



BANCA D'ITALIA
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LINKING MACRO- AND MICRODATA TO PRODUCE DISTRIBUTIONAL ACCOUNTS FOR NON-FINANCIAL CORPORATIONS

by Diego Caprara*, Luigi Infante**, Maurizio Magnani**,
Lucia Modugno** and Andrea Neri**

Abstract

In the last decade, there has been an increased demand for distributional information, consistent with aggregate national account statistics, in order to identify groups more affected by shocks or assess the effects of different policies. Up to now, national central banks and statistical institutes have addressed this need mainly for the household sector. This paper argues for the need to produce non-financial corporation distributional accounts. Specifically, we investigate the feasibility of creating these accounts, focusing on statistics that capture firms' ability to generate cash flows through their business or to obtain financial resources from the financial system. Our primary statistics of interest are corporate saving and its main components, and corporate funding. By exploiting business surveys combined with updated balance sheets, we assess the differences in concepts and definitions between surveys and national accounts. We discuss two classes of differences: the first affects all instruments and mainly refers to the reference population; the second is instrument-specific and may depend on differences in evaluation criteria or on items that are included in national accounts but not in surveys.

JEL Classification: C13, C18, D22.

Keywords: micro-macro linkage, savings, non-financial corporation sector.

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1. Introduction

The economic downturn that hit the global economy starting with the subprime mortgage crisis in 2007-2008 has increased the demand for timely, coherent, and consistent distributional information for firms and households. A concatenation of unpredicted events such as the COVID-19 outbreak, the Russia-Ukraine war, inflation, and global shortages has recently boosted the need for such information.

These new data requirements are reflected in the G20 Data Gaps 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 distributional information in the System of National Accounts (SNA) 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).

No similar broad-based initiative has been undertaken with reference to the non-financial corporation sector. Attempts to account for heterogeneity in this institutional sector are limited to assessing the role and weight of multinationals in shaping aggregate economic and financial developments. Macroeconomic data of relatively small countries can be in fact strongly influenced by the actions of resident corporations that are part of multinational groups. To cope with this issue, the ECB, Eurostat, and OECD encouraged the extension of financial accounts to include an account related to foreign-controlled corporations operating in the country. The new information would allow policy-makers to separate out the financial vulnerabilities ascribed to purely domestic corporations from those of foreign-controlled ones.

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

Regular, timely, and granular distributional information that is consistent with macroeconomic aggregates as measured in National Accounts on business economic and financial conditions could provide relevant information for policy-makers. For instance, in 2020 aggregate data showed a sharp increase in the leverage and the bank deposits of the non-financial corporation sector (Bottone et al., 2021; Infante et al., 2021; Lilla et al., 2021). Unfortunately, no timely information was available to understand the underlying heterogeneity of these phenomena.

DCA should in our view mostly focus on measuring firms' ability to produce cash flow, through their business, or to obtain resources from the financial system. Hence, they should primarily deal

with corporate saving, its main components, and corporate funding, which would give a better understanding of the distribution of saving across firms and a perspective on which group of firms relies more on external financial resources.

In the national accounting framework, firms' return 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 non-financial corporate saving. It represents an internal source of funds directly available to a firm to either invest in non-financial or financial assets or to reduce debt. In many countries, investment spending is higher than internally generated saving. As a consequence, firms also need to raise funds via equity or debt.

In many countries microdata on corporate balance sheets are generally available (e.g., the Central balance sheets database). Unfortunately, these archives are insufficient to produce DCA, as they are not timely and may not contain all the relevant information used for the national accounts compilation. For this reason, there is a need for timely corporate surveys that also provide flexibility in the type of information to be collected. However, the availability of information at the firm level is not enough.

The construction of distributional accounts generally requires at least three steps: (1) the analysis of the conceptual differences between survey and national accounts data, along with the assessment of the quantitative differences between macro data and micro estimates of the variables of interest when both are available, (2) the development of a methodology to reconcile, where necessary, the two sources of information, (3) the extrapolation of the information when only aggregate totals are available.

This paper focuses on the first step and is therefore preparatory to the subsequent ones. 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 introduce the national accounting framework relevant to our purposes (Section 2). We then describe in Section 3 the Survey of Industrial and Service Firms (Invind) conducted by Banca d'Italia that, linked with the available administrative records (mainly Central balance sheets, AnaCredit, and Credit register), could allow the computation of the distributional information of interest. Section 4 discusses the conceptual and definitional differences between the micro and macrodata, and provides a measure of the gap between the two set of statistics. Section 5 concludes.

2. *Non-financial corporation sector in the system of national accounts*

2.1 *Non-financial corporate saving and the need of external financing*

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

In this study we focus on two main items: corporate saving and external financing. Saving (Table 1) can be calculated as the sum between the gross operating surplus and the net property incomes (the difference between interests, dividends, rents received and paid), from which taxes on income and wealth are subtracted (net of government contributions). External funds instead are obtained through the capital market (in the form of debt and equity) and through financial intermediaries, particularly banks. The latter grant loans, which in most countries represent a large share of corporate funding. This information is included in financial accounts, showing how firms cover their financial needs.

Corporate saving (augmented or reduced by the value of net capital transfers) and external financing are employed to acquire either non-financial assets (machinery, plants, buildings) or financial assets (liquid assets, participations in other corporations, other financial assets) that can be simplified in the following equation[†]:

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

where all the components refer to transactions during a year or a quarter that accrue to the relative stock items. Saving and financial liabilities transactions (in particular, loans obtained and equity or bonds issued) represent respectively self-financing and external financing. If we consider the difference between financial assets and liabilities (or equivalently, saving minus the value of the investment in non-financial assets) we end up with the "net lending/net borrowing" balance, which shows to what extent corporations require external financial resources (if negative) or lend financial resources (if positive) to other sectors of the economy or abroad.

Figure 1 reports the sources of funds over a long time horizon (1999-2021) for Italy, as a share of the sector's gross value added. The flows of corporate saving are relatively more stable all over the period

[†] Financial transactions (financial assets and liabilities) are considered on a net basis, that is increases less decreases for each financial instrument. It turns out that in case firms record negative transactions for financial assets (net sales), the value of liquidating assets contributes to increase internal funds. Negative transactions in the case of financial liabilities are instead recorded when firms use resources to reduce their liabilities. The acquisition of non-financial assets is also considered net of disposals of non-financial assets.

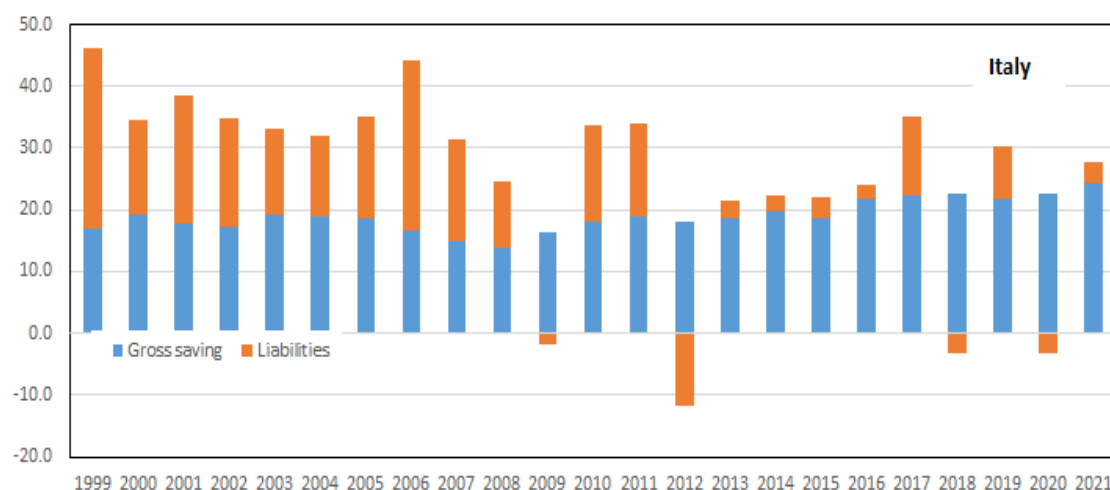
than net incurrence of new liabilities, which decreased considerably in the aftermath of the great financial crisis even recording negative values.[‡]

Table 1 Main items in the corporate economic accounts

Items	Definition
total output	Total market value of all final goods and services produced
- intermediate consumption	The value of the goods and services consumed as inputs by a process of production
= gross domestic product/value added gross	Value added created through the production of goods and services in a country
+ subsidies on production	Financial assistance provided by the government to encourage or support economic activity
- compensation of employees	Total remuneration, in cash or in kind, payable by an employer to an employee in return for work
- taxes on production and imports	Compulsory, unrequited payments, in cash or in kind, levied by a government on the production and imports
= gross operating surplus	Remaining profit after tax and workers have been paid
+ net property income including share of income	Income generated from property, minus any expenses related to the property
= gross income	Total amount of money earned by businesses
+ net social contributions	Social security contributions by employees, employers, and self-employed individuals, and other contributions whose source cannot be determined. They also include actual or imputed contributions to social insurance schemes operated by governments
+ net other current transfers	Net premiums and claims for non-life insurance, current transfers between different kinds of government units or between different households
- current taxes on income, wealth etc.	Taxes on the incomes of households or profits of corporations and taxes on wealth that are payable regularly every tax period
- social benefits other than social transfers in kind	Transfers in cash received by households intended to provide for the needs that arise from certain events or circumstances
= gross disposable income	Income generated by the business
- adjustment for change in pension entitlements	Pension entitlements can change due to various reasons such as changes in legislation, changes in employment conditions, or changes in the population's age structure
= (gross) savings	Remaining flow of money generated by the business
- consumption of fixed capital	Value of the fixed capital used up in the process of production
+ capital transfers (liabilities)	Positive / negative flows generated by transactions in which the ownership of an asset is transferred from one institutional unit to another.
- capital transfers (assets)	
= changes in net worth due to saving and capital transfers account	
+ consumption of fixed capital	Value of the fixed capital used up in the process of production
- total gross fixed capital formation	The total value of a producer's acquisitions, less disposals, of fixed assets
- acq. less disposals of non-financial non-produced assets	Net value of transactions relating assets that are not produced, such as lands
= net lending/net borrowing	Final disposable flow of money

[‡] Negative financial liabilities indicate that the reimbursement of equity or debt incurred in the previous years is larger than the incurrence of new liabilities.

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



Source: Istat and Banca d'Italia.

2.2 The information used in the compilation of the non-financial and financial accounts: an overview

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

Detailed microdata on economic accounts (e.g. production value, turnover, value added), employment, compensation of employees and investment are collected by Istat through surveys. All firms with at least 250 employees are surveyed, while a stratified random sample is selected from firms with less than 250 employees. Data are collected annually, at around 18 months after the year of reference. Previous data are combined with tax data, balance of payment and general government statistics to cover specific items of the secondary distribution of income account.

Also in the case of financial accounts the compilation is based on multiple sources. In particular, all the flows with the banking system derive from Supervisory reports and cover mainly loans received by corporations and deposits on the asset side of corporations, aggregated at sectoral level. Statistics on bonds are from the Security Issues database, which collects information security by security, on all securities issued on the market. Information on Shares and other equity and trade debts,

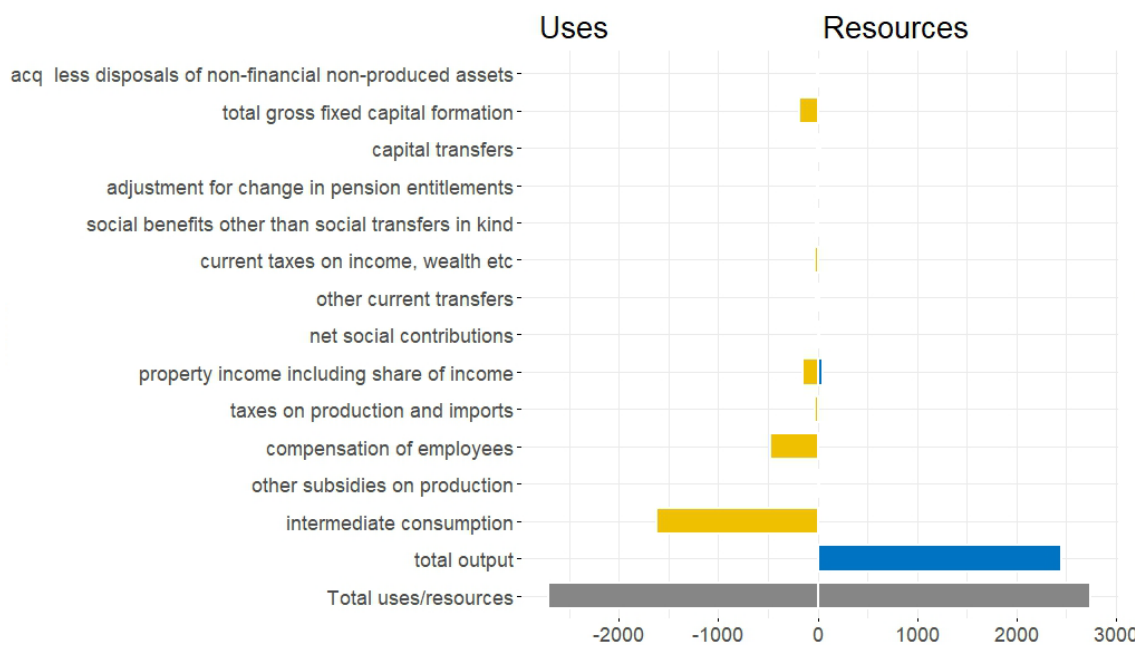
at firm level, is from the Italian central balance sheet office. All the relationships with non-residents come from the Balance of payments statistics, aggregated at sectoral level.

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

In this paper we use the Banca d'Italia Survey of Industrial and Service Enterprises (Invind) instead of Istat business surveys to obtain distributional information. The first reason is the timeliness of Invind data, which are generally available with around five months of delay, with respect to the reference year (Istat business surveys microdata are instead available with a longer delay).** A second reason is the flexibility in using and adapting microdata. In fact, we can easily link the Invind survey to administrative records and, if needed, we can modify the questionnaire, for future waves, to collect further information useful for the distributional accounts. Istat microdata are proprietary information for which, currently, we have limited access without the possibility of linking other datasets.

To estimate firm's net lending/net borrowing balance we use economic accounts by exploiting microdata on turnover, investment and costs of firms. As anticipated net lending/net borrowing balance could also be derived from financial accounts however, in this case we lack microdata on financial assets transactions (e.g. deposits) that prevent to compute the indicator.

Figure 2 Contribution to net lending/net borrowing in 2021
(billions of euro)



Source: Sequence of Accounts 2021 (edition of October 2022). The blue bars indicate the items (resources) that contribute positively to the net lending/net borrowing, whereas the yellow ones the items (uses) whose contribution is negative. The gray bars represent the total amount of uses (the negative one) and the total amount of resources (the positive) whose algebraic sum produces the net lending/net borrowing, equal to 40.3 billion in 2021.

Figure 2 depicts the main items in the economic accounts and their contribution to net lending/net borrowing in 2021. The items are split by resources (right-hand side) and uses (left-hand side), representing the corporations' revenues and expenditures, respectively. The difference between

** See <https://listarilevazioni.istat.it>.

the total resources and the total uses is net lending, if positive, or net borrowing, if negative. Total output, intermediate consumption, and compensation of employees represent the most important items. In the following sections, we will assess the coverage of the main items by using surveys' microdata, along with the coverage of the main financial instruments.

3. *The Invid-linked microdata*

3.1 The Invid survey

The Survey of Industrial and Service Firms (Invid) began in 1972, covering only industrial firms with at least 50 workers. Over the years, the sample size has grown progressively. Since 1999, it has included all manufacturing and energy firms and those operating 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 consists of about 4,000 firms, of which around 3,000 belong to the industrial sector and the remaining to services (Banca d'Italia, 2017).

The territorial branches of Banca d'Italia conduct the interviews between February and April. The questionnaire comprises a fixed part that contains general information on the firm and its structure, investment, employment, turnover, operating result, capacity utilization, and financing and a variable part that covers different themes each year. In the case of employment, investment and turnover, information is requested for three periods: the year just ended (preliminary results), the previous year (final results), and the following year (expected values).

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 sector of activity. Invid data are available at around five months after the end of the reference year.

Invid data provide a rich base on which to build DCA since they allow studying heterogeneity of firms for a wide variety of variables and contain information on expected values for the following year. Moreover, the survey is a very flexible tool in that it is possible to add new questions to cover remaining data gaps.

3.2 *Linking with administrative records*

We link the Invid survey to three register data. The first one is the Central balance-sheet database (Cerved) that covers the universe of Italian corporations with data from the fiscal year 1993. The database contains financial statements and other supplementary information, that are available about 18 months after the end of the reference year. The average share of merged observations between Invid and Cerved archives in the last five years is about 95 per cent, due to the presence of unincorporated enterprises or sole proprietorships, included in the survey but not in Cerved. The

second archive is the Credit Register (CR) which contains information on household and firm loans granted by banks and other financial intermediaries.^{††} Only loans over the threshold of 30,000 euro are reported, unless the loans are classified as a bad loans, in which case they are included. The data are available after around 40 days. The third archive linked to the Invind survey is the Analytical Credit dataset (AnaCredit), which contains individual reports by around 250 resident credit institutions and covers all the credit relationships in which the bank exposure to an individual debtor (sole proprietorships excluded) is at least 25,000 euros. In the rest of this paper we will refer to the merged dataset as Invind-linked microdata.

The descriptive analysis of the Invind-linked dataset reveals interesting insight: we observe, for instance, that in 2020 during the pandemic about 40 percent of the firms recorded negative saving (111 billion in total), compared with positive saving (224 billion) generated by the remaining 60 percent (Table 2). About 96 billion (43 percent) of the positive saving was attributable to the 1 percent of firms with the highest saving. Three-quarters of the negative saving were generated by the 5 percent of firms with the lowest saving.

Table 2 Distribution of firms' saving in 2020
(flows in billions and percentage shares)

Gross saving*	Flow (billions of euro)	Cumulative share of firms
Negative/null	-110.8	39.5
(0 - 1,9 mln euro]	18.3	75.0
(2 - 5,4 bln]	32.1	90.0
(6,1 - 10,6 bln]	26.8	95.0
(11 - 37,1 bln]	51.0	99.0
> di 37,1 bln	96.2	100.0
Total	113.6	

Notes: authors' elaborations on Invind-linked microdata. Statistics are weighted by sampling weights.

In Table 3 we group firms according to saving (negative and positive) and debt (negative and positive flows^{‡‡}). More than half of the positive flows of debt (46 billion euros) was attributable to firms with negative saving (19 per cent). Among the firms with positive saving, the aggregate value of positive flows of debt (35 billion) offsets the value of negative ones (27 billion). This heterogeneity is impossible to be grasped by looking only at the sectoral economic and financial accounts.

^{††} As mentioned in the previous section, for the compilation of financial accounts statistics from Supervisory reports, aggregated at sectoral level are used.

^{‡‡} Positive flows indicate new incurrences of debt, while negative flows stand for reimbursements of previous debt.

Table 3 Distribution of firms by indebtedness and saving

(percentage values and flows in billions of euros; values refer to 2020)

		(a)		
		Share of firms (percentage values)		
		Debt flows		
		Negative/null	Positive	Total
Saving	Negative/null	20.0	19.0	39.0
	Positive	37.0	24.0	61.0
Total		57.0	43.0	100.0

		(b)		
		Debt flows (billions of euro)		
		Negative/null	Positive	Total
Saving	Negative/null	-17.0	46.0	29.0
	Positive	-27.0	35.0	8.0
Total		-44.0	81.0	37

		(c)		
		Saving (billions of euro)		
		Negative/null	Positive	Total
Debt	Negative/null	-61.3	131.9	70.6
	Positive	-49.5	92.5	43.0
Total		-110.8	224.4	113.6

Notes: calculations based on the Inwind-linked microdata. Statistics are weighted using sampling weights. In panel (b) the amount of positive/negative flows of debt has been disaggregated by firms' status of realizing positive or negative saving. In panel (c) the amount of positive/negative saving has been disaggregated by firms' status of recording positive or negative debt.

4. Differences in concepts and definitions

This section discusses differences and problems in comparing aggregate economic and financial accounts and the Inwind-linked microdata, that can be grouped into two main categories: generic differences that affect all the items and item-specific differences.

General differences

4.1 Aim and set-up

Economic and financial accounts provide macroeconomic information on balance sheets, financing and investment by describing the relationship among all institutional sectors. The definitions of instruments, sectors, and concepts such as valuation follow the European System of Accounts (ESA 2010) manual and are mandatory in all EU countries. The compilation of economic and financial accounts is based on different sources, that are integrated by estimates when direct

sources are unavailable. Balancing methods assure a coherent picture across the accounts and address inconsistencies or discrepancies that arise when combining data for all sectors.^{§§}.

Business surveys provide information on firms' behavior and its determinants. Data reported for the main economic variables are based on official administrative documents like balance sheets.

4.2 Target population

In the system of national accounts firms are classified into two groups (based on their legal personality): corporations and “unincorporated enterprises” (and “sole proprietorships”). The latter are small firms that do not have corporate status and a complete sets of accounts. They are often grouped with households, to the point that enterprise flows cannot be disentangled from those of the household as a consumer. However, economic decisions made by households as consumers may differ from household producers, complicating the analysis of the sector's economic indicators. The complexity is further increased by the high variation of the share of production activities within the household sector across countries. As a general rule, the ESA 2010 manual includes in the household sector the producer units that do not maintain separate accounts, or for which it is impossible to divide production factors into labor and entrepreneurial inputs. On the contrary, entities keeping a complete set of accounts and with autonomy of decisions are considered distinct institutional units and consequently classified in the non-financial corporation sector, as quasi-corporations. The larger businesses with unlimited liability, sole proprietorships and unlimited partnerships, are generally classified in the non-financial corporations. Firms' size is a metric used to identify and classify quasi-corporations, but at the same time it may differ across countries. In Italy, it has been decided that unlimited partnerships and sole proprietorships with at least five employees are considered 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 and financial corporations. This paper only deals with the non-financial corporation sector, which includes all the businesses whose “center of economic” interest is located in Italy's economic territory. Besides the legal activities, national accounts include also underground illegal activities, which are not reported separately and comprise both legal activities deliberately concealed to authorities to avoid, for instance, tax payment and illegal activities (e.g., trading of drug, smuggling).^{***}

^{§§} Balancing methods hinges on accounting rules, in particular from quadruple entry bookkeeping principle. For instance, in the case of financial accounts, the accounting rules imply that, for any financial instrument, the sum of financial assets, across all the sectors, equals the sum of liabilities. Consequently, during the compilation, in case of differences they are ruled out by using balancing methods.

^{***} During the revision of the ESA 2010, Istat estimated an amount of not observed economy for about 13 percent of the GDP in 2013.

The target population of Invind, as already anticipated in section 3, is the universe of firms with 20 or more employees belonging to industry (excluding construction) and non-financial services, or with 10 or more employees belonging to the construction sector.

Given the exclusion of specific groups from Invind target population, the aggregates obtained from the Invind-linked microdata are lower than the corresponding figures in national accounts and they need to be adjusted before computing any distributional indicator.

An additional difference affecting the comparison of microdata aggregates with national accounts may arise from the institutional classification of entities, as some corporations surveyed as non-financial corporations may be reclassified, according to the rules of national accounts, in other sectors such as the government sector or captive financial corporations. To address this issue, the linkage with the register maintained by Banca d'Italia (aligned with Istat business register) is a crucial step that allows to discard from the Invind-linked dataset units not included in the non-financial corporate sector.

4.3 Periodicity and timeliness

In Italy, similarly to other countries, quarterly economic and financial accounts adopt an indirect method of compilation based in some cases on short-term economic indicators that allow overcoming the limits imposed by the scarce 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 based on the relationship - 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.^{†††}

The Invind survey is conducted every year, approximately from mid-February to mid-May, and especially in the case of quantitative information it collects data referred to the previous year and firms' expectation about the current year. The time lag of the other sources that we link to survey data ranges from a few months for debts (Security issue statistics, AnaCredit database) to more than one year for the Cerved database. Economic and financial accounts are instead published quarterly and are available within four months (at maximum) after the end of the reference quarter.

Considering each source's periodicity and timeliness, the alignment between our Invind-linked microdata and the economic and financial accounts can only be assured once a year when Invind data become available and it can only refer to the year preceding the survey fieldwork. Information about firms' expectations collected through the survey when aggregate data from national accounts are not

^{†††} See for instance <https://www.istat.it/it/archivio/167411>, Istat 2015.

yet available can be used, together with the information reconstructed for the past, for nowcasting exercises.

4.4 Item-specific differences

This section assesses the similarity and differences - between economic and financial accounts and the available microdata - of concepts and definitions of the items contributing in particular to net lending/net borrowing (see Table A1 in the Appendix) and to financial liabilities. We also compare figures for the period 2017-2021.

Total output. According to Istat, this item consists of goods or services produced within an establishment that become available for use outside that establishment, plus any goods and services produced for its final use. The production value equals the sum of turnover, changes in semi-product and product inventories, and changes in work in progress on orders. Invid collects exclusively information on turnover, i.e., revenues from the sale of goods or the provision of services, while changes in inventories are obtained through Cerved balance sheets. The value of own-use products is not available in either source.^{†††} As shown in Figure 3, the estimated total turnover in the Invid-linked dataset exceeds the value of total output in the SNA by about 300 billion euros on average in the period under consideration. The difference may partly be due to the rule used in national accounts to report the production value in specific economic sectors. For example, in the case of goods acquired by wholesalers or retailers for reselling without further processing, output is measured as the trade margin realized on the goods purchased for resale. Similarly, in the case of goods processed by a third corporation, since there is no change in ownership, national accounts record in the output of processing firms only the value of the service (this practice is common, for instance, in the case of pharmaceutical products, or may be part of the production system of multinational companies). These treatments differ from the corporate accounting system and may explain the overestimation of aggregates deriving from microdata.

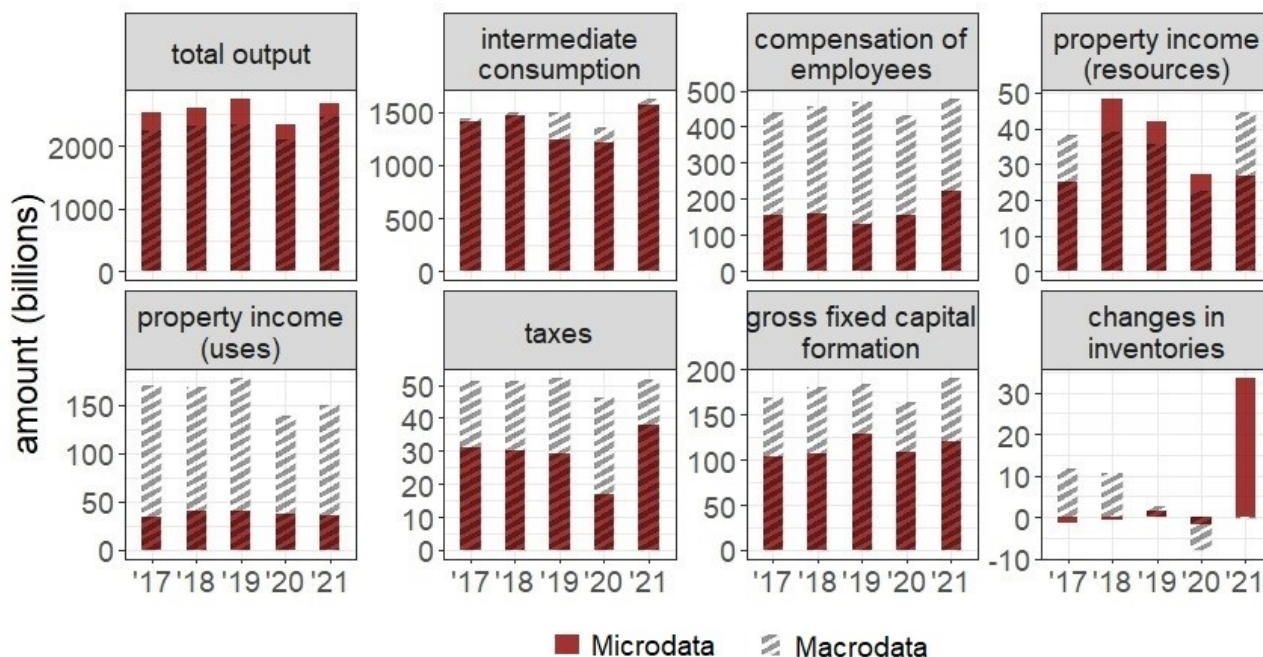
Intermediate consumption. The definition of this item is highly comparable between the economic accounts and Invid-linked microdata. Figure 3 shows indeed small differences between the aggregate figures, amounting on average to less than 10 percent of national accounts data. They may be partly due to the inclusion of FISIM (financial intermediation services indirectly measured) in the national accounts. FISIM represent the cost for the intermediation services that banks implicitly provide to firms (e.g., financial advice, evaluation and monitoring of creditworthiness, Lequiller and Blades, 2014) but that are not explicitly invoiced. The estimate of FISIM is allocated, based on the

^{†††}Since this exercise only quantifies the differences between the aggregate data and Invid-linked microdata on realized values, we can exploit the information from Cerved balance sheets. However, to obtain distributional statistics with proper timeliness, we would need some forecast/nowcast technique to estimate the change in inventories that, as anticipated, are available with a lag or include in the Invid survey.

amount of deposits and loans, to the intermediate consumption of non-financial corporations. In our microdata, we lack this information.

Total compensation of employees. This item corresponds to the sum of wages and salaries and of employers' social contributions. Invind collects data on total gross annual wages per capita except those for the managers; 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 the other national insurance funds. Our Invind-linked microdata sample contains about 30 per cent, on average, of missing observations. The aggregation of this item, without corrections and imputation of missing data, differs from the national accounts aggregate by about 300 billion euros, which is about one-third of the total amount. In addition to the general differences already discussed, this discrepancy can be also due to the fact that salaries do not include those of managers. Moreover, national accounts include wages and salaries referred to undeclared employees estimated by industry and firm size class on the basis of information from the Labor force survey (Istat, 2019).

Figure 3 Selected items contributing to net lending/net borrowing: comparison between micro-based aggregates* and macrodata
(billions of euro)



Source: Istat for SNA (edition of October 2022) and Invind-linked for microdata (see Section 3).
(* In the case of total output, micro-based aggregate refers to total turnover.

Property income. The item refers to incomes received from the property of an asset, both financial and non-financial, or revenues 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, the

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 macrodata. For instance, an average interest rate is multiplied by the stock derived from financial accounts to estimate interests on the uses and resources side in economic accounts. Direct data are used alternatively only in cases where counterpart information is known. Microdata is instead based on direct input from income statements. They cover interest and dividends on the uses and resources side but lack owner withdrawal from quasi-corporations since, as highlighted previously, statistics on quasi-corporations are not included in Inwind-linked microdata. The last item explains a large part of property income uses in the economic accounts. In 2021, income withdrawn by quasi-corporation owners was about 29 percent of property income uses. Finally, compared to the economic accounts, microdata do not include information on reinvested earnings on foreign direct investments. Reinvested earnings represent the undistributed earnings of foreign subsidiaries held by a unit as foreign direct investment, which according to BOP and ESA 2010 manuals are retained and assigned to the holder in proportion to the share of capital held. In our sample, between 2017 and 2021, the Inwind-linked microdata have on average a good coverage of the resources, while in the case of uses our estimates are lower than one-fourth of the corresponding macro aggregate, largely explained by the lack of information on withdrawal from quasi-corporations (Figure 3).

Taxes. Taxes on income paid by non-financial corporations mainly refer to corporate income tax. Taxes on production include duties on imports and other customs and agricultural duties. Other taxes on production mainly refer to the Italian regional tax on productive activity and municipal taxes on real estate. Istat collects detailed tax information from the Department of Finance (MEF) and, for Local Governments, also from budget reporting. Inwind-linked microdata include only data that refer to taxes on income, while no information is available for taxes on production and imports. All in all, about three-fifths of the macro estimate are covered by our microdata.

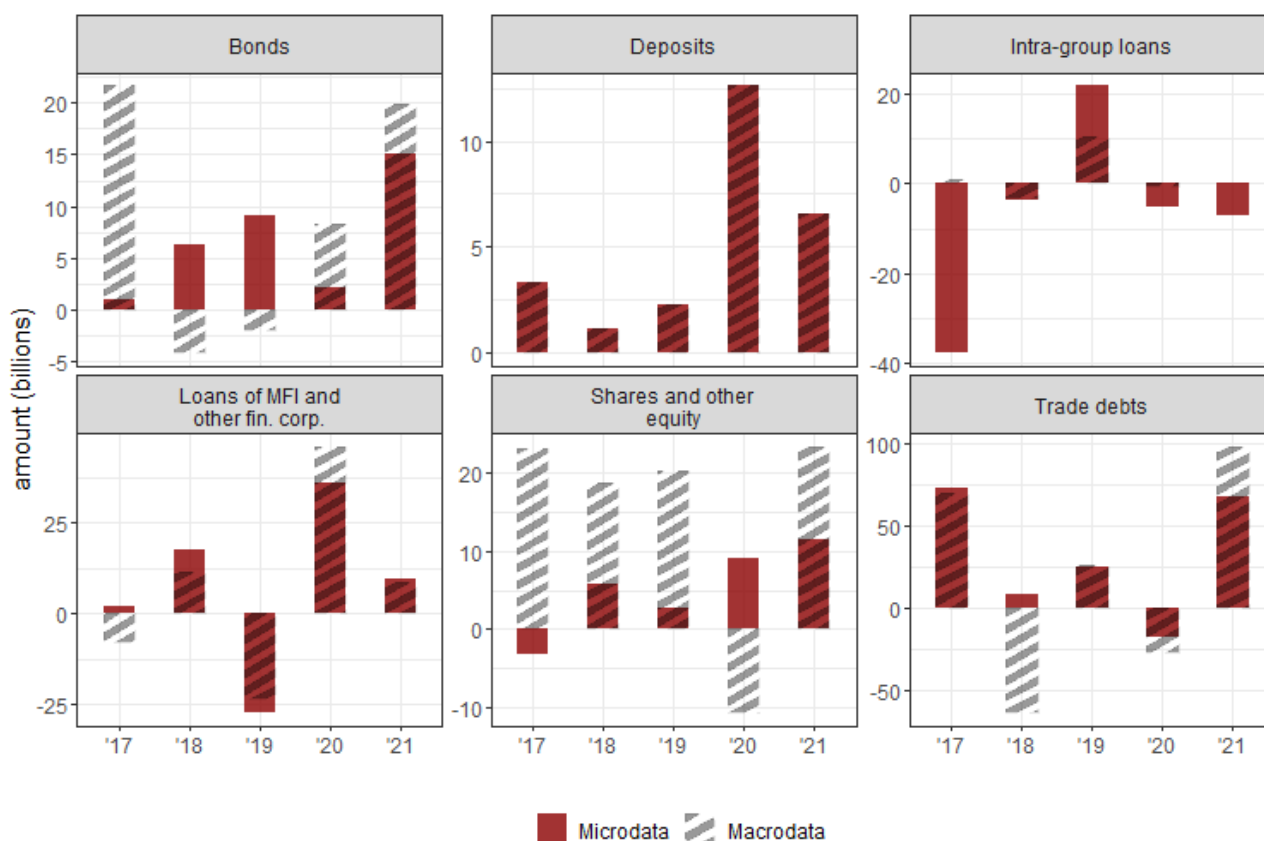
Total gross fixed capital formation is the sum of gross fixed capital formation, changes in inventories, and acquisitions, less disposals of valuables. While the latter two items are not collected in Inwind, gross fixed capital formation (that accounts for 98 per cent of the total) is completely comparable between economic accounts and Inwind. The aggregate estimate for total gross fixed capital formation obtained from Inwind-linked microdata differs from the aggregate in the economic accounts by about 60 billion, with a coverage of two-thirds. Changes in inventories are present in Cerved as the (algebraic) sum of changes in finite products and those in inputs.

Financial liabilities. Figure 4 and Figure 5 report the comparison between debt, loan and equity instruments from financial accounts and the aggregates obtained from Inwind-linked microdata, both in terms of flows and stocks. Minor differences emerge in the case of flows of loans granted by MFIs

and other intermediaries. The gap appears larger for stocks, where microdata are systematically lower than financial accounts. The differences are likely due to the low coverage of small corporations in Invid-linked microdata, along with the lack of quasi-corporations that are instead included in the financial accounts. Microdata are not available for loans granted by the central government or non-residents to Italian firms.

Invid-linked data underestimate also the flows of bonds and shares and other equity. In the case of stocks, between 2017 and 2019, the value of the two instruments from microdata covers from 70 to 90 per cent of the value reported in the financial accounts, while it becomes larger for the last two years reported in our sample. Trade debts are also aligned in the two sources, especially in the case of stocks.

Figure 4 Financial liabilities: comparison between micro-based aggregates and macrodata
(flows; billions of euro)

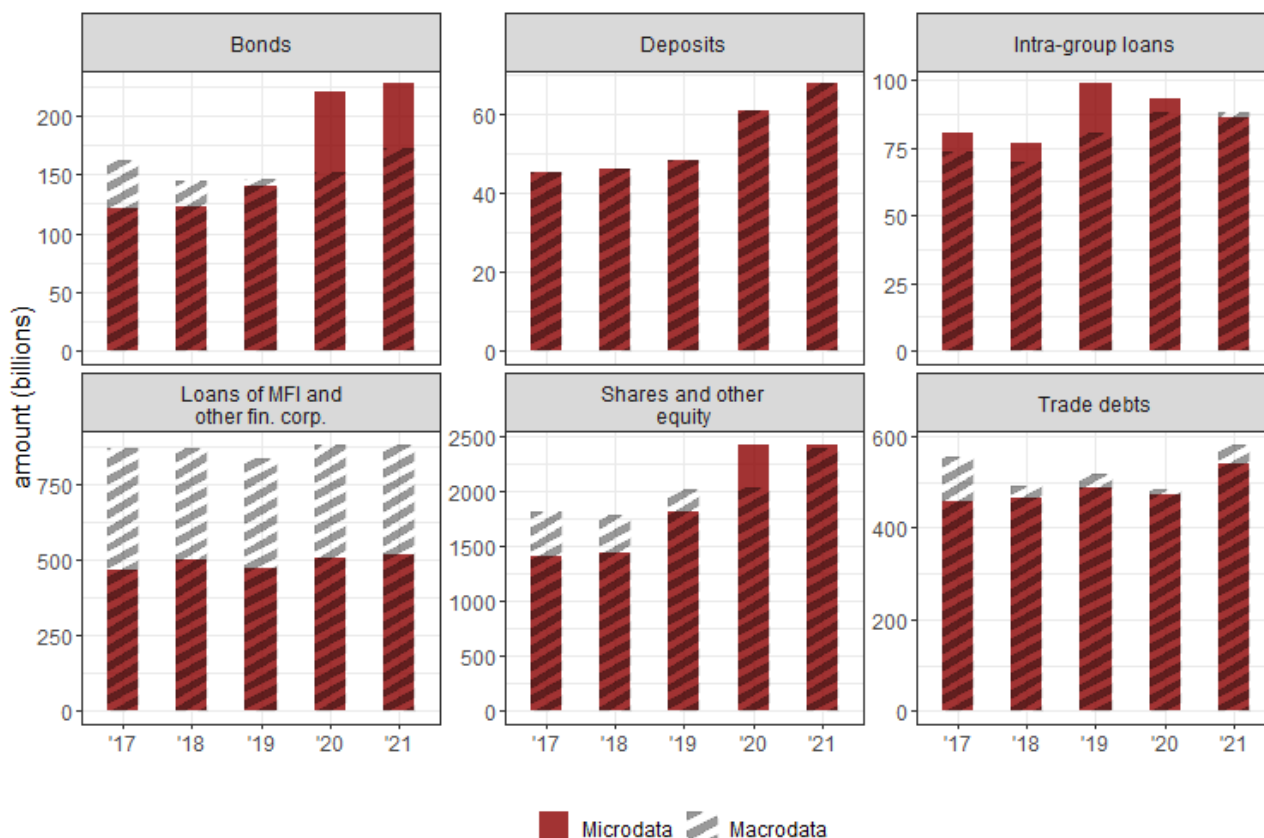


Source: Banca d'Italia for financial accounts, Invid-linked for microdata (see Section 3). The figure does not report "Loans of Central government", "Loans of rest of the world", "Insurance technical reserves", "Derivatives", "Other accounts" for which microdata are not available.

In general, there is a reasonably high level of coherence in the definitions and concepts between economic and financial accounts and the microdata we have combined. The main differences relate to the reference population because 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 a

statistical methodology to align the two sources. This is particularly the case for total output, the only item for which the survey-based estimate is systematically higher than the corresponding macro estimate.

Figure 5 Financial liabilities: comparison between micro-based aggregates and macrodata
(stocks; billions of euro)



Source: Banca d’Italia for financial accounts, Inwind-linked for microdata (see Section 3). The figure does not report “Loans of Central government”, “Loans of rest of the world”, “Insurance technical reserves”, “Derivatives”, “Other accounts” for which microdata are not available.

5. Conclusions

In the last decade there has been an increasing demand for distributional information to identify the groups more affected by shocks or assess the effects of different policies. Up to now, national central banks and national statistical institutes addressed this need mainly for the household sector.

This paper argues for the need to produce distributional accounts for the non-financial corporation sector. Using Italy as a case study, we investigate these accounts’ feasibility, focusing on corporate saving and financial resources that firms receive from the financial system.

Similarly to what is done for the household sector, the production of such information generally hinges on a (business) sample survey that collects the relevant information and on updated balance sheet data. Then, assessing the differences in concepts and definitions between surveys and national accounts is crucial.

In our analysis, we group differences into two main categories. In the first category, we discuss three general differences, that are common to all items considered. The first difference relates to the definition of the reference population. The non-financial corporation sector in national accounts includes also the quasi-corporations (with at least five employees in Italy), which are at the crossroads between corporations and households and may not be included in sample surveys that generally use a cut-off sampling design (like in Italy). The second difference 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 such as the government sector or captive financial corporations. The linkage of survey data with the Register maintained by Banca d'Italia (aligned with the Italian Institute of Statistics business register) is hence crucial for discarding these units. The third difference is the inclusion in national accounts of an estimate of the underground and illegal economy, which comprises both the legal activities deliberately concealed to authorities to avoid, for instance, tax payment and illegal activities (e.g. trading of drug, smuggling).

In the second category, we include instrument-specific differences that need a case-by-case investigation. We find, for instance, that the survey-based estimate of total output is larger than the macro aggregate, despite the cut-off sampling design. This may depend on several factors, such as differences in valuation criteria or the treatment of the value of production for specific units. In some cases, the difference may be due to items that are included in national accounts but not in the survey, such as inventories and valuables (that contribute to total gross fixed capital formation) or taxes on production and import, which explain a sizeable part of the gap in corporate taxation. Some of these issues can be overcome by including targeted questions to firms in the business survey.

Overall, our analysis, which represents a preliminary step, confirms the feasibility of distributional corporate accounts, at least for the Italian case. Future work is clearly needed to better understand the reasons behind item-specific differences and to develop a sound methodology to align the different sources of information.

Appendix

Table A1 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 ^{§§§}	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.	Invind (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.	Invind	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 employee	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-Invind (total gross annual wages per capita)	In SNA, it is equal to wages and salaries plus employers' social contributions. The item in Invind 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 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.

^{§§§} Source: <https://stats.oecd.org/glossary/>

Table A1 Correspondence between items of Sequence of Accounts concurring to the net lending/net borrowing and available microdata (continued)

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 pension fund, and without creating a special fund or segregated reserve for the purpose.	No micro-data available	
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 form 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).	Cerved (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; and (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	

Table A1 Correspondence between items of Sequence of Accounts concurring to the net lending/net borrowing and available microdata (continued)

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.	Invind (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	

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