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## **Linking Macro and Micro Data to Produce Distributional Accounts for the Non-Financial Corporations**

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# LINKING MACRO AND MICRO DATA TO PRODUCE DISTRIBUTIONAL ACCOUNTS FOR THE NON-FINANCIAL CORPORATIONS

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## Abstract

Starting from the financial crisis of 2008, there has been an increased demand for distributional information, as a tool to identify the portion of the distribution more affected by shocks. Up to now, national central banks and national statistical institutes addressed this need mainly for the household sector. In this paper, we argue that distributional statistics are valuable also in the case of the non-financial corporation sector, particularly when the information on the economic decisions of corporations are combined with the information on the availability of financial resources. To this aim, we exploit the survey of Industrial and Service Firms (SISF) run by Banca d'Italia, combined with other micro data (central credit register, security issue statistics and so on) to assess the coverage of aggregate statistics reported in the economic and financial accounts of the non-financial corporate sector. A first overview of the main differences between micro and macro data and the informative gap in the survey is reported. The paper represents the preliminary step towards the production of distributional corporate accounts.

## 1. Introduction

The economic downturns that hit the global economy starting with the subprime mortgage crisis in 2007/2008 have increased the demand for timely, coherent, and consistent distributional information relating to both firms and households. The need for such information has recently been boosted by a concatenation of unpredicted events such as the COVID-19 outbreak, the Russia-Ukraine war, inflation and global energy shortages.

These new data requirements are reflected in the G20 data gap initiative which encourages the production and dissemination of distributional information on income, consumption, saving, and wealth for the household sector. Following such a recommendation, several international initiatives have been undertaken. The OECD has established an expert group investigating how to add

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distributional information in the National Accounts (NA) relating to household income. The European Central Bank, in collaboration with national central banks, has developed a methodology to incorporate distributional information coming from the Household Finance and Consumption Survey (HFCS) into a national accounting framework to produce quarterly, timely estimates of the wealth distribution for the euro area and most of the euro area countries (ECB, 2020).

To date, no similar initiative has been undertaken relating to the non-financial corporation sector, probably also because of the scarcity of business surveys. Attempts to account for the presence of heterogeneity in the sector are limited to assess the role of multinationals in the economic and financial decision of the sector. Macro-economic data of relatively small country can be strongly influenced by the actions of also a limited number of multinationals. To cope with this issue, the ECB, Eurostat and OECD sponsored the production of a subsector related to Foreign-controlled corporations. The initiative is included in the recommendation 8 of the Data Gap Initiative (DGI-3), while the ECB required to euro area countries the production of financial account data referred to the subsector on foreign controlled non-financial corporations.

Regular, timely, and granular distributional results in line with macroeconomic totals relating business economic and financial situation could provide relevant information for policy making by helping in developing policies that are targeted toward specific groups and in assessing the impact of specific policies and events.

This paper advocates the need for the construction of a set of distributional accounts, which we refer to as Distributional Corporate Accounts (DCA), similarly to what has been done for the household sector.

DCA may provide insight in many topics that are relevant for policy making such as: (1) leverage, (2) net savings and (3) investments. For instance, in 2020, aggregate data have shown a sharp increase in the leverage and the deposits of the sector of non-financial corporations (Bottone et al., 2021; Infante et al., 2021; Lilla et al., 2021). Unfortunately, no timely information was available helping to understand the underlying heterogeneity of these phenomena. DCA would have useful to identifying how many firms have accumulated too much debt, along with their characteristics (i.e. size, economic sectors), and what risks such over-accumulation poses to the health conditions of the corporations and ultimately to the economy. They could have also been used to assess whether the joint accumulation of deposits on the asset side and debt (obtained at low rates), observed from the macroeconomic accounts, was an effect of the precautionary motives or of the behavior of different groups of corporations: medium and large corporations that increased deposits waiting for better times to invest or small corporations that used debt to weather the storm.

Another relevant issue for policy analysis is the ability of firms to produce cash-flow through their business or obtain financial resources from the financial system. To this aim, NA disseminate aggregate information on the corporate savings, delineating the formation and the use of saving, and on the corporate funding. DCA would enable to have a better understanding of the distribution of saving in the hands of firms and consequently of which group of firms experience more difficulties to get access, or produce internally, financial resources. Finally, DCA could contribute to the analysis of investment, through distributive measures of investment also conditional on the availability of internal and external financing. Again, timely distributional information on such variables could be used to have a better understanding of the economy, in particular, in presence of adverse shock.

Besides providing insights on the recent events, DCA could be used to evaluate the impact of shocks, policies and institutional changes on various groups of businesses. These insights in turn allow a better understanding of the implications of shocks for macroeconomic variables. For instance, they could be used to simulate the impact of the raise of interest rate on the sustainability of the debt, or to simulate the economic performances during Covid-19 crisis in absence of government interventions. Moreover, DCA could be used as basis for forecasting/nowcasting phenomena of interest.

In this paper, we focus our discussion on the estimation of distributional indicators relating to corporate saving, along with its main components, and corporate funding. These indicators may supply relevant information on respectively the internal generated and externally raised funds. The return of corporations, in the national accounting framework, is measured by the corporate operating surplus. Part of this income is used to pay interest to lenders and to pay corporate taxes, while the remainder may be distributed to the owners or retained within the corporation. The non-distributed part ends up in the non-financial corporation sector's saving. This saving represents an internal source of funds directly available to a corporation to either invest in non-financial or financial assets, or finally to reduce debt. In many countries, the internally generated saving of the non-financial corporations are not sufficient to meet investment needs. This is equivalent to say that corporations generally have a need to raise funds via equity or debt regularly.

The construction of distributional accounts generally requires at least three steps. The first is the analysis of the difference between micro and macro estimates of the variables of interest when both are available. The second is to develop methodologies to reconcile where necessary the two sources of information. The third is to extrapolate the information when only NA are available.

This paper focuses on the first stage and is therefore preparatory to the subsequent stages. In particular, the aim is to study the feasibility of DCA using the information available in Italy as a case

study. To this end, we first present the national accounting framework relevant to our purposes. We then present the available surveys from which to extract the distributional information of interest, namely the Survey of Industrial and Service Firms (SISF) conducted by Banca d'Italia, linked with the available administrative records (mainly Orbis, Anacredit, Credit register). In addition, we discuss the conceptual and definitional differences between the two sources of information, and finally, we provide an initial indication of the gap between micro and macro estimates.

The paper proceeds as follows. In the next section, we describe the main variables in the economic and financial accounts, dwelling on those measuring the amount of financial resources internally generated and those capturing the external source of funds. Section 3 contains a description of the survey with the micro data employed in this analysis, while Section 4 explains the main differences between the macro and micro data. Section 5 concludes.

## **2. The source and use of funds in non-financial corporation sector**

Sectoral accounts, from the System of National Accounts (SNA), provide aggregate information on the main results of corporations' economic activity. Production, value added, operating surplus, investment are recorded in the economic accounts while all the interactions with the financial system are included in the financial accounts.

At the end of the production cycle, firms try to achieve an equilibrium between the resources generated internally and the resources that can be obtained by accessing the financial markets. These resources are needed to finance new initiatives as well as to react to changing economic conditions, for instance to absorb the effects of an adverse shock. Firms accumulate savings to pay for operational and capital expenditures or to attenuate the fallout of financial stress. Savings are used as an internal source of funding for investment. The pecking order theory of corporate finance argues that firms prioritise their sources of financing, by preferring internal financing, then debt and equity.

The gross saving is the source of financing internally generated by corporations<sup>2</sup>, that turns out to be the balancing item of the current account.<sup>3</sup> The saving is generated in the distribution of income account, where the current transfers carried out by corporations, either as uses or as resources, are deducted from the operating surplus, a measure of the return of non-financial corporations. In fact,

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<sup>2</sup> The saving of corporations is exactly equal to their disposable income, because by definition corporations have no final consumption.

<sup>3</sup> In 2008 SNA terminology, the combination of the production account and the generation, distribution and use of income accounts.

part of the income generated by a non-financial corporation is used to pay interest to lenders, and to pay corporate taxes.<sup>4</sup>

The remainder of the income represents the economic return to the owners that can be distributed or retained within the corporation. In a nutshell, we could say that the saving is a function of the sales of the corporations, of the labor share (the compensation of the employees), of the value of the property incomes and of the taxation. The larger are the sales the larger is the saving of the corporations, while the higher is the labor share the lower the gross operating surplus and then the saving.

External funds are obtained through the capital market (debt and equity) and from the financial intermediaries, in particular the banking intermediaries. The latter grant loans, which in most of the countries represent a sizeable amount of financing.

In the non-financial corporations' economic and financial accounts the sources of funds available can be presented in such a way as to distinguish between internally generated or externally raised funds. In the case of external funds, the accounts reveal whether or not corporations chose to finance their funding needs through borrowing or through the issuance of shares.

The funds that corporations collect are employed to acquire either non-financial assets (machinery, plants, buildings) or financial assets (liquid assets, participations in other corporations, other financial assets) as simplified in the following equation:

$$\text{Saving} + \text{Financial liabilities} = \text{Non-financial assets} + \text{Financial assets.}$$

Saving and financial liabilities are respectively the self-financing and the external financing. This equation may also be rearranged as follows:

$$\text{Saving} = \text{Non financial assets} + (\text{Financial assets} - \text{Financial liabilities})$$

where (Financial assets - Financial liabilities) is equal to net lending/net borrowing, which can be interpreted as the amount of saving invested in the financial system, if positive, or as the amount of liabilities that corporations incur, if negative. As it is known, the net lending/net borrowing is measured in the capital account and in the financial account (as the difference between the total financial assets and the total liabilities); the two balances are conceptually equivalent, although

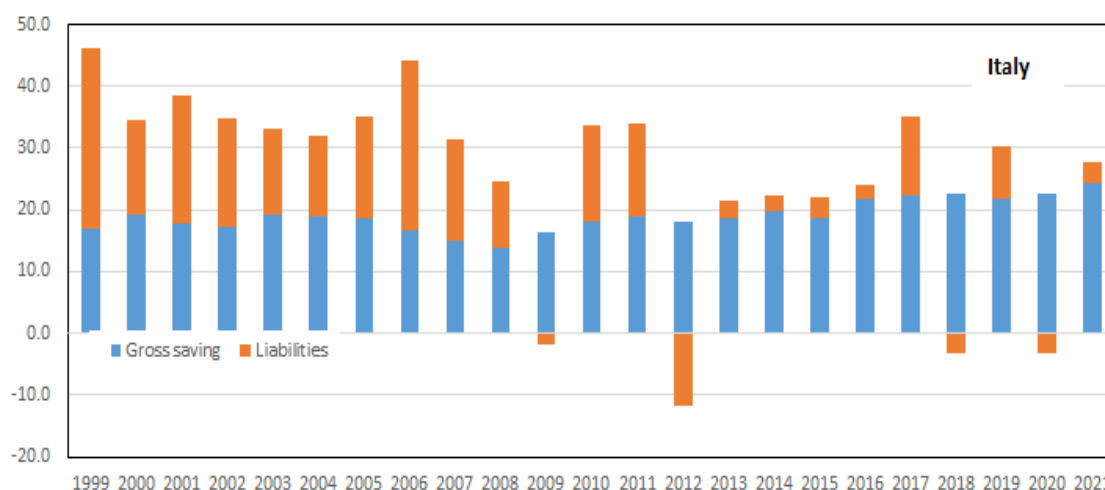
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<sup>4</sup> The transfers deducted from the operating income include property income, current taxes on income, social benefits paid or contributions received and other current transfers. There are five types of property income: interest; distributed income of corporations; reinvested earnings on direct foreign investment; investment income disbursements (among which property income attributed to insurance policyholders), and rents on land and sub-soil assets.

differences (usually labelled as vertical discrepancies) may be present, due to the different sources used in the compilation.

Figure 1 reports the sources of funds over a long time horizon (1999-2021) for the Italian case, over the sector gross value added. What emerges is that the internally generated resources appear stable all over the period reported, while the transactions of liabilities, reduced in the aftermath of the great financial crisis, recording also negative values.

**Figure 1 - Internal and external sources of funds in the Italian non-financial corporation sector**  
(percentage values over the gross value added)



Source: Istat and Banca d'Italia.

In Italy, annual non-financial accounts by institutional sector are compiled by the Italian Institute of Statistics (Istat)<sup>5</sup>, while the financial accounts by the Banca d'Italia. The compilation of sector accounts, from both sides, relies on a huge number of statistical sources.

As far as the economic accounts are concerned, the main sources, for most of the entries of the secondary distribution of income account for the institutional sector of non-financial corporations (S11) are based on counterpart information from the sector of general government (S13) and balance of payment statistics.

Istat conducts a survey on large enterprises about the financial statements (named SCI), along with a survey on economic outcomes of agricultural holdings. The compilation of the accounts is also based on an annual survey that collects census data from about 10,500 enterprises with at least 100

<sup>5</sup> See <https://ec.europa.eu/eurostat/documents/499359/7752836/IT+ASA+inventory+ESA2010+May2019.pdf/43fa942e-71a0-b6bb-47ba-17457b434a0b?t=1622556060511>

employees, providing information about turnover, production value, value added, wages and salaries and number of employees. Tax data on all natural persons, companies and entities to which the Revenue Agency has attributed an identification code (tax code, VAT number) are also employed.

As anticipated, financial accounts are based on multiple sources too. In particular, all the transactions with the banking system come from the Supervisory reports and cover mainly loans. Bonds are obtained from the Security issues database, which collects information on all the security issued. Shares and other equity and trade debts are obtained from the Italian central balance sheet office. All the relationships with non-residents come from the balance of payment statistics.

In order to recover distributional information on savings, net lending/net borrowing and financial liabilities we combine non-financial accounts and financial accounts micro data (for financial accounts we limit our attention to the liabilities).

Following the SNA framework described above there are two possible ways to obtain net lending/net borrowing balance. The first option is to derive this measure from the non-financial account side, while the second option is from the financial accounts.<sup>6</sup> In this paper, we adopt the first option because the survey we use focuses mainly on the turnover, investment and costs of firms. However, we integrate this information with statistics from central credit register, security issue statistics, corporate balance sheet, that are at the basis of the financial accounts compilation, to measure the external financing of corporations.

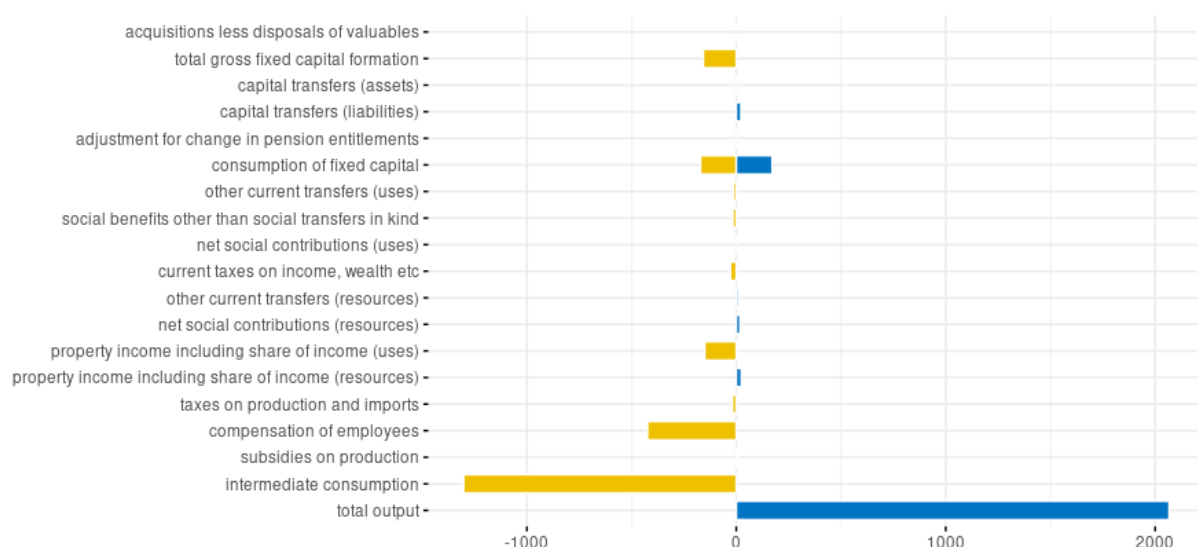
Figure 2 depicts the main items in the economic accounts and their contribution to the net lending/net borrowing in 2020. The items are broken down by resources (right-hand side) and uses (left-hand side), that represent respectively the revenues and the expenditure of the corporations. The difference between the total resources and the total uses is the net lending, if positive or the net borrowing if negative. In 2020, total output, intermediate consumption, compensation of employees are the largest in size. In the next sections we'll assess the coverage of the main items by using the micro data, along with the coverage of the main financial instruments.

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<sup>6</sup> We prefer the first option because micro data for the asset side of the financial accounts are not available for all the instruments, differently from the liabilities.



**Figure 2 - Contribution to the net lending/net borrowing in 2020**  
(billions of euro)



Source: Sequence of Accounts 2020. The blue rectangles indicate the items (resources) that contribute positively to the total, whereas the yellow rectangles the items (uses) whose contribution is negative.

### 3. The SISF survey

The survey of Industrial and Service Firms (SISF) began in 1972 and only covered industrial processing firms with at least 50 workers. Over the years, the sample size has grown progressively. Since 1999, it has included all manufacturing firms as well as energy firms and those in extractive industries; since 2001, it has incorporated firms with 20 to 49 workers and, since 2002, non-financial private service firms with at least 20 workers. From 2002 onwards, the sample has consisted of about 4,000 firms, of which around 3,000 belong to the industrial sector and the remaining to the service sector (Banca d'Italia, 2017).

The interviews are conducted between February and April by Banca d'Italia's territorial branches. The questionnaire is composed of a fixed part that contains general information on the firm and its structure, investments, employment, turnover, operating result, capacity utilization and financing and a variable part that covers different themes each year, which are the subject of detailed cyclical or structural analysis. In the case of employment, investments and turnover, information is requested for three periods: the year just ended (preliminary results), the previous year (final results) and the following year (forecasts).

The survey data also include sampling weights to account for selection probabilities. The weights are also post-stratified to the distributions of firms by geographical location, number of employees and branch of activity.

Starting from 1993, the information collected through the SISF survey is also complemented through another survey carried out between September and October. This survey is run on the same sample of firms used in the SISF survey and has the same reference population. The questionnaire also usually consists of a standard section and a special section but it contains mainly qualitative questions relating firms' expectations and opinions on different topics.

In this work, we link the SISF survey to three register data. The first one is the Cerved database that covers the universe of Italian corporations with data from fiscal year 1993. The database collects: (1) financial statements and other supplementary information, (2) financial statements reclassified according to the schemes of the Central; (3) consolidated financial statements of major groups. It represents the Italian component of the Orbis database (by Bureau van Dijk) that is probably the most comparable data resource on private companies across the world. Cerved information is available about 18 months later than the year to which it refers. The average share in the last five years of merged observations between SISF and Cerved archives is about 80%.

The second archive linked to the SISF survey is the Credit Register (CR) that contains information on household and firms' debts towards the banking and financial system. The CR is supplied with data that the participating intermediaries (banks, financial companies and other intermediaries) send in relation to loans and guarantees granted to their customers, to guarantees received from their customers and to loans or guarantees purchased from other intermediaries. There is a reporting threshold: a customer is reported if the sum to be repaid to the intermediary is equal to or over €30,000; this threshold is lowered to €250 if the customer has a bad debt. The data are available after around 40 days.

The third archive linked to the SISF survey is the Analytical Credit dataset (AnaCredit), which contains individual reports by around 250 resident credit institutions and surveys all the credit relationships in which a bank's exposure to an individual debtor is equal to or greater than €25,000. Compared to the already mentioned Credit Register, AnaCredit contains a wider set of information at a more granular level, but the financial companies and the other intermediaries are not included among the reporting institutions. Data are provided about 30 working days after the reference date.

Survey data linked to administrative records proved very useful in better understanding the phenomena that occurred during the pandemic. According to national accounts data, 2020 was an entirely atypical year, characterized by high growth in total debt and the financial balance of the nonfinancial corporate sector. The use of microdata data made it possible in retrospect (after balance sheet data became available) to show how the accumulation of the financial balance was highly

concentrated: for about 40 percent of the firms it was negative by a total value of 111 billion, compared with a positive flow of 224 billion generated by the remaining 60 percent of firms (Table 1). An amount of about 96 billion, or 43 percent of the positive flow, was attributable to the 1 percent of firms with the highest balances. Three-quarters of the negative flow was attributable to the 5 percent of firms with the lowest savings.

**Table 1 - Distribution of firms' savings in 2020**  
(flows in billions and percentage shares)

Gross savings*	Flow (billions of euro)	Cumulative share of firms
Negative/null	-110.8	39.5
0 – 1.9 bln euro	18.3	75.0
2 – 5.4 bln euro	32.1	90.0
6.1 – 10.6 bln euro	26.8	95.0
11 – 37.1 bln euro	51.0	99.0
> of 37.1 bln euro	96.2	100.0
<b>Total</b>	<b>113.6</b>	

Notes: authors' elaborations on SISF data linked with administrative records. Statistics are weighted by sampling weights.

Grouping firms according to the change in indebtedness and the ability to generate internal financial resources, more than half of the positive loan flow was attributable to firms with negative savings, while the overall positive savings are attributable to firms that did not increase their bank indebtedness in the year. Twenty-four percent of firms increased loans and simultaneously recorded a positive financial balance in 2020; 43 percent of total indebtedness in 2020 was given to these firms (Table 2).

**Table 2 - Distribution of firms by indebtedness and savings**  
(percentages and flows in billion euros)

		(a) Share of firms			(b) Flow of debt (bln)			(c) Savings (bln)		
		Variation of debts								
		Negative/null	Positive	Total	Negative/null	Positive	Total	Negative/null	Positive	Total
Savings	Negative/null	20.0	19.0	39.0	-17.0	46.0	29.0	-61.3	-49.5	110.8
	Positive	37.0	24.0	61.0	-27.0	35.0	8.0	131.9	92.5	224.4
	Total	57.0	43.0	100.0	-44.0	81.0	37.0	70.6	43.0	113.6

Notes: calculations based on the SISF linked with register data. Statistics are weighted using sampling weights. The table classifies firms according to the sign of the savings and change in debt. For each group of firms, the share of firms falling into it (column a), the total change in debt (column b) and the savings (column c) attributable to them are shown.

#### 4. Differences in concepts and definitions

This section discusses differences and problems in comparing SNA and the SISF that could potentially have an effect on all balance sheet items (though possibly to a different extent). These

differences should be reconciled as much as possible. They can be grouped into two main categories: generic differences that affect all the items and item-specific differences.

#### *4.1 Generic differences*

##### *4.1.1 Aim and set-up*

The aim of a business survey is to gain more insight into the economic behaviour of businesses as well as into the distribution of savings, investments and liabilities among firms. The valuation of the main economic variables is based on the firms' assessment, which is generally based on their documents (such as balance sheets). The granular level of information that it collects is not provided by macro statistics.

The aim of SNA is to provide timely macroeconomic information on the balance sheets as well as financing and investment and to describe relations between all institutional sectors. The definitions of instruments, sectors and concepts such as valuation are given by the ESA 2010 and are mandatory in all EU countries. The compilation of NA is based on different sources, on estimation methods when direct sources are not available, and on the balancing of the results in such a manner that the system shows a consistent picture of the economy. There are inevitable inconsistencies or discrepancies when combining data for all sectors, which are typically distributed to the sectors according to the relative accuracy of the data.

##### *4.1.2 Target population*

In the NA, firms are classified into two groups: corporations and "unincorporated enterprises" (and "sole proprietorships"). The latter are firms small in size that do not have corporate status or complete sets of accounts. They are themselves most often grouped with households, and in many cases transactions of the enterprise cannot be disentangled from the transactions of the relevant household as a consumer. Economic decisions made by households as consumers and as producers may be quite different, which complicates the analysis of economic indicators of the sector. The complexity of the analysis is further increased by high variation of the share of production activities within this sector across countries. For production units, that are not legally separate from the owning households but in practice operate as corporations, the NA manuals recognize quasi-corporations as separate statistical units, to be classified in the non-financial corporations sector. What should remain within the household sector are production activities that cannot be separated from the households, because they are unincorporated, do not maintain separate accounts, or because it is not possible to separate the factors of production into labour and entrepreneurial inputs. Normally, larger (for example, in terms of employment) businesses with unlimited liability, sole proprietorships and

unlimited partnerships can be recognized as quasi-corporations. The definition of quasi-corporation may be different across countries. In Italy, it has been decided that unlimited partnerships and sole proprietorships with at least 5 employees are considered as quasi-corporations and then classified in the non-financial corporation sector.

Corporations have a legal identity separate from that of their owners. They are grouped into two main sub-categories: non-financial corporations (S11) and financial corporations (S12).<sup>7</sup> The non-financial corporations sector includes all the businesses whose “centre of economic” interest is located in that country’s economic territory. Although not visible separately, beside the legal activities NA include non-observed economy. This is defined as both the legal activities deliberately concealed to authorities to avoid, for instance, tax payment and activities that are considered illegal (trading of drug, prostitution, smuggling). During the revision of NA that prepared the migration to the ESA 2010, Istat estimated an amount of not observed economy for about 13 per cent of the GDP, in 2013.

The target population of a business survey may vary depending on the topic of the survey and on budget constraints. In the case of the SISF survey, as already described in section 3, the population of interest is composed of firms having 20 or more workers and belonging to various branches of activity in industry (excluding construction) and non-financial private services, or having 10 or more workers and belonging to the construction sector.

Because of the population groups excluded from the SISF target population, the population totals in the survey should be lower than the corresponding NA figures. Consequently, the survey data should be somehow adjusted to compensate for non-covered subgroups before computing any distributional indicator.

#### *4.1.3 Periodicity and timeliness*

The SISF survey is conducted every year approximately from the mid of February to the mid of May, and collects both qualitative and quantitative questions. The information is then complemented by a much lighter survey (the “Business Outlook survey”, or BOS) generally conducted between the end of September and the beginning of October on the same businesses. The questionnaire of the BOS survey contains only qualitative questions and is shorter to allow concluding the entire survey within a month. The survey has a short lag between data collection and data availability. Survey information is available after two months at most.

The time lag for the other sources that can be linked to the survey varies from few months for the information on debts (Security issue statistics, Anacredit database) to more than one year for

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<sup>7</sup> In this paper we only deals with non-financial corporations.

balance-sheet data (Cerved database). The NA are published quarterly, and are available by maximum four months after the end of the reference quarter.

In Italy, similarly to several other countries worldwide, quarterly NA adopt an indirect method of compilation based in some cases on economic short-term indicators, that allow overcoming the limits imposed by reduced availability of direct measures. Temporal disaggregation methods are employed to recover quarterly statistics from annual data based on reference indicators. In particular, the technique adopted by Istat produces quarterly estimates on the basis of the relation - identified through an econometric method - between the specific annual accounts aggregate, and the value assumed in the same period by one or more suitable reference indicators.<sup>8</sup>

Considering the periodicity and the timeliness of each source, the alignment between SISF and the NA can be done once a year when the survey data are available. The alignment refers to the years preceding the fieldwork of the survey. The quarterly NA can then be used to compute distributional indicators that are consistent with macro figures. The information about firms' forecasts and expectations collected through the survey when NA are not yet available, could be used, together with the information reconstructed for the past, for nowcasting exercises.

As mentioned above, the data in the Sequence of Accounts include an estimate for the shadow economy, incomes of undocumented workers and an estimate for the self-production.

## 4.2 Item-specific differences

This section assesses the similarity of concepts and definitions of items contributing to the final net lending/net borrowing in the SNA and the available micro-data. Table A1 in the Appendix report the formula of the net lending/net saving as defined in NA listing all the items concurring to the final figure. Table A2 in the Appendix gives an overview of the matching of the variables and the indication of the source of micro-data.

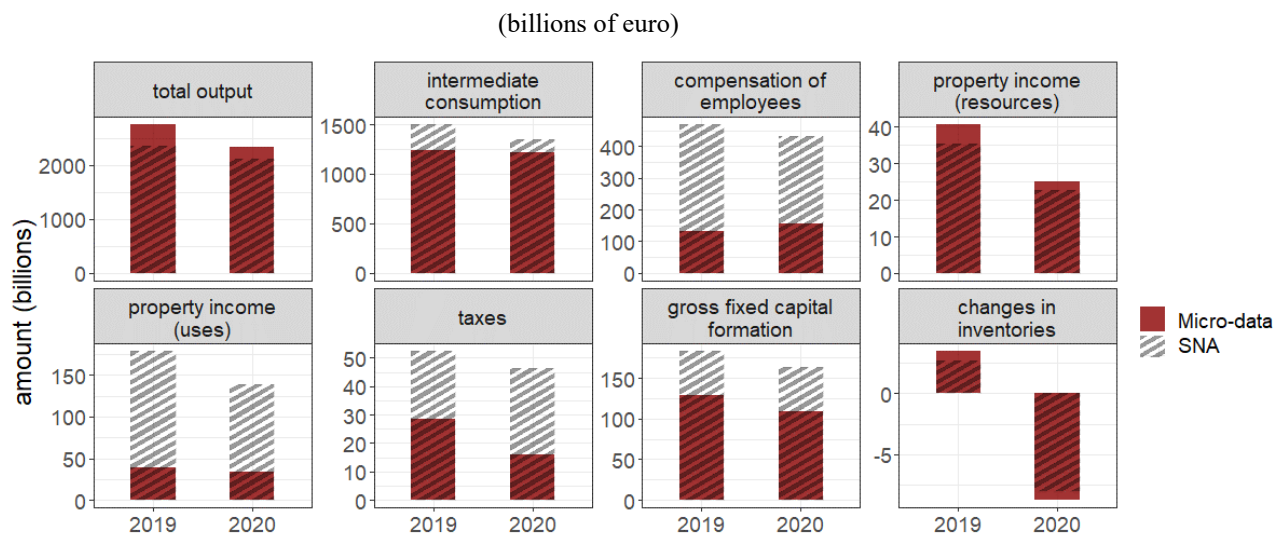
The two micro-data sources we use in the analysis are SISF linked with Cerved. Since the administrative information has a lag of 18 months, we employ data from SISF whenever available, although with some differences in concepts. In the following, we discuss the differences in 2019 and 2020 between the aggregate amounts in SNA and those obtained from micro-data only for items for

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<sup>8</sup> See for instance [I Conti economici trimestrali. Principali elementi informativi](#), Istat 2015.

which micro-data are available. Figure 3 shows the comparison between micro and macro estimates for the most important items (as shown in Figure 2).

**Figure 3 Selected item contributing to the net lending/net borrowing:  
the comparison between micro and macro data**



Source: Istat for SNA and SISF/Cerved for micro-data. In particular, turnover (to be compared with total output), intermediate consumption, compensation of employees and gross fixed capital formation are taken from SISF; the other items are taken from Cerved matched with the SISF sample. Statistics are weighted by sampling weights.

The total output, according to Istat glossary, consists of those goods or services that are produced within an establishment that become available for use outside that establishment, plus any goods and services produced for own final use. The value of the production is equal to turnover plus changes in semi-product and product inventories plus changes in work in progress on orders. In the SISF all the observations in the sample provide information on turnover, i.e., revenues from the sale of goods or the provision of services, and not on the values of own-use products or changes in inventories of such goods. The latter variable is present on Cerved but, since these data are available with a lag, we would need a forecast for time  $t$  that would be tricky for the non-linearity of the phenomenon. Although turnover is only a part of the total output, it is the most relevant component of it. As shown in Figure 3, the estimated total turnover in SISF exceeds the amount of total output in the SNA by about 300 billion on average over the two-year period under consideration, despite the fact that the survey refers to a smaller population. The survey value is however in line with the aggregated turnover obtained from all observations in Cerved (2,700 and 2,300 billion in 2019 and 2020 respectively).

The definition of the intermediate consumption is highly comparable between SNA and SISF. However, SISF contains 35% of missing observations on this item on average in these two years that



need imputation. This could rely on the panel characteristics of SISF or eventually by matching Cerved and the SISF observations with missing values and by taking for them a forecasting estimate from Cerved. A raw estimate of intermediate consumption from SISF with no corrections covers the one of the SNA by about 90 percent on average over the two-year period, with a difference of 200 billion.

Compensation of employees is equal to wages and salaries plus employers' social contributions. SISF collects data on total gross annual wages per capita except those for the executives; they include the employee social security and fiscal taxes, while they exclude all the payments made by the firm on behalf of the National Institute of Social Security or of the other national insurance funds. Moreover, SISF contains again about 35% of missing observations on average. The estimate of the total for this item, without corrections and without imputation of missing data, differs from the aggregate of the SNA of about 300 billion, which is only one-third of the total amount. In addition to the generic differences already discussed, this discrepancy can be due to the lack of observations and to the fact that the salaries do not include those of managers. Hence, this deficiency should be covered both by imputing missing values and by searching information that is more complete.

Property income refers to incomes received as a consequence of the property of an asset, both financial and non-financial, or incomes paid because the corporation is using an asset that belongs to another unit. There are four main types of property income: interest on loans and bonds, distributed income of corporations, reinvested earnings on foreign direct investments, rents on land and sub-soil assets. Sources to cover these instruments may be different in micro and macro data. For instance, to estimate interest on the use and resource side in the economic accounts, an average interest rate is multiplied by the stock derived from the financial accounts, by sector counterpart. Direct data are used alternatively only in case where counterpart information is known. Micro data use instead direct information from the income statement. They cover interest and dividends on the resource and use side, but lack withdraw of owner from quasi-corporations since, as highlighted previously, statistics on quasi-corporations are not included in SISF. The latter item explains a large part of property income uses in the economic accounts. In 2020, income withdrawn by quasi-corporation owners, in economic accounts, was about 30 per cent of property income uses. Finally, compared to the economic accounts, micro data do not include information on reinvested earnings on foreign direct investments. Reinvested earnings represent the undistributed earnings of a foreign subsidiaries, held by a unit as foreign direct investment, which according to BOP and SNA manuals are retained and assigned to the holder, in proportion to the share of capital held. Currently, the SISF survey does not collect information on such item. Yet a comparison can be made using the information available from



past years (from Cerved archive). The micro estimate is about one-third of the corresponding macro aggregate (Figure 3).

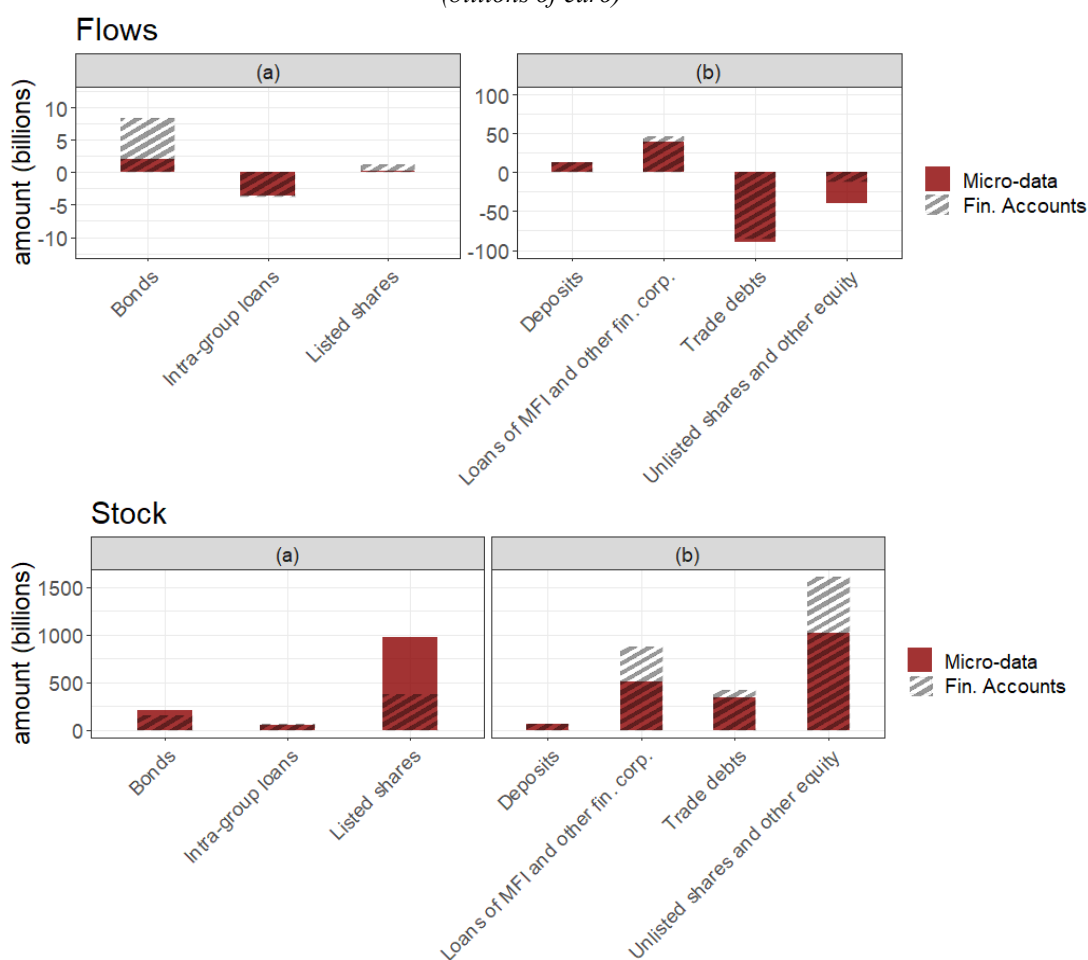
Taxes on income paid by non-financial corporations mainly refer to corporate income tax (IRES). Taxes on production includes duties on imports and other kind of customs and agricultural duties. Other taxes on production mainly consist of IRAP (the Italian regional tax on productive activity) and municipal taxes on real estate (IMU). Istat collects detailed information on taxes by the Department of Finance (MEF) and, for Local Governments, also from budget reporting. Taxes on products paid by Italy to the European Union are calculated on the basis of the information on unilateral transfer flows provided by the State General Accounting Department (GAD). Cerved data contains information on the total amount of taxes on income, wealth, production and imports, but no detailed information is provided in order to distinguish the kind of taxes paid. No information is currently directly collected in the SISF survey. Using the linked information from Cerved archive, the micro estimate of the total is at maximum half of the macro estimate.

Total gross fixed capital formation is defined as the sum of the gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables. While the latter two items are not collected in SISF, the first addendum is completely comparable between SNA and SISF and it accounts for about 98% of the total gross fixed capital formation. The total estimate for the gross fixed capital formation obtained from SISF, in which it is available for each observations, differs from the aggregate in SNA of about 55 billion with a coverage of the two-thirds of the total amount. Changes in inventories is present in Cerved as the (algebraic) sum of changes in finite products and those in inputs. It is also worth stressing that, as shown in the figure 2, this item is highly variable over time so it is not trivial to forecast it.

As for the financial side, Figure 4 reports the comparison between financial accounts transactions and SISF sample, broken down by instruments. Again, the survey does collect any direct information on such items so the comparison is made using the archived linked with administrative records. Data from the two sources appears quite aligned, with the exception of unlisted shares, where microdata records a negative value, like in financial accounts, but with a larger magnitude. Smaller difference is also present in the case of loans of MFI and other intermediaries; in this case, the value from microdata is lower than the one observed in financial accounts. Microdata are not available in the case of loans granted by central government, or by non-residents, to Italian firms. When we move to the outstanding amounts do not find significant difference with what observed in the case of flows. Interestingly, we notice that the microdata report a significant difference with the financial accounts for the equity instruments. Microdata overestimate the market value of the listed shares while

underestimate the value of unlisted shares and other equity. Finally, loans from microdata are similarly underestimated. More likely the differences discussed are due to a low coverage of the small corporations in SISF along with the lack of quasi-corporations that are instead included in the financial accounts.

**Figure 4 - Financial flows and stocks in 2020: the comparison between micro and macro data**  
(billions of euro)



Source: Istat for SNA and Cerved for micro-data. Data for 2020. Panel (a) and (b) show items with lower flow (less than 10 billions) and higher flow respectively. The figure do not report “Loans of Central government”, “Loans of rest of the world”, “Insurance technical reserves”, “Derivatives”, “Other accounts” for which no micro-data are available. Statistics are weighted by sampling weights.

In general, there is a high level of coherence between the definitions and concepts used by the sources of information used relating the items of interest. The main differences relate the reference population because of the existence of cut-off sampling and the fact that some items are not collected in the survey. There are differences in estimates that need further analysis and the development of statistical methodology to align the two source of information. This is particularly the case for the

total output, which is the only item for which the survey-based estimate is higher than the corresponding macro estimate.

## **5. Discussion and conclusions**

Starting from the financial crisis of 2008, there has been an increased demand for distributional information, as a tool to identify the portion of the distribution more affected by shocks or to assess whether the implementation of fiscal or monetary policies may have different effects on different groups. Up to now, national central banks and national statistical institutes addressed this need mainly for the household sector.

In this paper, we argue that distributional statistics are valuable also in the case of the non-financial corporation sector, particularly when the information on the economic decisions of corporations is combined with the information on the availability of financial resources, either internally generated or obtained from the financial system. The high heterogeneity across firms translates into different investment spending decisions and different abilities to access financial resources. This in turn may imply the presence of a group of firms acting as borrowers and a group of firms acting as lenders, with different implications in the transmission of monetary policy.

The difficult task of producing distributional statistics is not only limited to the collection of microdata but also embodies the necessity to assure the coherence of these data with the macroeconomic statistics, available in the system of national accounts. Furthermore, policymakers could also benefit from the availability of timely and quarterly distributional statistics linked to macro data.

In this paper, we exploit the survey of Industrial and Service Firms (SISF) run by Banca d'Italia since 1972, that currently covers 4,000 firms belonging to manufacturing, energy, extractive and service sectors and analyze its consistency with some national account variables. The information is collected annually and available approximately 4 months after the end of the reference year.

We discuss two non-alternative ways to derive external benchmarks, namely the economic and financial accounts. The choice is mainly based on the indicators of interest and the difficulty of collecting the required information through the survey. In our case, we use the economic accounts since the SISF survey already collects information on current and future turnover and costs.

From the comparison of SISF information with the official statistics reported in the economic and financial accounts emerge two main groups of differences. The first group, which we label as generic differences, mainly refers to the sector delineation or, to put in other words, to the definition of the

reference population. Non-financial corporation sector in the national account includes all the corporations and quasi-corporations (with at least 5 employees, in Italy), which are at the crossroads of corporations and households. Quasi-corporations are not surveyed in the SISF (although they are partly covered in the survey on household income and wealth run by Banca d'Italia, this information has not been carried on board along this comparison), therefore our exercise suffers from the lack of this part of the population. Furthermore, the SISF questionnaire is run over firms with at least 20 employees, excluding a sizeable part of small enterprises. A second aspect refers to the institutional classification of corporations. Some corporations surveyed as non-financial corporations may be reclassified, according to the rules of national accounts in other sectors, in particular in the government sector (S13) or among the captive financial corporations (S127). The misclassification of some units may affect the comparison of the estimates from micro data with national accounts statistics. To this aim, the linkage with the Register maintained by Banca d'Italia (that should be aligned with the business register managed by the Italian Institute of Statistics) is an important step, which allows discarding units not included in the corporate sector.

A second group of differences may be considered instrument-specific.

The first difference is in the measurement of total output, which in national accounts also includes the value of semi-product and product inventories. The survey-based estimate is greater than the macro aggregate, despite it does not include all the businesses in the population.

A second difference is in the compensation of employees, which covers one-third of the amount reported in the national accounts. This result is due to the presence of missing observations (item nonresponse) in the SISF and to the total lack of information on managers' salaries.

The definition of gross fixed capital formation in the SISF is strongly comparable with the one in the national accounts. The SISF amount covers two third of the value reported in the national accounts. The total gross fixed capital formation include also inventories and valuables, two items not collected in the SISF, which however are not relevant in the final aggregate.

The information on taxation also presents differences. Microdata available cover taxes on income, while no information is available for taxes on production and import, which explain a sizeable part of the corporate taxation. Furthermore, statistics on net capital transfers (in particular investment grants and other capital transfers) are not collected. The item reports transfer made by the government to finance all or part of the costs of acquiring fixed assets or payments by the government to cover losses accumulated as a consequence of unexpected events. Questionnaires submitted to corporations may be enriched by this information to bridge the gap with national accounts.

Overall, the analysis conducted in this paper confirms the feasibility of distributional corporate accounts, at least for the Italian case. It has also provided a first overview of the main differences between micro and macro estimates and the informative gap in the survey. The paper represents the preliminary step to creating DCA. Future work will relate to the development of a methodology to align the two sources of information and then to create quarterly indicators of the variable of interest.

Appendix: additional tables

Table A1 - Deriving the net lending/net borrowing from the economic accounts

	acquisition of non-financial assets account	change in net worth due to saving and capital transfers account	use of disposable income account	secondary distribution of income account	allocation of primary income account	generation of income account	production account/external account of goods and services
net lending/net borrowing	change in net worth due to saving and capital transfers account	net savings	gross disposable income	gross disposable income	gross operating surplus	gross domestic product/value added gross	total output -
							intermediate consumption +
							subsidies on production -
							compensation of employees -
							taxes on production and imports +
							property income including share of income (resources) -
							property income including share of income (uses) +
							net social contributions (resources) +
							other current transfers (resources) -
							current taxes on income, wealth etc -
							net social contributions (uses) -
							social benefits other than social transfers in kind -
							other current transfers -
							consumption of fixed capital -
	adjustment for change in pension entitlements +						
	capital transfers (D) -						
	capital transfers (C) +						
	consumption of fixed capital -						
	total gross fixed capital formation -						
	acq less disposals of non-financial non-produced assets						

**Table A2 - Correspondence between items of Sequence of Accounts concurring to the net lending/net borrowing and available microdata.**

Name in SNA	Account	Definition in National Accounts <sup>9</sup>	Source of microdata and related variable	Differences in the definition
total output	production account/external account of goods and services - resources	Output consists of those goods or services that are produced within an establishment that become available for use outside that establishment, plus any goods and services produced for own final use.	SISF (turnover) / Cerved (total production)	The value of production is equal to turnover plus changes in product inventories plus changes in work in progress on orders
intermediate consumption	production account/external account of goods and services - uses	It consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital; the goods or services may be either transformed or used up by the production process.	SISF	No differences
other subsidies on production	generation of income account - resources	They consist of subsidies, except subsidies on products, which resident enterprises may receive as a consequence of engaging in production (e.g. subsidies on payroll or workforce or subsidies to reduce pollution).	No micro-data available	
compensation of employees	generation of income account - uses	Compensation of employees is defined as the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period. Taxes less subsidies on production consist of taxes payable or subsidies receivable on goods or services produced as outputs and other taxes or subsidies on production, such as those payable on the labour, machinery, buildings or other assets used in production. Compensation of employees has two main components:  (a) Wages and salaries payable in cash or in kind;  (b) Social insurance contributions payable by employers, which include contributions to social security schemes; actual social contributions to other employment-related social insurance schemes and imputed social contributions to other employment-related social insurance schemes.	Cerved-SISF (total gross annual wages per capita)	In SNA it is equal to wages and salaries plus employers' social contributions. The item in SISF includes the employee social security and fiscal taxes; it does not include all the payments made by the firm on behalf of INPS or of the other national insurance funds. Executives' wages are not included.
taxes on production and imports	generation of income account - uses	Taxes on production and imports consist of taxes payable on goods and services when they are produced, delivered, sold, transferred or otherwise disposed of by their producers plus taxes and duties on imports that become payable when goods enter the economic territory by crossing the frontier or when services are delivered to resident units by non-resident units; they also include other taxes on production, which consist mainly of taxes on the ownership or use of land, buildings or other assets used in production or on the labour employed, or compensation of employees paid.	Cerved (taxes on income)	In micro-data no detailed information is available for taxes on production and imports.
property income including share of income	allocation of primary income account - resource	Property income is the income receivable by the owner of a financial asset or a tangible non-produced asset in return for providing funds to or putting the tangible non-produced asset at the disposal of, another institutional unit; it consists of interest, the distributed income of corporations (i.e. dividends and withdrawals from income of quasi-corporations), reinvested earnings on direct foreign investment, property income attributed to insurance policy holders, and rent.	Cerved (financial income/expenses)	There is not a specific evidence of the withdrawals from income of quasi-corporations.
net social contributions	secondary distribution of income account - resources	Employers' actual social contributions plus employers' imputed social contributions. Employers' actual social contributions are the amounts payable by employers for the benefit of their employees to social security funds, insurance enterprises, autonomous pension funds or other institutional units responsible for the administration and management of social insurance schemes. Employers' actual social contributions (ESA) are the amounts payable by employers for the benefit of their employees to social security funds, insurance enterprises, autonomous pension funds or other institutional units responsible for the administration and management of social insurance schemes. Employers' imputed social contributions (SNA) are equal in value to the amount of social contributions that would be needed to secure the de facto entitlements to the social benefits they accumulate; they arise only in cases where social benefits are provided by employers directly to their employees, former employees or dependants out of their own resources without involving an insurance enterprise or autonomous	No micro-data available	

<sup>9</sup> Source: <https://stats.oecd.org/glossary/>

		pension fund, and without creating a special fund or segregated reserve for the purpose.		
other current transfers	secondary distribution of income account - resources	Other sectors or other current transfers, in cash or in kind, between resident and non-resident entities include those (such as food, clothing, other consumer goods, medical supplies, etc.) for distribution to relieve hardships caused by famine, other natural disasters, war, etc. and regular contributions to charitable, religious and cultural organizations. Also covered are gifts, dowries, and inheritances; alimony and other support remittances; tickets sold by and prizes won from lotteries; and payments from unfunded pension plans by non-governmental organizations.	No micro-data available	
current taxes on income, wealth etc	secondary distribution of income account - uses	Most current taxes on income, wealth, etc consist of taxes on the incomes of households or profits of corporations and taxes on wealth that are payable regularly every tax period (as distinct from capital taxes levied infrequently).	Curved (taxes paid during the year)	The item in micro-data is given by the amount of taxes attributable to the previous year and derived from the relevant financial statements. It is only a proxy for taxes paid by firms during the year, as it does not take into account balance payments related to previous years, nor support measures from which firms benefited during the year in the form of grants or tax payment waivers.
social benefits other than social transfers in kind	secondary distribution of income account - uses	They consist of: (a) all social benefits in cash - both social insurance and social assistance benefits - provided by government units, including social security funds, and NPISHs; (b) all social insurance benefits provided under private funded and unfunded social insurance schemes, whether in cash or in kind.	No micro-data available	
other current transfers	secondary distribution of income account - uses	(As above)	No micro-data available	
adjustment for change in pension entitlements	use of disposable income account - resources		No micro-data available	
capital transfers	change in net worth due to saving and capital transfers account - changes in liabilities	Capital transfers are unrequited transfers where either the party making the transfer realizes the funds involved by disposing of an asset (other than cash or inventories), by relinquishing a financial claim (other than accounts receivable) or the party receiving the transfer is obliged to acquire an asset (other than cash or inventories) or both conditions are met. Capital transfers are often large and irregular but neither of these are necessary conditions for a transfer to be considered a capital rather than a current transfer.	No micro-data available	
capital transfers	change in net worth due to saving and capital transfers account - changes in assets		No micro-data available	
total gross fixed capital formation	acquisition of non-financial assets account - changes in assets	Gross fixed capital formation is measured by the total value of a producer's acquisitions, less disposals, of fixed assets during the accounting period plus certain additions to the value of non-produced assets (such as subsoil assets or major improvements in the quantity, quality or productivity of land) realised by the productive activity of institutional units.	SISF (gross fixed investment)	
acq less disposals of non-financial non-produced assets	acquisition of non-financial assets account - changes in assets	total gross fixed capital formation = gross fixed capital formation + changes in inventories + acquisitions less disposals of valuables	No micro-data available	



## References

Banca d'Italia (2017), Methods and Sources: Methodological Notes. Survey on Industrial and service firms, available at [http://www.bancaditalia.it/pubblicazioni/indagine-imprese/2015-indagine-imprese/en\\_survey\\_methodology\\_invind.pdf?language\\_id=1](http://www.bancaditalia.it/pubblicazioni/indagine-imprese/2015-indagine-imprese/en_survey_methodology_invind.pdf?language_id=1).

Bottone M., E. Mattevi, L. Modugno, M. Mongardini, A. Neri (2021), Indebitamento e liquidità delle imprese nel 2020: evidenze su microdati di impresa, Banca d'Italia, Note Covid-19

European Central Bank (2020), Understanding household wealth: linking macro and micro data to produce distributional financial statistics, Statistics Paper Series, n. 37.

Infante L., F. Lilla, G. Marinelli, M. Marinucci, G. Semeraro, F. Vercelli (2021), I conti economici e finanziari durante la crisi sanitaria del Covid-19, Banca d'Italia, Note Covid-19

Lilla. F, G. Marinelli, F. Vercelli (2021), I flussi economici e finanziari tra settori istituzionali nei paesi dell'area dell'euro durante la pandemia, Banca d'Italia, Note Covid-19.