Distributional national account estimates for household income and consumption: methodological issues and experimental results

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Abstract

Distributional national account estimates for household income and consumption: methodological issues and experimental results

Final report of the Joint OECD-Eurostat Expert Group on Disparities in a National Accounts Framework (EG DNA).

Who benefits from economic growth? What shares of national income and consumption are held by which household groups? How can national accounts (NA) aggregates for the household sector be distributed over population subgroups? Such questions have been asked many times over recent years and decades. In an attempt to make progress answering these questions, a joint OECD-Eurostat expert group has continued previous work on reconciling national accounts income and consumption with micro data sources, providing distributional information in line with the System of National Accounts (SNA). As a result, 16 countries provided distributional national accounts (DNA) data for a number of recent reference years following guidelines developed by the expert group. In addition, Eurostat compiled DNA for EU/EFTA countries based on harmonised micro- and macroeconomic statistics. Different methods to allocate the micro-macro data gap of individual income and consumption components were tested. Experimental results highlight the inequality in the distribution of disposable income and consumption expenditure in NA across countries. However, certain microeconomic concepts deviate significantly from the SNA. For such items, data comparability and coverage rates are low. In the absence of supplementary knowledge and (administrative) data sources, the uncertainty of allocating the gap for these items remains high. To improve the results, micro- and macroeconomic concepts will need to be further aligned in the future. A longer time series will make it possible to monitor the stability of DNA indicators. The DNA can then be an important source of information to judge the success of redistributive measures taken at national level.

Keywords: micro-macro data reconciliation, economic inequality, distributional national accounts

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Contents

1 Introduction

1.1. Presentation of the report

This report summarises the work achieved under the third exercise of the joint OECD-Eurostat Expert Group on Disparities in a National Accounts Framework (EG DNA) from 2017 to 2020.

National Accounts (NA) describe the economic behaviour of the average household. However, they do not investigate the heterogeneity of the sector. Average values can conceal significantly different living standards. Average per capita consumption, for example, may remain unchanged, while the distribution of consumption becomes more uneven. Likewise, dynamics in the distribution of income remain hidden in the NA averages. On the other hand, NA follow a methodology harmonised at global level (the System of National Accounts) and are thus generally comparable worldwide. Comparability is even better among EU countries due to the European System of National and Regional Accounts (ESA), which provides a common legal basis for the EU (Eurostat 1999, 2013). Another advantage of NA is that all possible forms of economic resources are detected, including those deliberately concealed (shadow economy). Finally, NA provide fully consistent and comprehensible data on income, consumption and wealth.

Distributional indicators are derived from micro data collections based on social surveys and administrative registers. These indicators are able to reflect differences in household income and consumption within a population. Unlike the System of National Accounts, however, they are not embedded into a larger framework and are not necessarily compatible with statistics on other economic sectors. In the EU, however, a common source for income statistics at household level is available, with the European statistics on income and living conditions (EU-SILC). Likewise, the European household budget survey (HBS), which has been in place since 1989 and which was formally regulated in 2019, provides harmonised consumption expenditure data comparable across EU countries.

Trying to interpret the NA estimates by looking at the distributional indicators in parallel is difficult and not conclusive, given that macro and micro data usually refer to different concepts of income and consumption. These concepts are defined in the SNA for macro statistics and in the Canberra Group Handbook (UNECE 2011) for micro statistics, but are not easily comparable. Thus, it would be much better if the national accounts directly included information on the distribution of economic variables between groups of households, given that the NA provide the ideal framework for adapting data from different data sources. The inclusion of distributional information as part of the NA would highlight how the results of the production system affect the income, consumption and savings of groups of households with different socio-economic characteristics.

In 2011, the OECD and Eurostat launched a first joint Expert Group on Disparities in a National Accounts Framework (EG DNA) to carry out a feasibility study on the compilation of distributional measures of income, consumption and savings across household groups consistent with national accounts definitions and totals (Fesseau and Mattonetti 2013, Fesseau et al. 2013, Eurostat 2013).

In 2014, the mandate of the EG DNA was renewed and a second exercise was launched in 2015, developing guidelines for estimating distributional national accounts and compiling a set of experimental results covering 11 countries for the reference year 2011/2012 (Zwijnenburg et al. 2017).

The work on distributional national accounts gained momentum again with the Conference of Directors-General of National Statistical Institutes (DGINS) dedicated to 'Statistics on income, consumption and wealth (ICW)' in 2016 ([1]). In the Vienna Memorandum issued by the conference and adopted by the European Statistical System Committee, it is agreed to develop a harmonised ICW statistical framework under the European Statistical System. This includes closer cooperation between the national accounts and microeconomic data sources as regards ICW concepts and definitions, improving the consistency and comparability of ICW statistics across statistical domains, developing a comprehensive methodology for linking micro and macro data, and publishing consistent household sector data on ICW distribution.

Thus, the availability of harmonised statistics at EU level covering the distributional aspects of households' income, consumption and wealth has become paramount. In the future, such statistics will show which household groups are most affected by economic ups and downs: who is winning, who is losing, and who is impacted most by national, regional or global crises. ICW statistics will also provide evidence to assess the social impacts of economic policies and the economic impacts of social policies.

In its third exercise, running from 2017 to 2020, the joint OECD-Eurostat Expert Group on Disparities in a National Accounts Framework (EG DNA) focused on a more recent reference year and took on board improvements in the methodology. With respect to previous rounds, the third exercise developed two parallel but distinct work streams. Firstly, some EU and other OECD countries produced their own estimates (national exercise) of distributional accounts, in line with EG DNA methodology and guidelines, in a standardised template. Secondly, Eurostat developed a centralised exercise, based on data available for the EU in EU-SILC and HBS, for countries not yet ready to publish national estimates. This involved testing different methods for allocating the micro-macro gap and a sensitivity analysis on their impact on the results. Countries could choose the method that best suited the reality in their country. The OECD is developing a centralised approach for non-European OECD countries. Results are expected to become available in the course of 2022.

In December 2020, Eurostat and the OECD published countries' estimates of distributional results together with the outcome of Eurostat's centralised exercise. With this publication, the objectives for micro-macro data reconciliation of the DGINS 2016 Vienna Memorandum have been achieved and the EG DNA mandate has been accomplished.

This paper presents the work accomplished most recently by the OECD-Eurostat Expert Group on the reconciliation of national accounts aggregates and micro data. It focuses on three objectives:

- discussing the main benefits and caveats of compiling distributional results in line with national accounts' data and the main differences with micro distributional results;
- presenting the methodology used for estimating distributional national accounts and discussing methodological challenges that arise when comparing and reconciling micro- and macroeconomic data on household income and consumption; and
- presenting the experimental distributional results of the joint OECD-Eurostat Expert Group on Disparities in a National Accounts Framework (EG DNA).

The paper contains six chapters. Chapter 2 provides a brief description of the background and the objectives for the EG DNA project. Chapter 3 explains the main methodology used for producing distributional national account estimates, both in the centralised approach and in national exercises. Chapter 4 presents the key distributional results of the national and centralised exercises (based on the results published by Eurostat and OECD on their respective dissemination websites). Chapter 5 provides a quality assessment. Finally, chapter 6 concludes that the objectives of the OECD-Eurostat EG DNA mandate have been successfully addressed.

([1]) DGINS Conference

2 Background, motivation and objectives of the EG DNA

2.1. Background

Household income, consumption and wealth are the three constituents of household economic well-being. At the aggregated level, the System of National Accounts provides international standards for computing total amounts of these different components of household economic resources, and for detailing the links between them. While the aggregate nature of the SNA provides a comprehensive, consistent and flexible set of macroeconomic accounts, it does not capture the disparities in income, consumption and savings across different household groups. However, measures of the distribution of income, patterns of consumption, redistribution through tax and transfer systems all provide information that is critical to the design of economic and social policies.

In contrast, micro data sources (e.g. surveys or administrative records) do provide measures of economic inequalities across individual households. However, they rarely provide coherent estimates of economically linked phenomena (e.g. consumption expenditure and disposable income) unless data comes from one single data source. Recent attempts to link micro data from different sources through a statistical matching procedure have been successful. Nevertheless, the procedure relies on certain assumptions and raises some uncertainty as to the synthetic micro data set.

Eurostat-OECD ICW Expert Group

The Eurostat-OECD Expert Group on joint distributions of income, consumption and wealth at micro level (EG ICW) has been working from 2017 to 2020 to produce a synthetic dataset containing household income, consumption and wealth micro data stemming from different data sources for the reference year 'around 2015'. Different methods have been used by different countries, statistical matching being the most prominent method, given that few countries have the possibility of record linking. As such, Canada, Finland, France, the Netherlands, Norway, South Korea, Switzerland, the United Kingdom and the United States were able to produce joint ICW distributions. In addition, Eurostat performed a statistical matching for all EU countries based on EU statistics on income and living conditions (EU-SILC), the Household Budget Survey (HBS) and the Household Finance and Consumption Survey (HFCS). A very good quality of the matching was achieved for total disposable income and total consumption expenditure. The matched results of net wealth and total assets were acceptable. A final report of the Expert Group will be published by mid-2022. Distributional indicators resulting from the three-dimensional ICW micro dataset of the centralised exercise are available as experimental statistics on Eurostat's public dissemination database ([2]). In particular, the joint distributions enable estimates of saving rates, multidimensional poverty and inequality, and of the impact of taxes on different income groups.

Micro data sources also fail to record certain economic resources, in particular if they do not directly go through the hands of the household. For example, household surveys do not directly collect data on social transfers in kind, i.e. goods and services provided to households by government and non-profit

([2]) Eurostat experimental statistics on the joint distribution of income consumption and wealth

institutions, either free of charge or at prices that are not economically significant. The in-kind provision of services, such as healthcare and education, is an alternative to providing households with a cash benefit with which to purchase these services, its inclusion in distributional measures leads to a more comprehensive measure of income inequality and to more comparable results over time and across countries with different welfare systems. Imputed social contributions, and partly imputed rents, are other examples here.

Finally, it is hardly possible through household surveys or registers, to get good quality data on income from the non-observed economy and investment income disbursements, whereas such items are included in the national accounts.

In short, NA ensure comprehensiveness, coherence and international comparability but cannot provide information on the distribution of economic resources and uses among people. For their part, micro data allow calculating distribution indicators but do not fully cover all people's economic resources and may give incoherent estimates on interlinked phenomena when data come from independent data sources.

By incorporating disparities among households in the NA framework, distributional accounts combine the benefits of national accounts and household micro data sources. They provide the opportunity to get a comprehensive and coherent view of the distribution of household economic resources across income, consumption and wealth, consistent with economy-wide totals.

The need for distributional accounts is even greater during economic crises, like the one in 2008-2009 or the current COVID-19 pandemic. Even though the economic consequences of COVID-19 can be measured (Eurostat 2021), the impact of the health crisis and the economic slowdown on social conditions and, consequently, on inequality is not yet fully known. However, it is becoming clear that low-income households are the most negatively affected (Eurostat 2020-1 & 2020-2, JRC 2020). An analysis of the distribution of all types of economic resources would allow effective and inclusive policy responses.

International directives have repeatedly suggested investigating the heterogeneity of the household sector by grouping households according to economic, socio-economic or geographical criteria. In the 1990s, the 1993 SNA (United Nations *et al.* 1995) and the ESA 95 (Eurostat 1999) suggested splitting the household sector into sub-sectors according to the broader category of household income (ESA 95, paragraph 2.79). In addition, the handbooks encouraged the development of social accounting matrices (ESA 95, paragraphs 8.133–8.155) as a tool to focus more on household economic behaviour ([3]). The 2008 SNA (United Nations *et al.* 2009) suggested various criteria for creating sub-sectors in the household sector, leaving countries the responsibility to choose the most appropriate one (SNA 2008, paragraph 4.159). The handbook also highlighted the main problems related to using sub-sectors, in particular the difficulty of reconciling national accounts data and social statistics based on micro data and the difficulty of achieving homogeneous sub-sectors in terms of economic behaviour (SNA 2008, paragraph 24.10). Finally, ESA 2010 (Eurostat 2013) suggests to group households according to the main source of income of the household. Despite these several recommendations, the compilation of household sub-sector accounts had never become a priority issue on the national accounts agenda.

In 2009, the Stiglitz-Sen-Fitoussi Commission (SSFC) report (Stiglitz *et al.* 2009) and the Communication of the European Commission 'GDP and beyond - Measuring progress in a changing world' (EC 2009) changed the climate dramatically. The SSFC report emphasises the need to shift from measuring economic production to measuring people's well-being. To this end, the focus must be on household income and consumption, not production. In addition, people's well-being must be looked at not only from a macroeconomic perspective, but also by including the micro perspective. In its 'GDP and beyond' Communication, the European Commission recognises that it is not only the economy that matters, but also society's ability to address environmental and social challenges, along with promises to step up efforts to measure progress in delivering social and environmental goals.

([3]) The Leadership Group (LEG) on Social Accounting Matrices and Labour Accounts provided guidance for the building of pilot social accounting matrices where households were grouped according to the household's largest source of income. As a result, some of the participating countries provided estimates of NA income items by households groups and NA consumption expenditure by households groups and type of consumption (for details see Eurostat 2003).

The shift of political interest from production to people's well-being, further enhanced by the 2008/2009 economic crisis, has triggered many reflections and experiments since, including in the field of national accounts. In response to the SSFC recommendations and the 'GDP and beyond' promises, the European Statistical System Committee launched the Sponsorship Group on Measuring Progress, Well-being, and Sustainable Development. This group identified priority areas in which the view from the household should be emphasised in European statistics. One of these priorities refers to the reconciliation of national accounts for the household sector with social statistics and establishes the goal of producing three deliverables: an adjusted gross disposable income for different categories of households; an actual individual consumption for the different categories of households; and a gross saving rate for the different categories of households.

Subsequently, in 2011, the OECD and Eurostat launched the first joint Expert Group on Disparities in a National Accounts Framework (EG DNA). The mandate was renewed in 2014 (second exercise) and again in 2017 for the development of the third exercise described in this report.

2.2. Objectives

The aim of the third exercise of the EG DNA was to produce distributional results for household income, consumption and savings consistent with national accounts concepts using micro data. This included the following steps:

1. further developing the methodology used in the two previous exercises and described in guidelines on 'distributional information on household income, consumption and saving in line with national accounts';
2. comparing and reconciling micro-macro aggregates for households' (adjusted) disposable income and final consumption expenditure;
3. assessing the reliability and robustness of the produced data; and
4. disseminating distributional national account results and metadata.

Fifteen EU and OECD countries participated in this exercise, producing national DNA estimates for a number of reference years (see Section 3.1). Given the availability of consumption micro data, 2015 was targeted to be covered by all participants, to ensure having at least one reference year in common for cross-country comparison. The year 2015 was also the one covered by Eurostat in a centralised exercise for all EU countries.

2.3. Parallel international initiatives to reconcile macro and micro data for the household sector

Other projects have also looked into the development of methodology to compile distributional results for specific parts of the sequence of accounts. Beside the EG DNA, two other main groups are working on producing distributional results in line with national accounts totals: the ECB Expert Group on Distributional Financial Accounts (EG DFA) and the World Inequality Database (WID).

The EG DFA has been developing methods to derive household distributional results, focusing on financial balance sheets for the household sector. In December 2015, the Statistics Committee (STC) set up the Expert Group on Linking Macro and Micro Data for the Household Sector (EG-LMM), to compare and link the Financial Accounts /National Accounts and the Household Finance and Consumption Survey (HFCS). The EG-LMM submitted its final report to the STC in June 2019 (ECB 2020). As a follow-up, the STC approved the creation of a new, smaller group, the EG DFA, which aimed to further develop this work and set the objective to compile Distributional Financial Accounts (DFA), make them available

to the European System of Central Banks (ESCB) and possibly selected other users by mid-2021, and propose a publication to the STC by end 2022.

The team responsible for the World Inequality Database (WID.world) has developed a methodology to derive Distributional National Accounts (DINA), focusing on income and wealth. They deviate from the other two projects (EG DNA and EG DFA) by focusing on adult individuals (i.e. 20 years and older) instead of households, and by applying slightly different income and wealth concepts. Instead of only focusing on the results for the household sector, they also allocate income and wealth of other sectors in the domestic economy to adult individuals, aligning to measures of income and wealth for the economy as a whole. Further details on the differences between the DINA and the EG DNA approaches have been described by Zwijnenburg (2019).

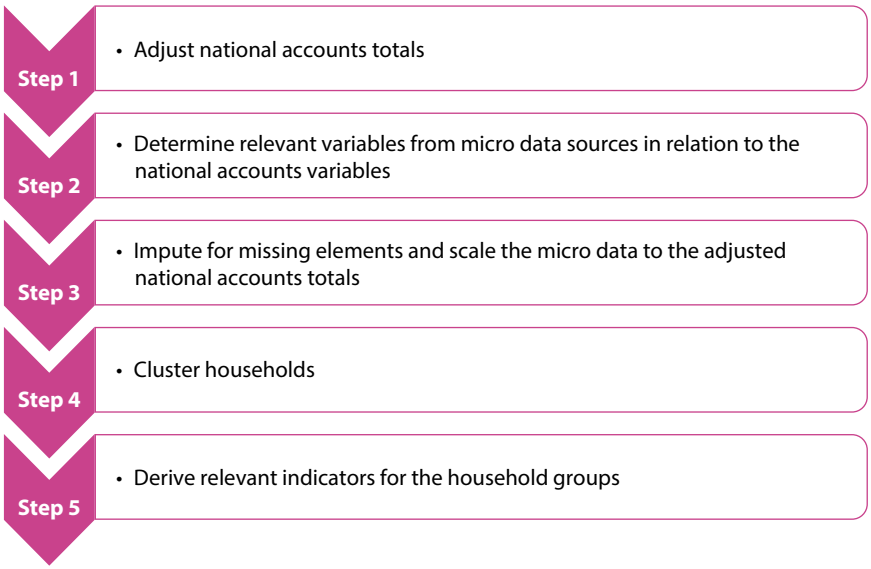
3 Methodology

3.1. Introduction

The EG DNA provided recommendations (guidelines) to assist national compilers in the implementation of distributional estimates of household income, consumption and savings in line with national accounts. The latest updated version of these guidelines was released in 2020 ([4]). Furthermore, valuable recommendations on the reconciliation of EU-SILC data and national accounts have been published by Törmälehto (2019).

The EG DNA guidelines propose the following step-by-step procedure (Figure 3.1).

Figure 3.1: A step-by-step approach for the estimation of distributional information



The procedure to arrive at distributional estimates contains five steps, starting with the adjustment of national accounts aggregates, which is required to exclude any amounts that do not relate to resident private households, i.e. the target population for the distributional results. This may for example concern amounts related to institutional households (such as people living in prisons, boarding schools and retirement homes) included in the national accounts aggregates for the household sector. The second step consists of lining up the relevant components from the micro data sources with the income and consumption variables from national accounts. These micro data provide the main underlying information to distribute income and consumption across households. In the third step, imputations are made for elements that fall outside the scope of micro data and the results are aligned to the 'adjusted'

([4]) Distributional information on household income, consumption and saving in line with national accounts – guidelines, version 2020

national accounts totals. In the fourth step, households are clustered into household groups, for instance based on their disposable income (after alignment to the adjusted national accounts totals) or based on socio-demographic characteristics, such as main source of income or household type. In the final step, relevant indicators for the description of income, consumption and savings distributions are derived, such as disparity ratios that show the degree of inequality in a country.

In addition to the above procedure, the EG DNA guidelines provide some explanations and guidance on how to deal with specific methodological issues. Finally, they include a template for the collection of national data and metadata.

For countries not yet ready to publish their own estimates, the OECD and Eurostat have run a centralised exercise. It relies on source data available centrally (Eurostat) or in national/private databases (OECD). Eurostat published centralised results in December 2020 for the following countries, some of which were not represented in the EG DNA:

- Income (2015): Austria, Belgium, Bulgaria, Switzerland, Cyprus, Germany, Denmark, Estonia, Greece, Spain, Finland, Croatia, Hungary, Lithuania, Luxembourg, Latvia, Malta, Norway, Poland, Portugal, Romania, Slovakia
- Consumption (around 2015): Austria, Belgium, Bulgaria, Cyprus, Germany, Denmark, Estonia, Greece, Spain, Finland, Croatia, Hungary, Lithuania, Luxembourg, Latvia, Malta, Poland, Portugal, Romania, Slovakia

The OECD is currently compiling centralised estimates for Chile (2017), Colombia (2016), Japan (2013) and South Korea (2016), which are scheduled to be published in the course of 2022.

This report combines information on the third EG DNA national exercises ([5]) and the Eurostat centralised exercise.

3.2. Data availability

In July 2019, the EG DNA launched its third exercise for collecting national distributional results in line with EG DNA methodology. While the goal was to collect data for as many years as possible, the main reference year was 2015, to ensure having at least one reference year in common for cross-country comparison.

Table 3.2.1 presents the periods for which data have been provided. Most of the national transmissions include data for both income and consumption, with the exception of Portugal and Italy (income only) and Israel (consumption only).

([5]) The information on the national exercises is based on the working paper by Zwijnenburg, Bournot, Grahn and Guidetti (2021): Distribution of household income, consumption and saving in line with national accounts - Methodology and results from the 2020 collection round.

Table 3.2.1: Reference years covered

Exercise	Country	Income year	Consumption year
National	Belgium (3)	2014	2014
	Czech Republic	2017	2015, 2017
	Ireland	2015, 2016	2015, 2016
	Italy	2015-2017	
	Netherlands	2015, 2017	2015, 2017
	Portugal (2)	2016, 2017	
	Slovenia	2012, 2015, 2018	2012, 2015, 2018
	Sweden	2012, 2015	2012, 2015
	United Kingdom	2003-2017	2003-2017
	Australia (1)	2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017	2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017
	Canada	1999–2019	1999-2019
	Israel		2015-2017
	Mexico	2008, 2010, 2012, 2014, 2016, 2018	2008, 2010, 2012, 2014, 2016, 2018
	New Zealand (1)	2006, 2009, 2012, 2015	2006, 2009, 2012, 2015
	United States	2015, 2016	2015, 2016
Eurostat – centralised	Belgium (3)	2015	2014
	Bulgaria	2015	2015
	Denmark	2015	2015
	Germany	2015	2013
	Estonia	2015	2015
	Greece	2015	2015
	Spain	2015	2015
	Croatia	2015	2014
	Cyprus	2015	2015
	Latvia	2015	2015
	Lithuania	2015	2016
	Luxembourg	2015	2015
	Hungary	2015	2015
	Malta	2015	2015
	Austria	2015	2015
	Poland	2015	2015
	Portugal	2015	2015
	Romania	2015	2015
	Slovakia	2015	2015
	Finland	2015	2016
	Norway	2015	—
	Switzerland	2015	—

Note: (1) The accounting years for Australia and New Zealand run from July T to June T+1. (2) In the third EG DNA exercise, Portugal provided national estimates for 2016–2017, but opted for publication of centralised results for 2015. (3) Belgium provided national estimates for 2014–2015 (income) and 2014 consumption, but opted for the publication of centralised results while the national methodology is being further improved.

In the national exercises, countries were generally able to find appropriate micro data sources as a counterpart for national accounts income and consumption items. In some cases, a single micro data source was used for the various income and consumption components, but in most countries, multiple data sources were used, including, for example, tax data and administrative registers. Often the consumption items are better represented in micro sources than the income components.

In its centralised exercise, Eurostat compiled distributional results for EU/EFTA countries based on micro and macro data available centrally from the following sources:

Macro data - national sector accounts for households: non-financial accounts by sector – annual data (Table 8 of the ESA 2010 Transmission Programme) for income; household final consumption expenditure (Table 5 of the ESA 2010 Transmission Programme) for consumption

Micro data – social (survey) statistics:

- EU statistics on income and living conditions, collected annually based on Regulation (EU) 1700/2019 (previously, Regulation (EC) No 1177/2003) of the European Parliament and of the Council.
- Household Budget Survey, conducted every 5 years based on a European Statistical System agreement.

Despite the different levels of conceptual comparability and the lack of additional sources (e.g. administrative data, national expert knowledge of the gap's origin) that are only available nationally, the survey data at Eurostat were considered to provide a suitable basis for experimental distributional national accounts estimates. With a few exceptions, the source data ensured a good coverage of counterpart variables according to the predefined micro-macro conceptual links. In addition, the social statistics published by Eurostat have the advantage of being harmonised and comparable across countries. Table 3.2.2 presents an overview of the micro data coverage for the main items used in the exercise. Because of missing or limited source data for 2015, centralised exercise estimates could not be made in the following cases:

- taxes on wealth – due to missing micro data for wealth taxes (Austria, Belgium, Switzerland, Luxembourg, Norway);
- operating surplus, gross - due to missing micro data for imputed rent (Germany);
- no NA data for Iceland for all income items, and limited number of NA income items for Malta and Switzerland;
- consumption – no HBS data for Switzerland, Norway or Iceland; and
- consumption - no distribution possible due to missing income variables in HBS (Italy).

Table 3.2.2-a: Availability of micro data for main income and consumption items – income

	Income item (NA code)	National Exercise														Centralised exercise (EU/EFTA countries)
		Czech Republic	France	Ireland	Italy	Netherlands	Portugal	Slovenia	Sweden	United Kingdom	Canada	Israel	Mexico	New Zealand	United States	
		2017	2016	2015	2015	2017	2016	2015	2015	2015	2015	2017	2016	2015	2015	2015
B2	Operating surplus	X	X	X	X		X	X		X			X		X	X (1)
B3	Mixed income	X	X	X	X	X	X	X		X	X		X	X	X	X
D1R	Compensation of employees received	X	X	X	X	X	X	X		X			X	X	X	X (2)
D4N	Net property income received / Net property income paid	X		X		X	X	X	X	X			X	X	X	X (3)
D41R	Interest received, not adjusted for FISIM(4)		X	X		X			X	X			X	X	X	
D42R	Distributed income of corporations received		X	X		X		X	X	X			X		X	
D44R	Investment income disbursements received									X			X			
D41P	Interest paid, not adjusted for FISIM(4)			X		X			X				X	X	X	
B5	Primary income	X		X		X	X			X			X	X	X	
D5P	Current taxes on income and wealth	X		X	X	X	X	X		X	X		X	X		X (5)
D61P	Net social contributions paid	X	X	X	X	X	X			X			X	X	X	X (2)
D62R	Social benefits other than STiK received	X	X	X	X	X	X	X		X	X		X	X	X	X
D7NR	Other current transfers (net) received	X		X		X							X	X		X
D72R-D71P	Net non-life insurance claims minus premiums			X		X				X			X	X		
D75NR	Miscellaneous net current transfers received	X		X		X	X						X	X		
B6	Disposable income	X		X		X				X			X	X		X
D63R	STiK received					X				X			X			
D63R1	Education					X	X			X			X			
D63R2	Health					X	X			X			X			
D63R3	Other					X				X						
B7	Adjusted disposable income					X				X			X			

(1) Except for Germany. (2) Excluding employers' social contributions. (3) Excluding investment income disbursements. (5) Except 'Taxes on wealth' for Austria, Belgium, Switzerland, Luxembourg and Norway. (4) Financial intermediation services indirectly measured.

Table 3.2.2-b: Availability of micro data for main income and consumption items – consumption

	Consumption item	National exercise														Centralised exercise (EU countries)(1)
		Czech Republic	France	Ireland	Italy	Netherlands	Portugal	Slovenia	Sweden	United Kingdom	Canada	Israel	Mexico	New Zealand	United States	
		2017	2016	2015	2015	2017	2016	2015	2015	2015	2015	2017	2016	2015	2015	2015
CP010	Food and non-alcoholic beverages	X	X	X		X		X	X	X	X	X	X	X	X	X
CP020	Alcoholic beverages, tobacco and narcotics	X	X	X		X		X	X	X	X	X	X	X	X	X
CP030	Clothing and footwear	X	X	X		X		X	X	X	X	X	X	X	X	X
CP040	Housing, water, electricity, gas and other fuels	X	X	X		X		X	X	X		X	X	X	X	X
CP050	Furnishings, households equipment and routine maintenance of the house	X	X	X		X		X	X	X	X	X	X	X	X	X
CP060	Health	X	X	X		X		X	X	X		X	X	X	X	X
CP070	Transport	X	X	X		X		X	X	X		X	X	X	X	X
CP080	Communications	X	X	X		X		X	X	X	X	X	X	X	X	X
CP090	Recreation and culture	X	X	X		X		X	X	X		X	X	X	X	X
CP100	Education	X	X	X		X		X		X	X	X	X	X	X	X
CP110	Restaurants and hotels	X	X	X		X		X	X	X	X	X	X	X	X	X
CP120	Miscellaneous goods and services	X	X	X		X		X	X	X		X	X	X		X
P31DC	Final domestic consumption expenditure	X	X	X						X		X	X	X		X
P33	Final consumption expenditure of resident households abroad			X								X		X		
P31NC	Final national consumption expenditure	X	X	X		X		X	X	X		X		X		
P4	Actual final consumption					X				X		X	X	X		

Note: (1) HBS 2015 wave

3.3. Adjustments to national accounts totals

The EG DNA guidelines list a number of adjustments to the national accounts totals that are necessary to remove any amounts that do not relate to resident private households. These cover: exclusion of non-profit institutions serving households (NPISHs) if reported together with the institutional sector households; correction for expenditures of non-resident households on the territory and of resident households abroad; and adjustment for non-private households.

Table 3.3.1 presents the overall adjustments made by each country and in the centralised exercise. All of them had source macro data for the households sector, excluding NPISHs. Not all countries were able to adjust for expenditure of non-residents on the territory at the detailed level, as suggested by the guidelines, but rather applied this correction at the aggregated level.

In the centralised exercise, Eurostat adjusted the official NA figures by a country-specific factor to exclude the part of the population that does not concern private households (mainly institutional households). It is an implicit coefficient derived as the ratio between the total population in the social surveys (EU-SILC or HBS, respectively) and the population corresponding to the NA concept for the purpose of per capita GDP figures. Due to the lack of detailed information, aggregate adjustment coefficients were calculated separately for income and consumption and then applied at the level of individual income and consumption items.

Table 3.3.1: Adjustments to national accounts' totals

Exercise	Country	% difference between adjusted and original national accounts' totals		NPISHs reported with households	Adjustment of non-resident households' expenditures on the territory
		Income ([1])	Consumption([2])		
National exercises	Czech Republic (2017)	-1.28	-1.80	No	No
	France (2016)	-1.56	-2.73	No	Yes
	Ireland (2015)	-0.39	-0.77	No	No
	Italy([3]) (2015)	-0.45	—	No	—
	Netherlands (2017)	0.00	0.00	No	Yes
	Portugal([3]) (2016)	0.00	-	No	—
	Slovenia (2015)	-0.15	-0.20	No	Yes
	Sweden (2015)	-0.13	-1.34	No	Yes
	United Kingdom([3])	—	—	—	No
	Australia([3])	—	—	—	—
	Canada (2015)	0.00	0.00	No	Yes
	Israel([3]) (2015)	—	-2.89	No	No
	Mexico (2016)	0.00	0.00	No	Yes
	New Zealand (2015)	0.00	0.00	No	Yes
	United States (2015)	-0.36	-2.80	No	No
Centralised exercise (EU/EFTA countries)	Belgium	-0,04	-0,49	No	No
	Bulgaria	-0,25	-2,58	No	No
	Denmark	-0,42	-0,71	No	No
	Germany	-0,32	-4,68	No	No
	Estonia	-0,80	-0,98	No	No
	Greece	-1,56	-1,32	No	No
	Spain	-0,98	-0,95	No	No
	Croatia	-1,40	0,25	No	No
	Italy	—	-0,48	No	No
	Cyprus	-0,37	-0,37	No	No
	Latvia	-1,75	-0,81	No	No
	Lithuania	-0,56	0,71	No	No
	Luxembourg	1,25	-5,34	No	No
	Hungary	-1,77	-1,78	No	No
	Malta	-0,61	-4,76	No	No
	Austria	-0,46	-1,85	No	No
	Poland	-2,46	-1,08	No	No
	Portugal	-0,16	0,16	No	No
	Romania	-0,14	0,19	No	No
	Slovakia	-3,23	0,07	No	No
	Finland	-1,39	-1,13	No	No
	Norway	-0,51	—	No	—
	Switzerland	-1,04	—	No	—

Notes: ([1]) National exercises: simple average of the adjustments to primary income (B5), disposable income (B6) and adjusted disposable income (B7), except for Italy where it is the simple average of the adjustments to primary income (B5) and disposable income (B6), due to non-availability of data on adjusted disposable income (B7). EU countries (centralised exercise): difference between the total population in EU-SILC and the population corresponding to the NA concept for the purpose of per capita GDP figures. ([2]) National exercises actual final consumption. EU countries (centralised exercise): difference between the total population in HBS and the population corresponding to the NA concept for the purpose of per capita GDP figures. ([3]) For Australia and the United Kingdom, the percentage difference is not available as no information was provided regarding original NA estimates. For Italy and Portugal, information is only available for income. For Israel, information is only available for consumption.

3.4. Conceptual links and comparison of micro-macro income and consumption items

Part II of the EG DNA guidelines provides recommendations on how to deal with methodological issues concerning some specific items. For example, operating surplus mainly covers the imputed rent of owner-occupied dwellings but should also consider any related maintenance and repairs, financial intermediation services indirectly measured (FISIM) and taxes on production. Mixed income most closely corresponds to income from self-employment but also relates to non-observed economy/underground production and production for own consumption. In addition, there is a lack of information on whether employers' imputed social contributions may be distributed based on the distribution of wages and salaries or of that of employers' actual social contributions. Further explanation and practical guidance has been included in the EG DNA methodology for property income, including FISIM, net social contributions paid/received, social benefits, other current transfers, STiK, adjustment for the change in pension entitlements, and taxes less subsidies on production and imports.

Once the micro-macro links had been established, the micro-macro gap was calculated. Figure 3.4.1 presents the coverage rates that show the micro aggregate as a percentage of the adjusted national accounts total in the national exercises. For all income items, the range of coverage rates among countries is very wide. There is no clear pattern, although Mexico and the United States show relatively low rates for all items. Furthermore, the Czech Republic and Slovenia show poor micro-macro coverage for some specific income items. Looking across items, generally, the best alignment between micro and macro data is found for compensation of employees (80–100 %), while distributed income of corporations, interest received and mixed income show a relatively low micro-macro coverage rate for most countries. In some cases, the micro data aggregates are higher than NA estimates, but there is no recognisable pattern in these cases.

Figure 3.4.1: Coverage rates by country for the main income items, national exercises (%)

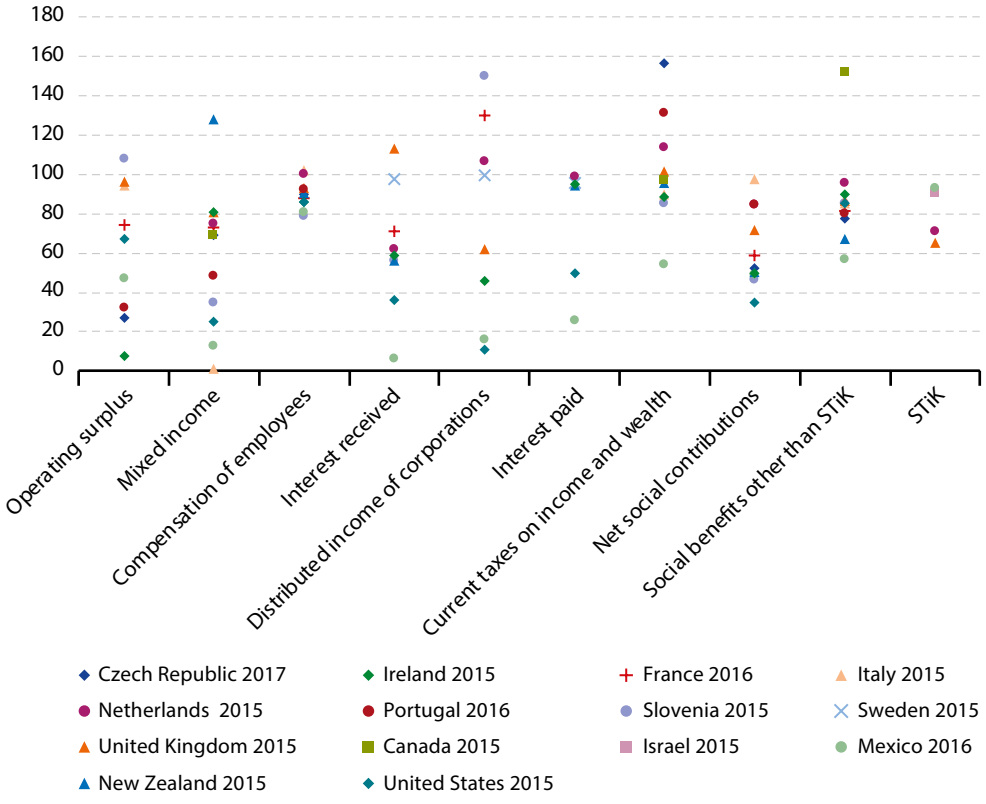
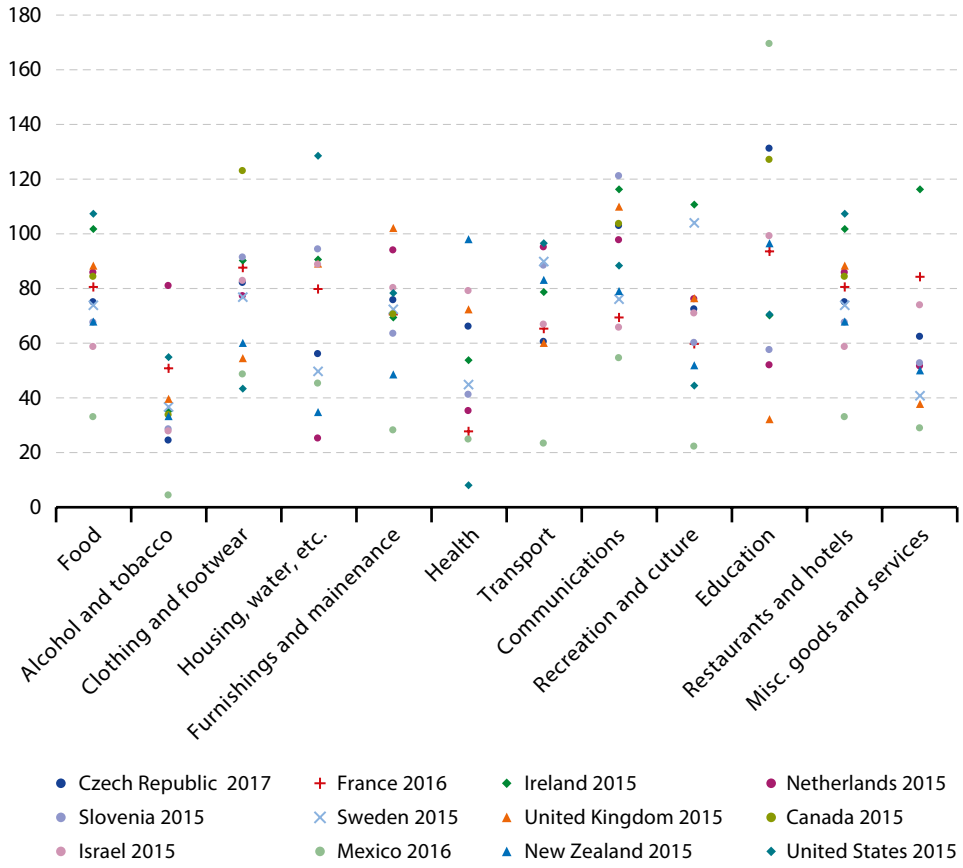


Figure 3.4.2 shows coverage rates for each of the consumption items. Again, coverage rates differ very much between countries. Among the various items, alcohol and tobacco shows the poorest coverage, while communications and education are the two categories showing, on average, the best coverage rates across all countries.

Figure 3.4.2: Coverage rates by country for the main consumption items, national exercises (%)



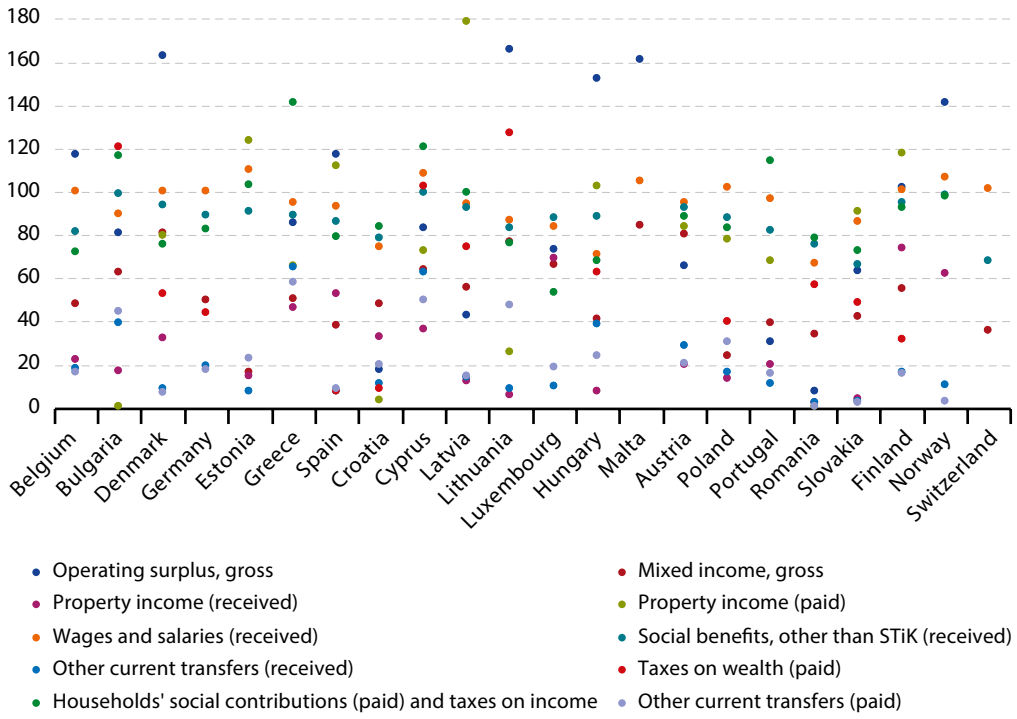
Looking for the best possible micro-macro bridging at the central level, the individual survey variables were combined to sub-aggregates to achieve conceptual correspondence with NA items. Table 3.4.1 presents the micro-macro correspondence defined for gross disposable income in the Eurostat centralised exercise.

Table 3.4.1: Correspondence between EU-SILC and National Accounts income items, centralised exercise

Item	EU-SILC		National Accounts		Indicative assessment of conceptual link
	Code	Description	Code	Description	
Operating surplus, gross	HY030G	Imputed rent	B2G	Operating surplus, gross	Low
Mixed income, gross	PY050G	Cash benefits or losses from self-employment	B3G	Mixed income, gross	Medium
	HY170G	Value of goods produced for own consumption			
Property income (received)	HY090G	Interest, dividends, profit from capital investments in unincorporated business	D4/ resource	Property income, received	Medium/ Low
	HY040G	Income from rental of a property or land			
Property income (paid)	HY100G	Interest repayments on mortgage	D4/use	Property income, paid	Low
Wages and salaries (received)	PY010G	Employee cash or near cash income	D11/ resource	Wages and salaries	High
	PY020G	Non-cash employee income			
	PY021G	Company car			
Social benefits, other than STiK (received)	HY050G	Family/children related allowances	D62/ resource	Social benefits, other than social transfers in kind	High
	HY060G	Social exclusion not elsewhere classified			
	PY090G	Unemployment benefits			
	PY100G	Old-age benefits			
	PY110G	Survivor benefits			
	PY120G	Sickness benefits			
	PY130G	Disability benefits			
	PY140G	Education-related allowances			
	HY070G	Housing allowances			
Other current transfers (received)	HY080G	Regular inter-household cash transfer (received)	D7/ resource	Other current transfers, received	Low
Taxes on wealth (paid)	HY120G	Regular taxes on wealth	D59	Other current taxes	Low
Households' social contributions (paid) and taxes on income	HY140G	Taxes on income and social contributions	D51/use	Taxes on income	High
			D613/use	Households' actual social contributions	
			D614/use	Households' social contributions supplements	
Other current transfers (paid)	HY130G	Regular inter-household cash transfer (paid)	D7/use	Other current transfers, paid	Low/No

The conceptual coverage in the survey statistics (EU-SILC) of the national accounts definition of household disposable income varies substantially across income items, which also has an impact on the micro-macro gap by item (Figure 3.4.3). The micro-macro coverage rates vary substantially across countries, with Croatia and Romania showing relatively low rates for all items. Among the items, the best micro-macro alignment is generally observed for wages and salaries, and social transfers, other than STiK. In contrast, the lowest coverage rates are observed for other current transfers (paid/received) and property income (received). While the micro data used in the centralised exercise follow a common methodological framework, the micro-macro gaps by item vary to a different extent across countries. This variation seems to relate to the level of micro-macro conceptual comparability at the item level. Less variation is observed in the coverage rates of items with close micro and macro concepts - wages and salaries, and social benefits, other than STiK. By contrast, operating surplus is the item with the greatest variation of coverage rates across countries, which is also likely due to the variety of methods for estimating the imputed rent of owner-occupied dwellings applied in the different national practices.

Figure 3.4.3: Coverage rates by country for the main income items, centralised exercise, 2015 (%)

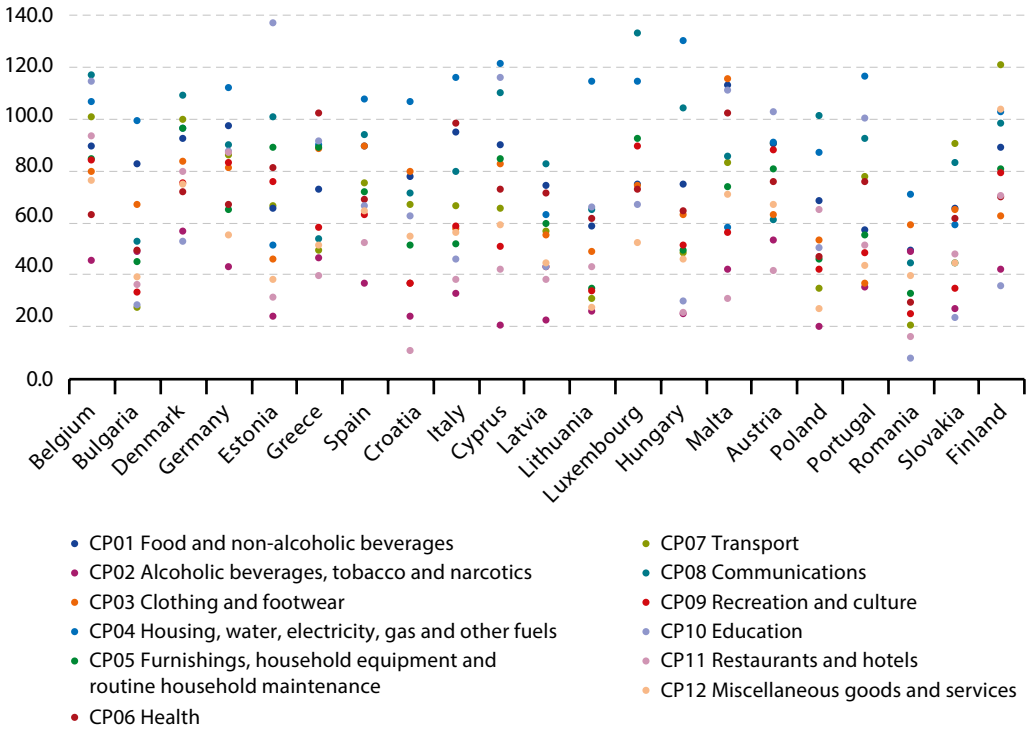


Note: The following items exceed 200 % of coverage rate and are not visible in the figure: Operating surplus, gross (Estonia, Poland); Taxes on wealth (Greece, Portugal); Property income, paid (Belgium, Luxembourg, Norway); Mixed income, gross (Norway).

For consumption, the micro-macro data were linked at the level of the 12 main COICOP ([6]) categories in order to overcome the few conceptual differences occurring at a more detailed level. The source national accounts data are based on the domestic concept, which includes household expenditure made on the domestic territory by residents and inbound tourists, but excludes residents' expenditure made abroad. Figure 3.4.4 presents the micro-macro coverage rates by consumption item. Alcoholic beverages, tobacco and narcotics shows the poorest micro-macro coverage, while housing, water, electricity, gas and other fuels, and communications are the items with the best coverage rates on average among all countries. Romania shows coverage rates below 80 % for all consumption categories.

([6]) Classification of individual consumption according to purpose (United Nations Statistics Division, 2018)

Figure 3.4.4: Coverage rates by country for the main consumption items, centralised exercise, 2015 (%)



Source: HBS 2015 wave

3.5. Gap allocation methods

When all possible adjustments have been made to both the micro and macro data, remaining gaps have to be allocated. If the nature of the gap is known, there might be indicators helping to allocate these gaps; otherwise, a statistical method without the use of auxiliary information must be chosen. If the nature of the gap is unknown, an allocation method is chosen based on the best guess on where the gap should be allocated. This adds uncertainty to the resulting distributional indicators.

The EG DNA guidelines include four methods to align the micro data with the adjusted national accounts totals. The first method (method A) implies a simple calibration, i.e. applying the same adjustment coefficient (macro total/micro total) to all households. This method is recommended when the micro totals are closely aligned to the adjusted national accounts totals, and the impact of the scaling is only small.

If no direct micro data are available to allocate the amounts to the relevant households, three other methods are recommended, all of them making use of indirect information. Method B presents a proxy for the missing information by using the distribution of another income or consumption component. Method C imputes missing distributional information according to exogenous data (e.g. socio-demographic information) available at the level of the individual or of the household. If no information is available, Method D can be used, where the imputations are made in such a way that the inclusion or exclusion of the component does not affect the distributional results of the main indicators. Table 3.5.1 presents the number of times the above methods were applied for each of the income and consumption items in nationally compiled estimates.

Table 3.5.1: Number of times methods A, B, C or D were used for each item

Income and Consumption items		Methods used			
Code	Name	A	B	C	D
B2	Operating surplus	6		3	
B3	Mixed income	6			
D1R	Compensation of employees	5	2		
D41R	Interest (not adjusted for FISIM)	3	1	1	
D42R	Distributed income of corporations	9	2		
D44R	Investment income disbursements	2	4	1	
D41P	Interest (not adjusted for FISIM)	1	2	3	
D5P	Current taxes on income and wealth	9	1	2	
D61P	Net social contributions	2	1		
D62R	Social benefits other than STiK	11	1	1	
D72R-D71P	Net non-life insurance claims minus premiums	3	2	2	1
D63A	Social transfers in kind - Education	2	3	5	
D63B	Social transfers in kind - Health	3	3	4	
D63C	Social transfers in kind - Other	1	5	4	
CP010	Food and non-alcoholic beverages	12			
CP020	Alcoholic beverages, tobacco and narcotics	12			
CP030	Clothing and footwear	12			
CP040	Housing, water, electricity, gas and other fuels	8			
CP050	Furnishings, households equipment and routine maintenance of the house	12			
CP060	Health	9	2		
CP070	Transport	10	1		
CP080	Communications	12			
CP090	Recreation and culture	11	1		
CP100	Education	11		1	
CP110	Restaurants and hotels	12			
CP120	Miscellaneous goods and services	7	1		
P33	Final consumption expenditure of resident households abroad	3	4		

The EG DNA guidelines elaborate further on items where micro data may be missing and distributional results may need to be imputed. For example, employers' imputed social contributions may possibly link to the distribution for wages and salaries, whereas financial intermediation services indirectly measured may link to interest paid/received. The distribution of social transfers in kind may possibly be estimated using available socio-demographic information.

After successful gap allocation, the EG DNA guidelines requested to cluster households into income quintiles based on equivalised household disposable income. The equivalisation is applied to take into account differences in size and composition of households, recalculating results according to the number of consumption units in each household, before allocating them to the relevant income quintile. The OECD-modified equivalence scale was chosen as reference method. Accordingly, the first adult counts as 1 consumption unit, any additional person aged 14 and over each counts as 0.5 consumption units, while each child under 14 counts as 0.3 consumption units.

Eurostat tested different methods for the gap allocation in order to distribute the national accounts totals using micro data. All of them were applied to income, while only M1 and M3 were deemed suitable for consumption.

Method M1 - Proportional allocation

The entire gap is distributed proportionally over households. The assumption behind this approach is that the distribution found in the sample survey is close to the real distribution of the household population, meaning that potential under-reporting or sampling errors are evenly distributed among the population.

Method M2 - Pareto tail modelling (complemented by proportional scaling)

The measured values for the households above the 90th percentile were adjusted such that the tail distribution conforms to a Pareto distribution. After the Pareto top 10 % adjustment, the remaining gap by item is allocated to all households by simple proportional scaling to match the corresponding NA totals. The application of this semi-parametric method suggests that the sample survey greatly underestimates the economic resources of households at the very top of the distribution.

Methods M3.1 and M3.2 – Allocation of ascending/descending gap shares by quintile

Method M3.1 suggested under-coverage/under-reporting of higher income groups and represented a 'to-the-top' allocation: gap shares 0 %, 10 %, 20 %, 30 %, 40 % to Q1, Q2, Q3, Q4, Q5 accordingly. In contrast, method M3.2 assumed an under-coverage/under-reporting of low-income households and comprised a 'to-the-bottom' allocation: gap shares 40 %, 30 %, 20 %, 10 %, and 0 % to Q1, Q2, Q3, Q4, and Q5 accordingly. The meso-level gaps were subsequently distributed across the underlying households. In trying to avoid possibly distorting results, each household within the respective quintile was adjusted by an equal amount rather than proportionally to their initial relative contribution. The proportionality used in these two gap allocations is rather hypothetical but was still considered useful for sensitivity comparison with the other approaches.

Method M4 - Combined approach

This method combines the Pareto-based results for property income (received), gross mixed income, and taxes on wealth with the proportionally scaled results for the other items into a disposable income aggregate. The application of this approach on income suggests that the sample survey strongly underestimates the above three items for households at the very top of the distribution, whereas other income items are correctly estimated.

After consultation with the involved countries, the methods described in Table 3.5.2 were finally applied. For countries that did not specify a preferred dataset, Eurostat applied the default method, which is method M4 Combined approach for income and method M1 Proportional for consumption. These countries are Austria, Bulgaria, Switzerland, Germany, Denmark, Croatia, Latvia, Hungary, Poland and Romania.

Table 3.5.2: Countries grouped according to the gap allocation method applied to income and consumption items

Type of items	Gap allocation method			
	M1 Proportional	M3.1 Ascending gap shares by quintile	M4 Combined approach	Country-specific combination of methods by item
Income	Belgium, Greece	Slovakia, Spain	Bulgaria, Denmark, Germany, Estonia, Croatia, Cyprus, Latvia, Hungary, Austria, Poland, Portugal, Romania, Finland, Norway, Switzerland	Lithuania, Luxembourg, Malta
Consumption	Belgium, Bulgaria, Denmark, Germany, Estonia, Greece, Spain, Croatia, Cyprus, Latvia, Luxembourg, Hungary, Malta, Austria, Poland, Portugal, Romania, Slovakia, Finland	Lithuania (1)		

(1) Except for items CP02 (M1) and CP04 (M3.2).

After the gap allocation, and in accordance with step 4 of the guidelines, Eurostat clustered households into income quintiles. For income, the households were grouped into quintiles based on the equivalised aggregate income. For consumption, the households were clustered according to the equivalised sum of the HBS variables: EUR_HH095 (Monetary net income) + EUR_HE042 (Imputed rent).

3.6. Sensitivity analysis

The choice of the gap allocation method may affect the resulting distribution across household groups significantly, in particular for income and consumption items with large gaps (poor coverage) between micro and macro data. The uncertainty inherent in the distributional results is even more significant when the nature of the gap between the micro and macro sources is unknown and it is thus uncertain which method harvests the best results. This uncertainty may be even greater at the level of total disposable income and consumption, as these aggregate the uncertainty of their individual components.

Therefore, it is important to quantify the impact that different allocation methods have on the results and to estimate the uncertainty range using distributional indicators. Eurostat used two common distributional indicators to measure the uncertainty range: the Gini coefficient and the Q5/Q1 ratio. They were applied to the results of each method for each income and consumption item and for the total income/consumption aggregates. Comparing the values of the distributional indicators after the gap allocation with the Gini coefficient and the Q5/Q1 ratio of the original input micro data (EU-SILC and HBS) highlights the changes introduced through the different gap allocation methods.

The following charts present the Gini results for the total income (Figure 3.6.1) and total consumption (Figure 3.6.2) aggregates before and after the micro-macro gap allocation in the Eurostat centralised exercise.

Figure 3.6.1: Gini coefficient before and after gap allocation, centralised exercise, total income (%)

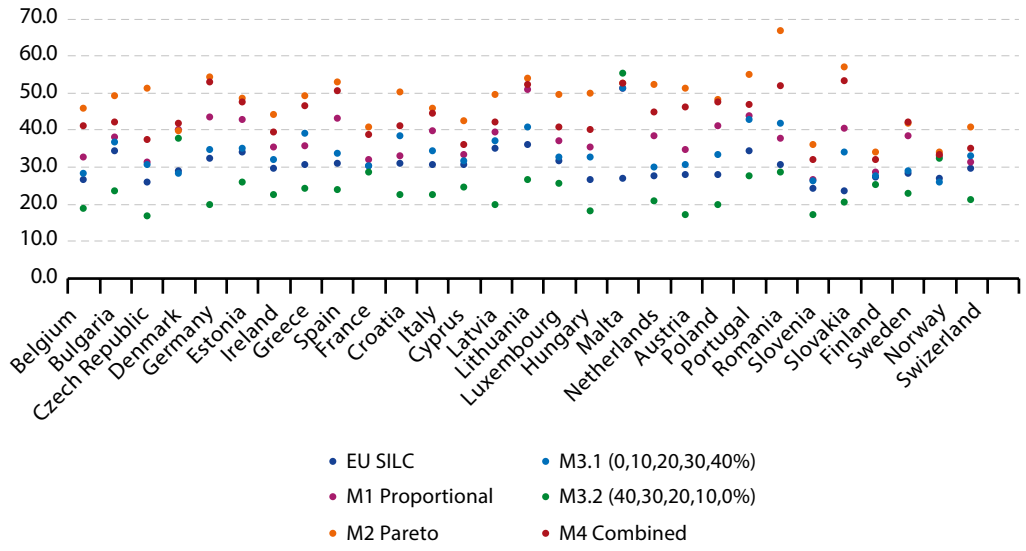
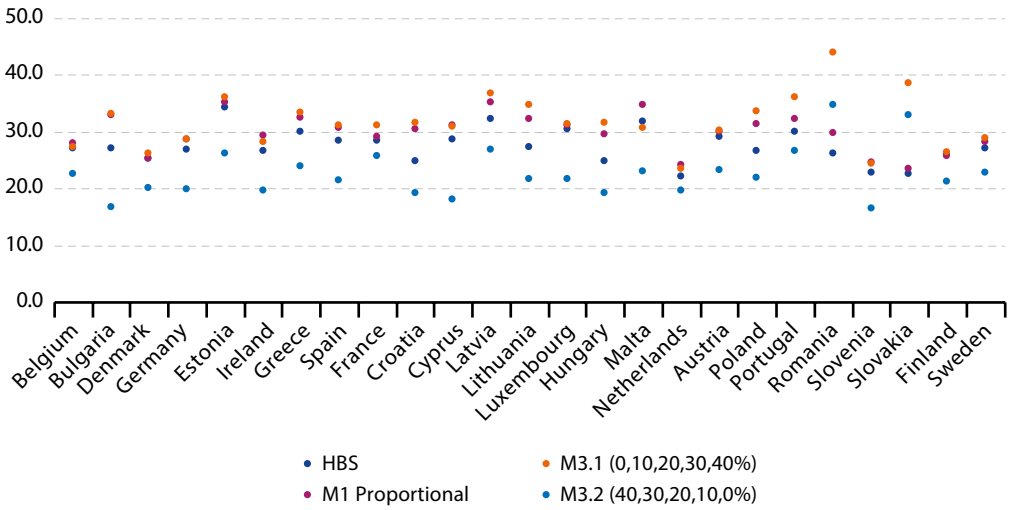


Figure 3.6.2 Gini coefficient before and after gap allocation, centralised exercise, total consumption
(%)



The simple proportional method (M1) preserved the original distribution from the survey data at the detailed level. When aggregated up to total income or consumption, the inequality across households generally increased, depending on the household income composition and the size of the micro-macro gap by item. As was also to be expected, the Pareto tail modelling (M2) drastically increased the inequality by targeting only a small portion of the population. Applied to all income items, it was a fairly extreme scenario. However, it proved appropriate for transactions that were concentrated in the top income population. The two M3 sub-approaches allocation of ascending/descending shares by quintile were less marginal and produced contrasting results in terms of inequality. Despite the rather hypothetical approach, the applied assumptions were still considered relevant for some country-specific cases of underestimating higher/lower income households. Finally, the combined approach (M4) seemed to provide balanced results by combining the most suitable method for each item and capturing the likely distributional pattern of household income. As explained earlier, it was thus used as the default method for countries not having indicated a preferred set of centralised results.

3.7. Limitations

The process of compiling distributional results in line with macro totals is challenging. Most difficulties were mentioned in the previous sections but it is worth summarising some limitations that have presented challenges for the exercise and have potentially given rise to uncertainties in the results.

Availability of suitable micro data. Indeed, national accounts include items that are usually not covered in micro statistics. In such cases, imputations are necessary. In addition, not all national compilers have access to additional data sources, such as tax information or administrative registers. For the centralised exercise, micro data are only available from regular social surveys; additional sources that might be available nationally cannot be used. (On the other hand, this ensures a harmonised approach across all countries.)

Lack of knowledge of the nature of the micro-macro gaps. The micro-macro gaps may be relevant not only for the centralised exercise but also to some extent at the national level. In this regard, several countries claimed to have additional data sources available that can be used to allocate a large part of the gap to relevant households. However, in some cases, countries need to rely on assumptions to allocate any remaining gap. A number of approaches have been recommended in the EG DNA guidelines, while several alternative scenarios were tested centrally. Where one needs to rely on assumptions, this adds to the uncertainties of the results.

Frequency and timeliness of survey data. National accounts data are normally obtained with higher frequency and better timeliness than survey data, which are typically available no earlier than T+2 years after the reference period. Some surveys are even less frequent, for example the Household Budget Survey in the EU, which most countries only conduct every 5 years.

Resources. Last but not least, the compilation of distributional results depends on the availability of sufficient resources. Many countries opted to be included in the centralised exercise mainly due to the lack of resources. A couple of countries made use of grants offered by international organisations (Eurostat).

3.8. Publication of manual for producing distributional results

Because of the complexities involved in the compilation of distributional results in line with national accounts' totals and the need to arrive at harmonised results, the secretariat has been working on a compilation guide that provides a detailed description of the methodology, and which focuses on specific compilation issues. In this way, it combines all the knowledge and expertise as built up by the expert group during the project. This will help compilers in developing high-quality and comparable results, and users in obtaining a good understanding of the underlying concepts and in how results have been derived.

A first draft of the manual already gained useful feedback. This will be incorporated in the final version. At the same time, the secretariat is working on further updating the manual to incorporate guidance on specific issues as addressed by the group over the recent period. It is expected that the manual will be published in the course of 2022.

4 Experimental distributional results

4.1. Experimental statistics

In December 2020, Eurostat and the OECD published for the first time the results of the third EG DNA exercise. Eurostat published the results as a dedicated section 'Income and Consumption: Social Surveys and National Accounts' in the Experimental Statistics area of the website. Data are presented in two excel files, the first for household income and the second for household consumption. Both files contain a 'Results' and a 'Flat data' sheet.

The Results sheet allows the user to select and extract specific tables by combining the following fields (pivot table slicers) and categories:

- Dataset: Distributional (adjusted), EU-SILC, HBS, NA (adjusted), NA (original), NA-EU-SILC coverage rate, NA-HBS coverage rate, NA-EU-SILC gap, and NA-HBS gap.
- Indicator: Sensitivity indicators (Gini coefficient and Q5/Q1 ratio), Q1, Q2, Q3, Q4, Q5 and Total.
- Country: All countries participating in the EG DNA are included. For user convenience, countries in the national exercise are marked with a note.
- Year: From 2011 to 2018.
- Item: A selection of NA items of the 'allocation of primary income' and 'use of income' account. For user convenience, the items compiled within the national exercises are marked with a note.

The 'Flat data' sheet allows users to download data in a format easily processable with various statistical software.

Beyond data, users can also access documents that help in understanding the data, in particular the Guidelines of the OECD-Eurostat joint Expert Group on Disparities in a National Accounts Framework, a methodological note on the centralised exercise and a metadata file.

The OECD website presents the 'Distributional information on household income, consumption and saving' dataset as experimental statistics, in the Annual National Accounts section of the OECD database. The dataset includes the main items of 'allocation of primary income' and 'use of income' accounts distributed across households, classified according to equivalised disposable income quintile, household type and main source of income of the household.

It is possible to select and extract various tables by using the following filters: Country (all countries that participated in the third EG DNA exercise); Year; Measure (current, prices, per consumption unit and per household). Furthermore, for most countries, supplementary information is provided on the distribution of the number of households and individuals across the households groups as defined in the distributional accounts, broken down by socio-demographic categories, such as age group, gender, education level and labour market status.

Additional information on data can be found in the metadata section accompanying the visualisation of data.

The OECD also drafted a working paper on the results of the third exercise, focusing on the methodological steps and presenting the main results of the national exercises (Zwijnenburg *et al.*, 2021). The working paper does not include the results of the centralised exercise.

In fact, its main focus is on adjusted disposable income and actual final consumption, which are not covered in the centralised approach.

4.2. Examples of analysis of distributional data

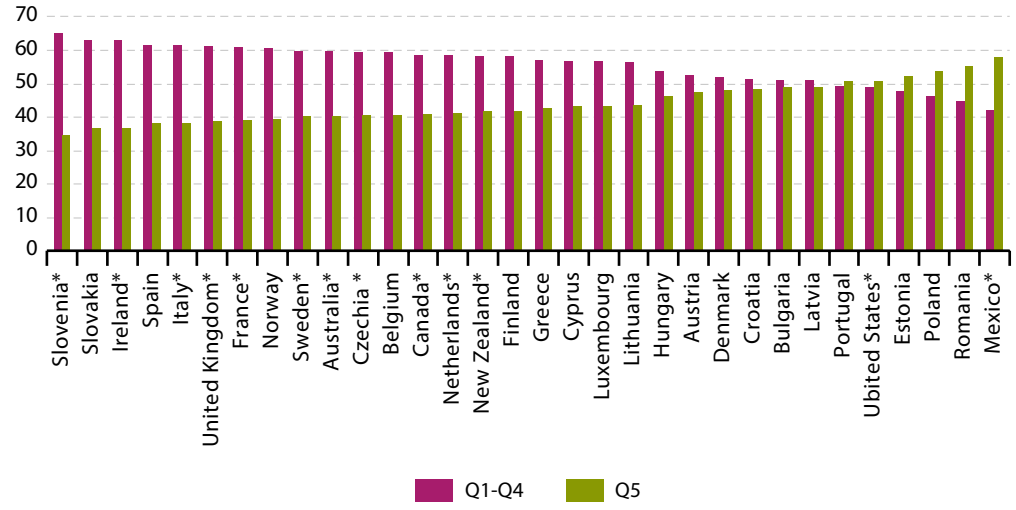
The aim of this section is to highlight how distributional national accounts data can improve our understanding of economic inequality with respect to both national accounts and micro data. Unfortunately, it was not possible to develop all analyses for all countries, due to the different availability of data. Indeed, for some countries, the distributive results of some specific income or consumption items are lacking (see Section 3.2 for details). In addition, centralised and national exercises refer to a slightly different list of NA items. In general, the national exercise contains more items than the centralised exercise and follows the sequence of household sector accounts more closely. On the other hand, cross-country comparability might be more challenging for the national exercise due to the use of different data sources and methods.

For transparency, national accounts countries are marked with an asterisk in the graphs.

4.2.1. Inequality in the distribution of disposable income

Figure 4.2.1.1 shows the share of gross disposable income received by households belonging to the first four equivalised disposable income quantiles (Q1–Q4), compared with the share of gross disposable income of households in the fifth quintile. Countries are ranked according to the increasing share of disposable income held by the fifth quintile or, equivalently, according to the decreasing share held by the first to fourth quintiles as a whole. The graph illustrates the proportion of disposable income held by the two groups. In 6 out of the 32 countries for which data are available, the 20% highest income households own more of the gross disposable income than the other 80% of the population all together. In the cross-country comparison, Slovenia is the country where households in the fifth quintile hold the lowest share of disposable income (35 %), while fifth quintile households in Mexico hold the highest share (nearly 60 %).

Figure 4.2.1.1: Shares of gross disposable income held by households belonging to the first four quintiles (Q1–Q4), compared with the share held by the fifth quintile (Q5). Year around 2015. Countries ranked by percentage according to the increasing share of disposable income held by the fifth quintile.
(%)



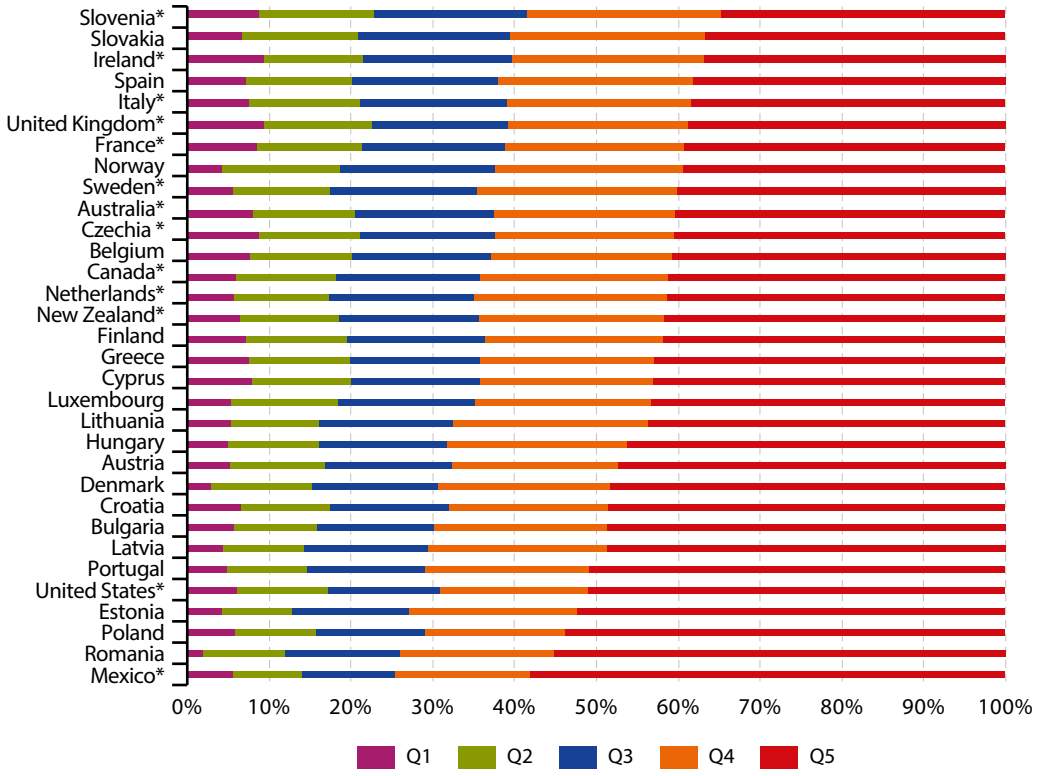
Note: Countries are ranked according to the increasing share of disposable income held by the fifth quintile. Asterisks indicate the countries that carried out a national exercise.

In a perfect, equal situation, each quintile would receive one fifth of total disposable income. The further the distribution moves away from this distribution, the more unequal is the distribution of disposable income.

Detailing the analysis by single quintile, it can be seen (Figure 4.2.1.2) that Slovenia shows not only the lowest share of disposable income (35 %) for the richest group of households, but also the highest share of disposable income (9 %) for the poorest group. Although Mexico shows the highest share held by the fifth quintile, the distribution from the first to the fourth quintile appears more equal than in other countries.

Finally, averaging across countries, the analysis shows that the first quintile holds 6.3 % of disposable total disposable income, the second quintile holds 11.8 %, the third 16.2 %, the fourth 21.6 % and the fifth 44.1 %.

Figure 4.2.1.2: Shares of gross disposable income by equivalised disposable income quintiles. Year around 2015.

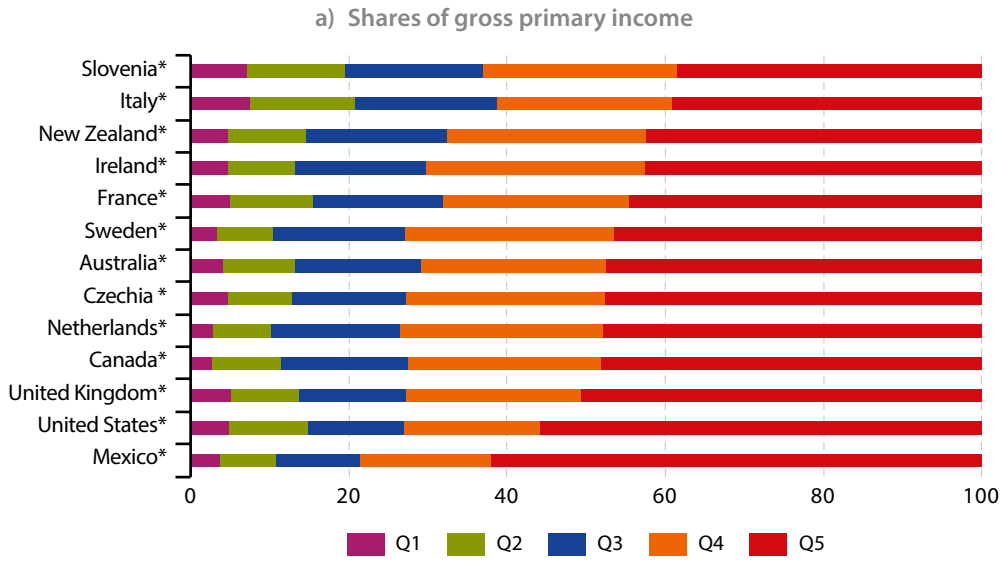


Note: Countries are ranked according to the decreasing share of disposable income held by the fifth quintile. Asterisks indicate the countries that have carried out a national exercise.

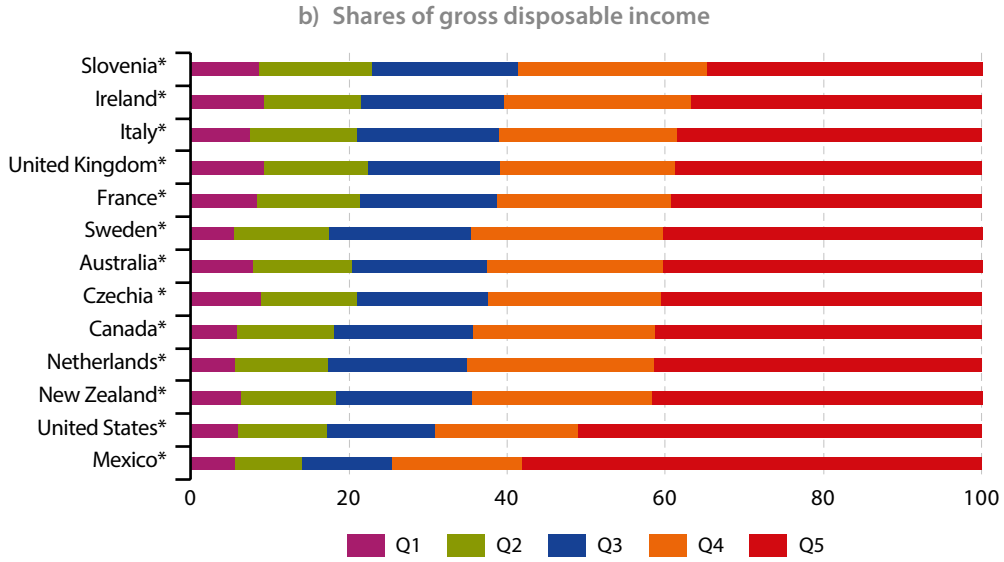
4.2.2. Inequality in the distribution of primary and disposable income

Distributional national accounts have the advantage of showing how income inequality changes in the passage from primary to disposable income. Comparing the shares by quintile of primary and disposable income provides an indication of the impact of the income redistribution process in mitigating inequality (Figure 4.2.2.1). The distribution of primary income by quintile is available only for national exercise countries. Due to the lack of appropriate micro data (in particular for employers' imputed social contributions), the centralised exercise did not so far include employers' social contributions (on both the resource and the use sides), which finally did not affect the aggregate disposable income according to the NA definition.

Figure 4.2.2.1: Primary and disposable income shares by equivalised income quantiles. National exercise countries, year around 2015.
(%)



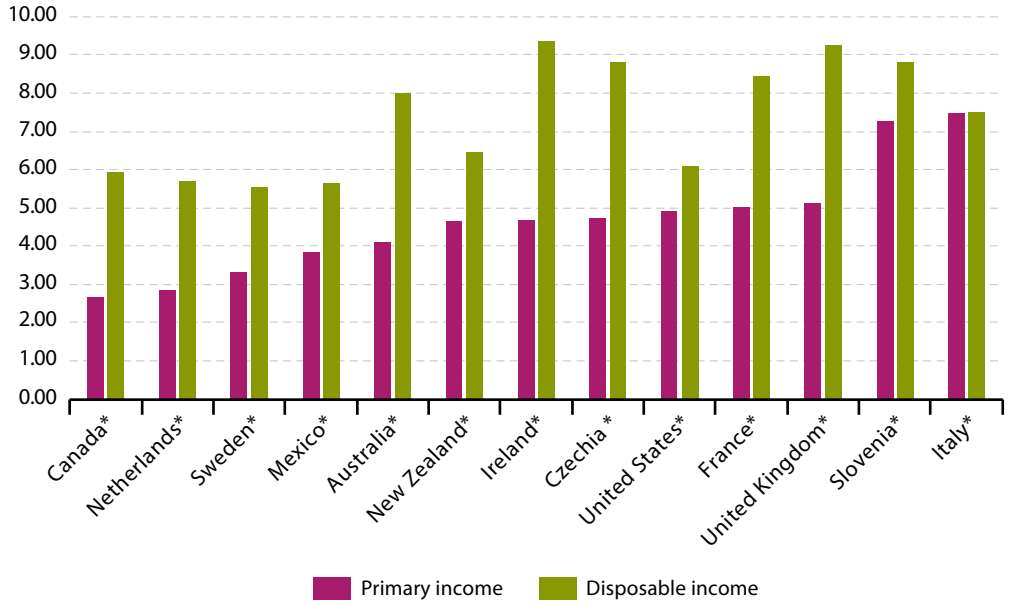
Note: Countries are ranked according to the decreasing share of gross primary income held by the fifth quintile. Asterisks indicate the countries that have carried out a national exercise.



Note: Countries are ranked according to the decreasing share of gross disposable income held by the fifth quintile. Asterisks indicate the countries that have carried out a national exercise.

The share of the first income quintile is expected to increase as we move from primary to disposable income. Indeed, this happens for all countries but with significant variations from country to country (see Figure 4.2.2.2). The redistributive effect is greatest in Canada and Ireland, where disposable income doubles as compared with primary income in the lowest income group of households. By contrast, in the United States, the share of disposable income of the same group increases only by 1% as compared with primary income, and in Italy, it does not change at all.

Fig. 4.2.2.2: Shares of primary and disposable income allocated to the poorest group of households (bottom quintile). National exercise countries, year around 2015.
(%)



Note: Countries are ranked according to the increasing share of primary income held by the first quintile. Asterisks indicate the countries that have carried out a national exercise.

4.2.3. Inequality in consumption expenditure

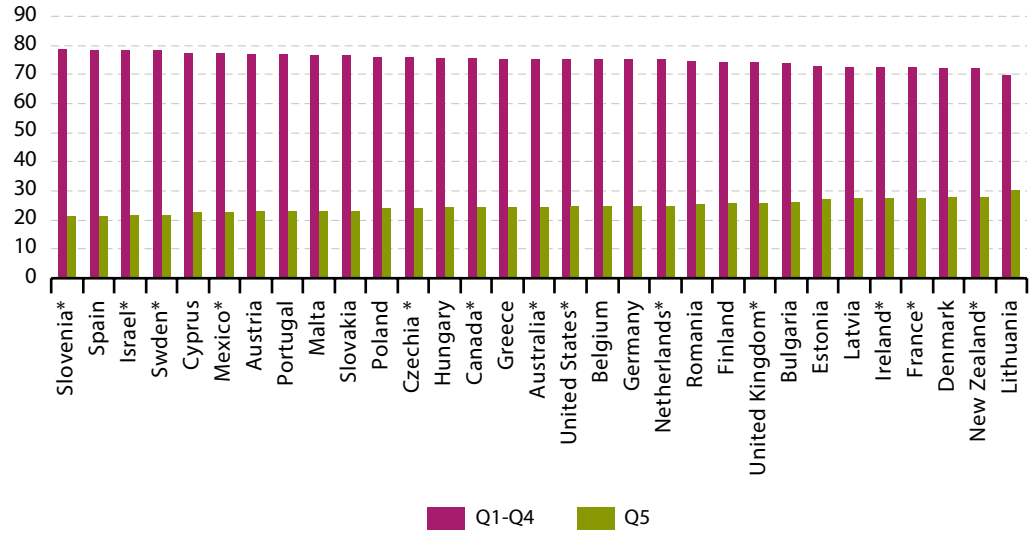
Inequality in terms of consumption expenditure can be highlighted best by comparing the shares of expenditure incurred by the different groups of households. As in the income analysis, we compare the share of consumption expenditure of households belonging to the fifth quintile with the consumption expenditure of all other households. The analysis can be carried out for consumption expenditure as a whole (Figure 4.2.3.1) or for specific consumption categories, such as food and non-alcoholic beverages (Figure 4.2.3.2).

Fig. 4.2.3.1: Shares of total final consumption expenditure spent by households belonging to the first four quintiles (Q1-Q4), and to the fifth quintile (Q5)([1]). Year around 2015.
(%)

Note: Countries are ranked according to the increasing share of total final consumption expenditure made by the fifth quintile. Asterisks indicate the countries that have carried out a national exercise.

([1]) Data on consumption expenditure refer to 2015 with the following exceptions: Germany (2013), Belgium (2014), and Lithuania (2016). Consumption results are not available for Italy, Switzerland, Norway and Island. Consumption is domestic for countries in the centralised exercise and national for countries in the national exercise.

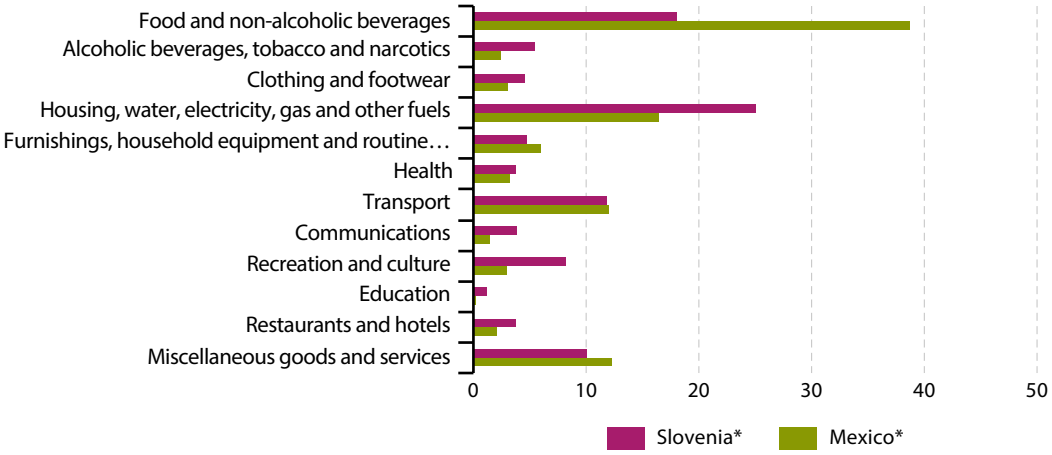
Fig. 4.2.3.2: Shares of food and non-alcoholic beverages expenditure spent by households belonging to the first four quintiles (Q1-Q4) and to the fifth quintile (Q5). Year around 2015.
(%)



Note: Countries are ranked according to the increasing share of food and non-alcoholic expenditure spent by the fifth quintile. Asterisks indicate the countries that have carried out a national exercise. Data on consumption expenditure refer to 2015 with the following exceptions: Germany (2013), Belgium (2014), and Lithuania (2016). Consumption results are not available for Italy, Switzerland, Norway and Island. Consumption is domestic for countries in the centralised exercise and national for countries in the national exercise.

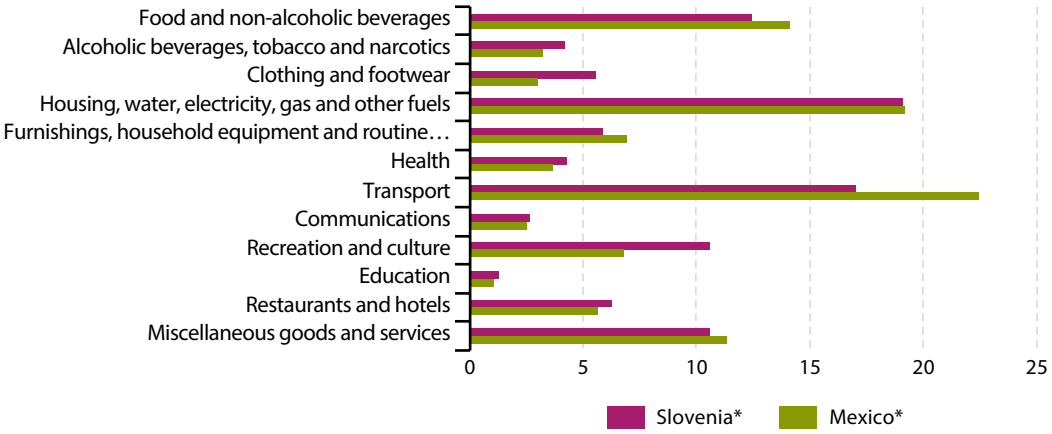
Furthermore, it is possible to investigate if households behave differently in terms of consumption choices, depending on the level of their income. Figures 4.2.3.3 and 4.2.3.4, for example, compare the consumption behaviour of households belonging to the first and fifth quintiles respectively, in the two countries with lowest and highest income distribution inequality, based on the previous analysis.

Fig. 4.2.3.3: Shares of consumption expenditure by kind of consumption for the poorest households, in two countries with a lower (Slovenia) and higher (Mexico) level of income distribution inequality. Year 2015.
(%)



Note: Asterisks indicate the countries that have carried out a national exercise.

Fig. 4.2.3.4: Shares of consumption expenditure by kind of consumption for the richest households, in two countries with a lower (Slovenia) and higher (Mexico) level of income distribution inequality. Year 2015.
(%)



Note: Asterisks indicate the countries that have carried out a national exercise.

For poorest households (see Figure 4.2.3.3) the food and non-alcoholic beverages category represents almost 40% of total expenditure in Mexico, a value much higher than Slovenia's 18 %. This shows that, in particular in countries with pronounced income inequality, households in the lowest income quintile are forced to spend a high share of their income on primary needs. The difference between the two countries is much less relevant when the richest households are compared (see Figure 4.2.3.4); in fact, consumption expenditure for food and non-alcoholic beverages is about 14 % in Mexico and 12.5 % in Slovenia. Interestingly, the share of resources spent on transport increases in the fifth income quintile in both countries, but much more so in Mexico, where the higher income enables households to spend more on private vehicles and leisure travelling. By contrast, expenditure on recreation and culture is much higher in Slovenia, although this expenditure increases very much from the first to the fifth income quintile in both countries.

5 Quality assessment

More insight into the quality of the estimation results of the distribution of income, consumption and savings compatible with the national accounts data is very important. With this, users can better understand how these results have been derived, and make effective use of them in directing policy decisions.

The distributional estimates objectively depend on the quality of the input data. Therefore, it is important that the latter fulfil common quality principles for statistical output. Such principles have been developed and agreed for both the micro and macro statistics domain. For example, in the European Statistics Code of Practice of the European Statistical System, the principles are included in the Common Quality Framework. The principles are also set out in practical terms in the concepts and indicators used for both national accounts ([7]) data and the data sources for micro data, such as the EU-SILC ([8]) and HBS ([9]). Both the micro and the macro data are regularly assessed on the following main quality aspects: relevance; accuracy; timeliness and punctuality; accessibility and clarity; and comparability and coherence.

The quality of the distributional results that combine micro and macro input data might itself be reflected in the light of the above quality aspects.

5.1. Relevance

Relevance is an attribute of statistics measuring the degree to which statistics meet current and potential needs of users. It examines whether all the statistics that are needed are produced, and the extent to which the concepts used (definitions, classifications, etc.) reflect user needs.

Macro statistics are clearly aimed at users interested in the aggregated trends of the general economy, whereas micro data deliver social statistics, which describe the trend in the distribution of resources (income and consumption) in the population. Combined, the distributional national accounts provide a comprehensive and coherent view of the distribution of household economic resources across income, consumption and savings, consistent with economy-wide totals.

The availability of statistics covering the distributional aspects of household income, consumption and wealth, aligned with the national accounts, will help in assessing the social impacts of economic policies and the economic impacts of social policies. It is also an important step in the process of reconciling micro statistics from social surveys with macroeconomic statistics available through the System of National Accounts, thus bringing social indicators in line with macroeconomic governance. In this context, the EG DNA methodology and results have already been providing a valuable input in the ongoing process of the SNA review.

([7]) For example, Quality report on National and Regional Accounts - 2016 data

([8]) EU and National Quality reports, EU-SILC

([9]) Household Budget Survey, 2015 Wave, EU Quality Report

Therefore, the main users of distributional national accounts are policymakers at national and/or international level in the area of population living conditions and social cohesion. As such, DNA can be an important source of information to judge the success of redistributive measures taken at national level. Researchers investigating household economics and social well-being, and journalists, are other end-users of distributional national accounts. Further collaboration between statisticians and policymakers would help to fine-tune the product to fully satisfy user needs.

5.2. Accuracy

Accuracy of statistical outputs, in the general statistical sense, is the degree of closeness of computations or estimates to the exact or true values that the statistics were intended to measure.

The allocation of gaps can only be done with reasonable certainty, and has to be performed using reliable supplementary sources or proxy models. At the national level, imputations for missing items have been made, following the recommendations of the EG DNA guidelines to the extent possible. At the central level, several scenarios were tested, each one of them raising uncertainties as to the results. The impact of the different gap allocation methods has been measured by a sensitivity analysis (Section 3.4). It reveals that the distributional results are highly sensitive to assumptions under the different approaches. While these scenarios are aimed at capturing common issues related to under-reporting and/or under-representation in sample surveys of households of various income groups, they lack not only specific knowledge of the origin of the gaps but also additional (administrative) data sources that could improve the accuracy of the distributional results. Thus, for the time being, and unless supplementary data sources are identified, the accuracy of DNA estimates has to be described as imperfect. In particular, for income and consumption items with poor coverage rates, the accuracy of results may be insufficient (see Section 3.3). Due to a higher uncertainty at both the very top and the very bottom of the distribution, which is inherent to survey data, distributional national results have only been produced for larger household groups. Increasing the granularity of data to small sub-populations would overstretch the accuracy of results that can currently be achieved, at least for countries that cannot rely on micro data from administrative sources.

5.3. Timeliness and punctuality

Timeliness refers to the length of time between data availability and the event or phenomenon they describe. Punctuality is the time lag between the actual delivery of data and the target date on which they were scheduled for release, as announced in an official release calendar, set out by regulations, or previously agreed among partners.

Generally, macro data are produced with both higher frequency and better timeliness than survey data, which are typically available no earlier than T+2 years from the reference year. In addition, some surveys (for example HBS in the EU) are only carried out every 5 years by many countries. The first set of annual macro data are available at T+9 months and, by the time the survey data are published at T+2 years, the national accounts data are already semi-definitive. This partially explains the relatively long time lag in the availability of distributional data aligned with macro totals after the reference period.

Several countries managed to produce longer time series of distributional results. This may have been due to survey data being available annually. It may also be explained by the better frequency of available administrative data (e.g. tax information, administrative registers). Where not in place yet, longer time series with an annual frequency for income are envisaged for the future.

5.4. Accessibility and clarity

Accessibility and clarity pertain to the conditions by which users can obtain, use and interpret data. They reflect the data's information environment, including whether data are accompanied by appropriate metadata and illustrations, such as graphs and maps, and whether information on their quality is also available.

In December 2020, following the work of the EG DNA, distributional results for all involved countries were first published as experimental statistics on the websites of the OECD ([10]) and Eurostat ([11]). These publications include distributional data for income and consumption, detailed methodological information (EG DNA guidelines and a methodological note on the EU centralised exercise), metadata (both for national and centralised exercises), and sensitivity indicators.

At national level, seven countries already published their results: Australia, Canada, France, the Netherlands, New Zealand, Slovenia and the United Kingdom.

5.4. Comparability and coherence

Comparability is the measurement of the impact of differences in the applied statistical concepts, measurement tools and procedures where statistics are compared between geographical areas, sectoral domains, or over time. *Coherence* is the measurement of the adequacy of the data to be reliably combined in different ways and for various uses. The adequacy of statistics that are produced for different primary purposes to be used jointly is assessed through checking for cases where there is a lack of coherence between these statistics. While national statisticians may use different types of underlying data sources and compilation techniques, the EG DNA methodology for aligning micro data to the national accounts totals provides a way to improve comparability of these results across countries and over time. As outlined in the guidelines, the quality of the distributional results greatly depends on the linkage between the macro and micro data (Section 3.2). Thus, information on further national specificities was requested in the metadata sheet of the EG DNA data collection template. These metadata have been published by Eurostat for the EU national exercises and the EU centralised exercise, including general information on the sources used, reference year, household population, national publication of results, and gap allocation method applied (for countries in the centralised exercise). Countries have generally been able to find a micro counterpart for most national accounts items. The data sources include a variety of additional (administrative) information in addition to the available survey data in national authorities.

By contrast, the centralised exercise relies on micro data available from regular social surveys only. These data are deemed comparable across countries and over time since they follow a common harmonised methodology agreed at EU level. The micro-macro links have been defined with best possible conceptual correspondence. While they cover the SNA definition of disposable income, the income item breakdown differs from the one requested in the EG DNA template. Despite the different levels of conceptual comparability and the lack of additional sources (e.g. administrative data, national compilers' knowledge of the gap's origin) that are only available nationally, the survey data at Eurostat provide a suitable basis for experimental distributional national accounts estimates.

([10]) OECD experimental statistics on Household distributional results in line with national accounts

([11]) Eurostat experimental statistics on Income and consumption: Social surveys and national accounts

6 Conclusions and way forward

6.1. Methodological challenges

The production of distributional results for household income, consumption and savings is challenging because it requires the reconciliation of micro- and macroeconomic data. The information needed to group households according to socio-economic characteristics comes from surveys, while the information needed to compile national accounts comes from various independent data sources.

The EG DNA suggests a top-down approach to obtain distributional NA estimates, which means that the totals of NA are distributed among household groups based on surveys or other micro data sources.

The application of this method poses the following main methodological challenges:

1. *How to identify, for each NA item, a counterpart in the micro data source able to represent its distribution?*

   The EG DNA guidelines indicate the steps to follow to obtain the best distributional indicators, based on available statistics. However, for some items, it may be difficult to find a good conceptual match, even using conceptual and classification adjustments. Further collaboration between micro and macro statisticians is needed to bring together economic concepts in this regard.

2. *How to distribute NA imputed items, i.e. those items that do not have a counterpart in micro data sources?*

   Certain items are not covered by micro data at all, since these variables are specific to the System of National Accounts. This concerns, for example, financial intermediation services indirectly measured (FISIM), employers' imputed social contributions, investment income disbursements, social transfers in kind and income from non-observed economy. For these items, one needs to rely on auxiliary data that may be available.

3. *How to align micro and macro results when the nature of the gap is unknown?*

   The top-down approach inevitably implies the need to allocate gaps. Indeed, even if there is a perfect conceptual link, the NA total will not perfectly match with the counterpart aggregate stemming from micro data. The EG DNA suggested some methods to allocate the gaps. However, it is clear that the method applied has a significant impact on inequality measurements. Furthermore, these gaps pose a challenge for explaining the main underlying reasons for these gaps, to users of both micro and NA statistics.

4. *How to make the distributive indicators derived from independent micro data sources coherent with each other to obtain consistent distributional estimates of NA?*

   According to the metadata, countries generally used independent micro data sources to derive distributive indicators for income and consumption expenditure respectively. The coherence of distributional national accounts estimates is better, the more consistent the indicators

derived from the two independent data sources are. In fact, income, consumption, and savings are interlinked economic phenomena. Therefore, the coherence of the micro data sources represents an important starting point for obtaining high-quality estimates of distributional NA. This can be adequately addressed by matching available micro data (survey data, but also administrative data), preferably by record linkage or, if not possible, by statistical matching. A lot of work on this topic has been done by the Eurostat-OECD EG on joint distributions of income, consumption and wealth. However, in order to properly distribute NA items, it is necessary to align micro data to the SNA concepts. In summary, available micro data coming from different data sources should be matched into one unique data set where concepts are aligned to those of the SNA.

The EG DNA developed a methodology to face these challenges and prepared guidelines to obtain the best distributional NA estimates, conditional on the information and data available.

6.2. Lessons from the EG DNA national and centralised exercises

The EG DNA national and centralised exercises followed, to the extent possible, the methodology described in the guidelines by using national and central data respectively. Data and related information are accessible, as experimental statistics, on the Eurostat and OECD websites.

The empirical application pointed to several quality problems, especially for the centralised exercise countries (see Section 3). This obviously depends on the fact that the centralised exercise relies on Eurostat data only. Conversely, national exercise countries searched for the best available data sources, trying to allocate the micro-macro gaps in an informed way.

In any case, it is necessary to recall that all the figures published and presented in this report are experimental and should be interpreted with caution. At this stage, it is not possible to identify what causes the gap between micro- and macroeconomic data and to which part of the population the gap should be allocated and to which extent. In fact, as assessed for the centralised exercise countries, the conceptual link between macro and micro concepts is weak and coverage rates are low in some cases (see Section 3.3). As a general remark, it is important to recall that the relevance and validity of the results should be discussed based on the methodology, sensitivity analysis and quality assessment.

If, on the one hand, prudence is necessary, on the other it is important to underline the significant progress made by EG DNA in these last 10 years. Countries have provided results based on an improved collection template, have taken on board specific improvements in the methodology, and may have benefited from the opportunity to compare results over the three exercises to test the robustness and stability of the results. Some countries, such as France, the Netherlands and Slovenia, have gained the necessary experience to produce and publish DNA regularly. Other countries plan to publish results soon; the Czech Republic and Ireland, for example, aim to publish their first DNA in 2021. Other countries, like Italy, plan to continue working on this issue in view of a future publication. More details can be found in the metadata file published along with the EG DNA results on the Eurostat website.

Finally, the centralised exercise has shown that approximate DNA can be obtained even if using data that is only available centrally. It also highlighted the importance of measuring the impact of different gap allocation methods, which in the end need to be based on informed assumptions.

6.3. Way forward

The EG DNA addressed all issues of the current mandate. These are the main recommendations for further improving the quality of DNA estimates.

- Strengthen the synergy between all stakeholders involved in the production of statistics on the distribution of income, consumption and wealth.
- Pursue the alignment of concepts of the SNA and social surveys, as regards both variables and the population covered, and reduce data gaps by increasing the coverage of key variables.
- Invite countries to build consistent income, consumption and wealth micro datasets, based on micro data from administrative registers and from household surveys, using record linkage and, as a second-best option, statistical matching techniques. The ideal result would be a reliable register where monetary variables covering income, consumption, savings and wealth, compatible with SNA, were available both for individuals and for households.
- Explore possibilities to increase the frequency and timeliness of the results.
- Strengthen the synergy between DNA data users and producers to increase the relevance of DNA by truly fulfilling user needs. This may involve increasing the granularity of DNA estimates, once a sufficient level of accuracy has been reached.

Eurostat and the OECD will continue to contribute to this important project as part of the activities related to the SNA review process.

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List of abbreviations

COICOP	Classification of Individual Consumption by Purpose
DGINS	Directors-General of National Statistical Institutes
DINA	Distributional National Accounts (developed in the World Inequality Database project).
DNA	Distributional National Accounts
EFTA	European Free Trade Association
EG DFA	Expert Group on Distributional Financial Accounts
EG DNA	Expert Group on Disparities in National Accounts
EG ICW	Expert Group on joint distributions of income, consumption and wealth at micro level
EG-LMM	Expert Group on Linking Macro and Micro Data for the Household Sector
ESA	European System of National and Regional Accounts
ESCB	European System of Central Banks
EU	European Union
EU-SILC	European statistics on income and living conditions
FISIM	Financial intermediation services indirectly measured
GDP	Gross Domestic Product
HBS	European household budget survey
HFCS	Household Finance and Consumption Survey
ICW	Income, Consumption and Weath
LEG	Leadership Group
NA	National Accounts
NPISHs	Non-profit institutions serving households
SNA	System of National Accounts
SSFC	Stiglitz-Sen-Fitoussi Commission
STC	ESCB Statistics Committee
STiK	Social transfers in kind
WID	World Inequality Database

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Distributional national account estimates for household income and consumption: methodological issues and experimental results

FINAL REPORT OF THE JOINT OECD-EUROSTAT EXPERT GROUP ON DISPARITIES IN A NATIONAL ACCOUNTS FRAMEWORK (EG DNA).

PDF: KS-TC-21-010-EN-N

Micro and macro economic statistics are built on different frameworks. They differ in their goals, economic concepts and the way data are produced. The System of National Accounts assures comprehensive, coherent and internationally comparable figures for the household sector at the macroeconomic level. Only micro economic statistics, however, can provide information on the distribution of economic resources among individual or groups of households. The OECD, Eurostat and several countries joined efforts to progress on a methodology that bridges the differences, producing estimates on household income and consumption that are in line with national accounts aggregates, but build onto micro data. In this final report of the Joint OECD-Eurostat Expert Group on Disparities in a National Accounts framework (EG DNA), we describe the methodology and present some experimental distributional national accounts for the household sector.

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