscal and, thus statistical, authorities. It consists of the unobserved value added related to false declarations about turnover and/or costs (under-reporting of value added), or to the use of unregistered workers.

(2) *Illegal economy* includes economic activities that produce illegal goods and services (or legal goods and services without authorization). Though National Accounts should register all illegal activities falling within production boundaries and meeting the “mutual consent” principle,ⁱ based on Eurostat recommendations, only drugs trafficking, prostitution services and smuggling of tobacco and alcohol are actually included.

(3) *Statistical underground* includes all economic activities that are unobserved due to inefficiencies that may affect databases (sample and non-sample errors) and/or to coverage issues in statistical archives.ⁱⁱ

(4) *Informal economy* includes economic activities that are carried out in unstructured contexts, characterized by transactions and work relationships that are mainly defined within the scope of personal or family relationships.

Although the measurement of underground economy is mainly related to underreported value added and the value added generated by the use of unregistered workers, further integrations are made to account for tips and un-registered rents paid to households.

Finally, referring to underreporting and the value added generated by the use of un-registered workers, a further integration is represented by the related amount of un-declared VAT (VAT fraud). According to Eurostat recommendations, only VAT fraud “without complicity” is considered. This case arises when the buyer pays the due amount of VAT, which become part of the income of the seller (who does not pay the VAT to the Tax Authority). Conversely, in the case of VAT fraud “with complicity”, where neither the buyer pays the VAT nor the seller retain any amount, there is no economic flows to measure in National Accounts.

Underreporting of value added

Underreporting of value added is connected with the concealment of a part of the business income through false declarations about turnover and/or costs aimed at reducing taxable profits and at avoiding the payment of other indirect taxes (e.g. VAT, IRAP).

The methods that allow the estimation of underreporting use FRAME-SBS as the main informative source. FRAME-SBS is a census database that integrates survey data and administrative records to provide information about the main economic variables for the whole population of Italian active business units.

The availability of census micro-data allows for developing specific procedures that permits to improve the matching between estimation methods and firms characteristics. The reference population includes the business units that produce for the market and employ less than 100 workers,ⁱⁱⁱ which does not meet specific non-treatability conditions.^{iv}

The reference population

In order to adapt estimation models to the economic, technological and organisation characteristics of business units, the reference population is broken-down in four groups.

1. **Minimal-size firms** include business units where the work of the entrepreneur can be supposed to be fully fungible with the one of an employee (being equal the level of specialization, working-hours and the sector of economic activity). In this case, the firm actually coincides with the entrepreneur and it is characterised by a very small or absent endowment of equipment.

From the group of Minimal-size units, the *Business units in condition of economic marginality* are identified. They consist of operators that have other forms of income (pensions or compensation of employees from other firms) or having more than 70 years of age. These units are excluded from the procedure.

2. **Micro-firms** include business units that employ less than 10 workers in industry and less than 5 workers in services (being not included in the group of Minimal size units).
3. **Organised firms** include business units with less than 100 workers that employ more than 10 workers in industry and more than 5 workers in services.
4. **Firms belonging to domestic groups** include business units with less than 100 workers that belong to groups of firms including only domestic business units (Multi-National groups are thus excluded).

Identification and adjustment for under-reporting

The application of two different methods for Minimal-size firms and the other groups permits to obtain the identification and adjustment for underreporting.

For *Minimal-size units* the identification and the adjustment for underreporting are based on the comparison between the declared business income and a threshold defined in terms of the wage of a representative employee working in similar productive conditions. In this context, the threshold represents an opportunity cost for entrepreneurial activity, i.e. the indifference threshold between being entrepreneur and working as employee. Consequently, where the declared business income is lower to the related opportunity cost, the firm is assumed to underreport the value added for an amount that is equal to the distance between the declared income and the threshold.

The definition of the threshold is based on the information about the compensation of employees by qualification provided by the Inps-Emens database. The comparison between the threshold and the business income is carried out within statistical domains defined based on a stratification generated by regression threes technique. This method allows to determine statistical domains (in terms of economic activity, territory, firms characteristics) in order to assure the highest homogeneity in the distribution of the labour cost per worker.

In order to account for economic cycle fluctuations and other contextual factors, which can affect to a different extent business income and wages, the threshold is adjusted with a coefficient estimated by a panel model that uses the information related to firms performance, sectoral competitiveness, labour market indicators and controlling for sector of economic activity, territory and size-class.

For other groups (*Micro-firms*, *Organized firms* and *Firms belonging to domestic groups*), the adjustment for underreporting is based on the application of econometric techniques at the micro level within homogeneous statistical domains (in terms of sector of economic activity and size-class). In particular, the method exploits the ROC analysis applied to a composite indicator – representing the main economic and organizational features of firms – which allows to profile the economic behaviour of firms. The model permits to grasp contextual conditions (including business cycle fluctuations) and the structural characteristics of firms.

The method is composed of two stages: identification and adjustment.

The identification of underreporting business units is carried out starting from a set of indicators (that profile the organization, the performance and the structure of costs of firms), which are summarised by a factor analysis and then aggregated in a composite indicator. A logit model and the related ROC analysis allow for defining a cut-off point over the composite indicator that discriminates between underreporting and non-underreporting firms.

The adjustment, which determines the amount of undeclared value added is obtained in two steps. In the first one, the procedure calculates the amount of the value added (net change in inventories) per worker that is needed in order to bring underreporting firms on the cut-off point based on which the identification has been done. In the second one, the final amount of the adjustment is obtained by applying to each worker employed in the given underreporting firm the difference between the initial and the adjusted nominal productivity.

In this way, the adjustment for underreporting not only depends on the distance between the composite indicator of underreporting firms and the cut-off for the identification (which can be thought of as the distance from the “economic normality” defined by the model), but also on the relative relevance of the nominal productivity within the economic and structural profile of firms.

Value added generated by the use of unregistered workers

The procedure to measure the value added generated by the use of unregistered workers is composed of two stages: (1) the estimation of unregistered labour input (employees and self-employed) in terms of jobs, persons employed, hours worked and Full Time Equivalents units (FTEs); (2) the estimation of the value added generated by each unregistered FTE (employee and self-employed).

In this case, the available information does not allow for measuring the phenomenon at the micro level (individuals and/or firms). Therefore, the analysis is carried out within statistical domains defined in terms of sector of economic activity and size-class.

The measurement of unregistered labour input

The increased availability of administrative sources at the micro-data level enabled to adopt a methodology for estimating labour input based on the integrated use of individual data from statistical registers, surveys and administrative sources. Based on statistical integration techniques (micro-linkage), two databases are built yearly, one on the labour demand side- having employers as analysis units - and one on workers covering labour supply.

The first database provides information on registered jobs of employees and self-employed in annual average for each production unit. It covers all the institutional units included in the production boundary and is based on statistical registers and administrative data.

The second, instead, covers both registered and unregistered labour input and is developed by integrating surveys and administrative sources. The most important source of the database on workers in terms of coverage and richness of information is the annual sample of the Labour Force survey merged with administrative archives (hereafter FI-Admin)^v, which combines detailed information on the employment status and employment characteristics of each survey respondent, with information on the same individual derived from administrative sources (social contribution paid and work activity). Checks of consistency among information related to the same statistical unit in the different sources make it possible to measure and statistically correct the over-coverage of administrative records and any under-coverage phenomena in the Labour Force survey.

Furthermore this integration allows to classify each job estimated with FI-Admin as registered or unregistered depending on whether or not a validated administrative signal is present^{vi} for each of them and to calculate for each job the corresponding amount of hours worked based on those recorded by the survey. The validation of administrative signals is based on a probabilistic model. In order to achieve an exhaustive coverage, jobs related to non-residents working for resident production units must be added to those estimated through FI-Admin. Several sources are available for this type of workers depending on whether they are persons with a residence permit or so-called illegal immigrants.^{vii}

In addition, for sectors like land transportation and domestic services additional unregistered jobs are estimated using indirect information sources and ad hoc estimation methods. Finally the amount of persons engaged in illegal activities are added to undeclared jobs.

Starting from the estimate of jobs, it is possible to measure the total hours worked, as the product of jobs and per capita hours calculated through FI-Admin by domains identified by type of employment (registered and unregistered, employees and self-employed), economic activity, enterprise size class and legal form of the employer. A final step in the process of estimating hours worked consists of separating so-called 'cash in hand' paid hours or grey hours from the total hours worked by registered employees, which in the general procedure are estimated together with the registered ones.

Finally, FTEs are obtained by dividing the total amount of hours worked and the average number of hours worked by a full-time main job in each estimation domain, complying with the definitions of ESA 2010.

The measurement of the value added generated by unregistered workers

Once the number of unregistered FTEs (employees and self-employed) has been estimated, their contribution in terms of value added have to be measured.

This amount is conceptually additive with respect to the value added from underreporting. Indeed, the models that measure underreporting allow to correct the value added being the endowment of production factors (and thus also the workforce) given.

The whole amount of value added generated by the use of unregistered workers is composed by the sum of two components: the value added related to the use of unregistered employees, and the one connected with the economic activity of unregistered self-employed.

Concerning unregistered employees, their contribution to the formation of value added can be broken-down in two parts: the compensations they receive from the firm and the mark-up over the labour costs that firms retain in their gross operating surplus.

In order to overcome the rough assumption that registered and unregistered employees have the same compensations, the salaries of unregistered workers is assessed by comparing the declared wages included in the FI-Admin database that gather information about both registered and unregistered workers. A coefficient that corrects the compensation of unregistered workers considering the observed differential is then applied within statistical domains in order to obtain a more reliable estimates of the actual compensation of unregistered employees (also accounting for the fact that in this case no social contribution are paid).

The mark-up component is estimated under the assumption that firms apply the same margin over the labour costs for registered and unregistered workers operating in similar enterprises. In particular, the mark-up is defined by applying (within statistical domains in terms of sector of economic activity, size-class and territory) to unregistered employees (in terms of FTEs) the same mark-up calculated considering registered employees.

The value added generated by unregistered self-employed is measured by applying (within statistical domains defined in terms of sector of economic activity, territory and size-class) the nominal productivity (value added per

FTE) calculated for similar firms included in the Frame-SBS database to un-registered self-employed (in terms of FTEs).

From the perspective of the production process, therefore, unregistered employees generate a value added which is equal to the sum of their compensations plus the mark-up the firms gain over their wages, while unregistered self-employed generate a value added which is equal to their nominal productivity. From the perspective of the distribution of income, only the compensations enter the income of unregistered employees, while the value added generated by unregistered self-employed and the mark-up component are part of the gross operating surplus of business units.

The estimates of the VAT fraud without complicity

The underground value added (coming from both underreporting and unregistered workers) represent an undeclared tax base for VAT. The existence of underground value added thus implies a VAT fraud against the treasury. VAT fraud, which originates from unregistered transactions, may imply or not the consent of the buyer. In the first case, contractors can agree to hide the transaction and the related VAT: the buyer does not pay the VAT, the seller does not receive any amount and no impact is generated on the representation of economic flows. In the second case, the seller does not register the transaction, while the price paid by the buyer include the VAT. In this latter situation, the VAT received by the seller is retained in the income of the fraudster and should be represented in the economic flows. This is the rationale for including the VAT fraud without complicity in the measurement of GDP and GNI.

The measurement of VAT fraud is based on the distinction between the two typologies of fraud. The starting assumption is that unregistered *business-to-consumers* (B2C) transactions generate VAT fraud “without complicity”, while *business-to-business* (B2B) transaction generate VAT fraud “with complicity”. This initial assumption is then relaxed considering, for B2C transactions, the probability of complicity of the buyer based on market/sectoral specificities (e.g., constructions, professional services, healthcare) and, for B2B transactions, the information on the *mismatch* in invoicing coming from electronic invoice database,

In a similar way, the different components of underground value added are assumed to be connected to the different typologies of VAT fraud. Value added from under-reporting is supposed to generate both typologies of VAT fraud, while the value added generated by unregistered workers shows different cases. Value added generated by unregistered self-employed can only generate VAT fraud “with complicity”, since they are unregistered firms (without VAT number). The value added generated by unregistered employee (both compensations and mark-up) may be connected, as in the case of underreporting, with both typologies of VAT fraud.

The estimates of VAT fraud “without complicity” is then carried out by applying the VAT rate calculated for similar enterprises, to the amount of the hidden tax base (the underground value added).

The other components of the under-ground economy

The estimates of under-ground economy is complemented by the identification of further residual components.

The first one is represented by unregistered rents (residential and non-residential) paid to households. The estimates is obtained by comparing the whole amount of (residential and non-residential) rents exhaustively measured by standard National Accounts procedures,^{viii} with the registered component represented by the rents paid to enterprises (gathered from Frame-SBS database) and households (gathered from the Italian Revenue Agency).

The value of tips for some specific sectors of economic activity (e.g. hotels and restaurants, personal services) is assessed as a percentage of the expenditure for final consumption of the related services.

The measurement of the underground value added is finally integrated by the procedure that allows the reconciliation of the independent estimates of the supply and demand aggregates. This integration includes, in proportions that cannot be directly identified, purely statistical effects and components of underground economy that cannot be estimated by the current procedures.

Illegal economy

According to Eurostat recommendation, Istat developed a statistical framework to measure illegal economy considering three activities: drugs trafficking, prostitution services, smuggling of tobacco.

In a context characterised by unstable and often distorted informative sources, the estimation procedures have been developed considering the following goals: (1) consistency with Eurostat recommendations; (2) identification and resolution of possible issues in measuring and representing illegal activities in the system of National Accounts.

The inclusion of illegal activities in the system of National Accounts involves: measuring and classifying the economic aggregates (production, imports, final consumption, exports distributive margins and intermediate costs) related to illegal economy; avoiding distortion in National Accounts estimates coming from a distorted representation of the interaction between legal and illegal economy within the system of National Accounts.^{ix}

Estimates of each illegal activity are carried out by using a specific methodology developed considering data availability (and reliability), Eurostat recommendation and the theoretical frameworks proposed in the literature.

Drugs trafficking

The approach to estimate the aggregates related to drugs trafficking is based on the information about the demand, which are considered more reliable. The procedure allows for assessing the quantity of drugs (by typology) that is consumed during the year considering the number of consumers (by typology of drugs)^x and their consumption habits (by typology of consumers).^{xi} The quantity of drugs that are imported and exported^{xii} is estimated taking into account the different purities along the supply chain. The assessment in value of these quantities is obtained considering the information about prices published by UNODC (international prices) and the Ministry of Internal Affairs (wholesale and retail prices within the domestic market).^{xiii}

The assessment of the aggregates related to production processes (distributive margins, intermediate costs and value added) is carried out considering three different activities along the value-chain: wholesale international trade, wholesale domestic trade and retail trade. They are characterised by relevant “technological” and “functional” differences, which call for analysing them in a separate manner.^{xiv} For each type of activity, production (in terms of distributive margins), amount and typology of intermediate costs^{xv} (reflecting the related “technologies” of production) and the value added are separately measured.

Prostitution services

As for the estimates of prostitution services, Eurostat recommends a supply-side approach. The method developed by Istat considers different typologies of prostitution services (street, home-based, night club) and distinguishes between legal and partially “visible” prostitution (home-based) and “hidden” prostitution (street).

The methodology is based on a preliminary estimates of the number of prostitutes (by typology of the service), the number of daily provisions and working days per year. Starting from this information, the whole number of prostitution provisions by typology during the year within the domestic territory can be assessed.^{xvi} The related value is determined by using an estimates of prices by typology of service.^{xvii} Being imports and exports of prostitution services excluded by hypothesis, the value of final consumption equals the level of production, while the value added is determined by subtracting a share of intermediate costs.

Smuggling of tobacco

As the estimates of tobacco smuggling, Eurostat recommends the use of demand-based indicators that are based on the information about the “smoking” population and their “smoking” habits (in a similar vein as in drugs trafficking). However, as available surveys seem to under-estimate the incidence of “smoking” population^{xviii} with respect to official indicators about the selling of cigarettes,^{xix} a supply-side approach has been adopted.

Coherently, estimates are based on seizures,^{xx} considering three typologies of products: (1) original cigarettes imported over the legal quantities or imported along illegal supply-chains; (2) “cheap white”, i.e., cigarettes produced in Countries outside the EU and illegally imported; (3) counterfeited cigarettes, which are characterized by trademarks reported without the consent of the owner.

Assuming negligible domestic production and exports, the whole quantity of illegal cigarettes consumed in Italy is imported. In order to estimate aggregates in value, prices are determined starting from legal retail prices.^{xxi} Assuming intermediate costs as a share of production (assessed as final consumption less imports), the value added can be determined.

Main information sources

Frame SBS, a statistical archive including the main economic and structural information about the whole population of Italian active business units (about 4,4mln firms). The archive integrates administrative and fiscal records (Balance sheets, ISA, IRAP, Unico) and the information coming from surveys and other statistical archives (PMI, SCI and RACLI).

Revenue Agency database on income from renting received by individuals, corporations and unincorporated firms

Quarterly Labour Force Survey

INPS database on persons employed

Prezzi medi semestrali delle principali sostanze stupefacenti forniti dal Ministero degli Interni.

IPSAD-CNR on the use of illegal drugs.

EMCDDA European Web Survey on Drugs on drugs consumption habits

Guardia di Finanza, seizure data on tabacco

Release and revisions policies

The estimates of non-observed economy are published once a year (year t), in the month of October, where the results referring to year $t-2$ are provided. In the context of the general revision of National Account of September 2024, methodologies to estimate different components of non-observed economy have been updated with respect to the previous general revision of 2019.

New methods have been applied for years 2021 and 2022, while time series 2011-2020 have been reconstructed through a procedure that considers the previous dynamics of each component of underground and illegal economies.

Compared to the previous version of this Report, levels and impacts of non-observed economy have been revised according to the introduced innovations. The results provided in this Report may change in the next editions due to possible revisions in the estimates of National Accounts.

For technical and methodological information

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Notes

ⁱ The measurement of illegal activities in National Accounts does not involve any assessment of the turnover or wealth of criminal organizations. Indeed, the analysis is limited to a subset of illegal activities and does not consider possible legal activities related to criminal organizations.

ⁱⁱ The incidence of the statistical component of NOE has been strongly reduced by the innovations in informative sources on business units. The estimates of the regular economy is obtained by processing an annual census database (Frame-SBS) that includes economic information for the whole population of Italian active business units. Frame-SBS integrates survey data and administrative records and for the main economic variables is not affected by sample errors. Therefore, the introduction of Frame-SBS, by virtually eliminating statistical errors, made negligible the incidence of the NOE coming from inefficiencies of informative sources.

ⁱⁱⁱ Larger firms (more than 100 workers) have been excluded based on the evidence of tax planning strategies (often involving international transactions) that cannot be captured by current methods. In this context, the estimates would need *ad hoc* models and international agreements for exchanging data.

^{iv} The conditions of non-treatability apply to: (1) business units for which underreporting can be assumed not to exist, such as firms belonging to Public Administration or operating in regulated markets; (2) business units for which there is a limited availability of data, such as multinational groups; (3) start-ups or business units for which peculiar events (bankruptcy procedures, receivership) prevent the efficient application of models; (4) business units with economic values that are affected by peculiar conditions.

^v The methodology for constructing the integrated database between Labour Force Survey and administrative archives was developed by a Working Group of experts from the National Institute of Statistics. The preliminary analyses and the methodology are described in detail in AA.VV. 'Methodological solutions for the integrated use of statistical sources for employment estimates', Istat Working Papers, num. 19/2015.

^{vi} With the exception of some specific activities where social contributions are not compulsory.

^{vii} Non-resident employed persons with residence permits are estimated by integrating data from the Register on Employment (employees and self-employed) with the Statistical Register of Individuals and Households (RBI), which contains information on the residence of all the population. In this way, a deterministic measure of foreign non-resident registered workers is obtained. Then the estimate of unregistered non-resident workers is calculated assuming that non-resident foreigners have the same labour behaviour, in terms of registered /unregistered work, as resident foreigners responding in FI-Admin. For foreigners illegally staying in the country the estimation of jobs is based on indirect sources, since no direct information is available. The calculation of this jobs is based on the estimate of individuals illegal living in the country produced yearly by Istat as part of the 'present population' in compliance with the EU Regulation on Qualified majority voting population (EU Regulation QMVP n. 1260/2013 art. 4). An employment rate of non-EU foreigners derived from Labour Force Survey is then applied to this sub-population.

^{viii} The estimates of the value of rents follow a demand-side approach: as for residential rents starting from the stratified stock of rented dwellings, the measurement is obtained by applying the average rent for each stratum; as for non-residential rents, the measurement is based on data the expenditures of firms.

^{ix} Legal goods and services used in illegal production processes represent the induced legal activity in illegal activities and have to be represented within the system of National Accounts. However, they may have already accounted for (e.g. misclassified as final consumption by households or as intermediate consumption of firms) or not. In the first case, including induced activities in the estimates of illegal economy would lead to an overestimation of aggregates (i.e., double counting), while, in the second case, not including them would lead to their under-estimation. In order to avoid such possible distortions, assumptions have been made to determine which components of induced activities have been already accounted for (and thus need to be reallocated) or not (and thus need to be integrated). This allowed to identify the components of induced activities of illegal economy that have to be considered as part of the legal (regular or underground) economy.

^x This procedure is applied to the estimates of the following drugs: Heroine, Cocaine, Cannabis, Amphetamine, Ecstasy, LSD.

^{xi} The number of consumers is determined starting from Emcdda data (produced for Italy by the Anti-Drug Policy department, Dpa), which provide information on the incidence (prevalence rate) of the consumption of drugs in Italy, and from the *Italian Population Survey on Alcohol and other Drugs* by the Consiglio Nazionale delle Ricerche. The typology of consumers and consumption habits are defined based on evidences found by scholars and international organizations (Emcdda, Unodc).

^{xii} This share has been defined based on the information provided by the analysts of the Italian Central Direction for Anti-Drug Services (Dcsa).

^{xiii} In particular, import prices are determined as the average between the price in production countries and the implicit price in the value of the drug once entered in the Italian territory. The reference price for exports is equal to the wholesale national price (first level of distribution). Retail price is defined as the average of (minimum and maximum) consumer prices provided by the Italian Ministry of Internal Affairs.

^{xiv} Sallusti, F. *Organizzazioni criminali e relazioni nel mercato della droga: analisi e classificazione*. L'industria, Anno XXXV n.2 aprile-giugno 2014.

^{xv} Intermediate costs by typology are estimated, for each activity along the supply-chain, as a share of the turnover. The information about the shares are determined based on the information provided by the analysts of Dcsa.

^{xvi} To assess the phenomenon Istat used data gathered from specific studies (European Commission, Gruppo Abele and Codacons).

^{xvii} The information about the prices of prostitution services by typology has been gathered from a private entity (Codacons) that carried out a survey in the cities of Milan, Rome and Naples.

^{xviii} Istat, *Indagine annuale Aspetti della vita quotidiana*.

^{xix} Data published by the Italian Amministrazione Autonoma dei Monopoli di Stato.

^{xx} The information about seizures are gathered from Guardia di Finanza.

^{xxi} Being direct information about import and retail prices not available, legal process net taxes are used.