II. Ensuring the Consistency of Micro and Macroeconomic Approaches

The first part of this report was dedicated to clarifying the conceptual framework of distributional accounting, which involves the classification of households according to their income and identifying the transfers they receive or contribute to. It stressed the importance of adopting a comprehensive approach to transfers in order to achieve a coherent view of redistribution.

However, redistribution measures are generally based on microeconomic data that only cover a part of income and transfers. Therefore, in order to achieve the objective of exhaustiveness, we propose starting with the broadest scope, i.e. the macroeconomic aggregates of national accounting, and to make use of the various sources of microeconomic data to distribute them, while looking to fill in the missing information. In other words, identifying these differences in scope assumes that the components of national income will be distributed "row by row".

This is the purpose of this second part, which aims to reconcile the microeconomic and macroeconomic approaches to the study of redistribution by means of a method that distributes 100% of national income based as closely as possible on the practices of social statistics and microeconomic studies. Having established the general framework (II.1), the various components of national income are reviewed, starting with disposable income (II.2), the keystone of microeconomic data, followed by adjusted disposable income, i.e. including individualizable collective consumption expenditure such as health and education (II.3), before studying other transfers such as taxes on production and products, followed by non-individualizable public expenditure (II.4). A final section (II.5) then focuses on specific issues relating to the extremes of distribution, very high and very low incomes.

II.1. General Framework

This section presents the conventions proposed by the working group that will allow all income and transfers that make up national income to be distributed to households.

II.1.a. Usable Sources of Information

In order to distribute national income in its entirety, it is necessary to begin with two main sources: on the one hand, there is national accounting data, which are summarised in a table of integrated economic accounts (TIEA), to which are added further outflows from national accounting and, on the other hand, there are various sources of information that micro-found the distribution of income and transfers (see **Recommendation 18**).

The TIEA is based on an international framework of conventions, which allows the exercise to be replicated in other countries. Additional sources may be derived from national accounting satellite accounts, or even taken from the sources used to establish the TIEA. They can be adapted in each country according to the information available. The more detailed the information, the more robust the microeconomic foundations. The TIEA is arranged in institutional sectors (S), non-financial corporations (S11), financial corporations (S12), public authorities (S13), households (S14) and non-profit institutions (S15). In this report, we also make use of the distribution operations identified in the national accounts by the letter D (for example D1 for employee remuneration) and the rows referring to balances associated with the letter B (such as B5n for NNI, which is equal to the balance of net primary income for the various sectors).

Although the national accounts offer a unified and comprehensive framework in line with UN standards, the same cannot be said for microeconomic data. Nevertheless, numerous national initiatives are moving in this direction. In France, for example, the Tax and Social Revenue Survey (ERFS) brings together socio-demographic information from the Labour Force Survey, administrative information from the CNAF, CNAV and CCMSA, and details of income declared to the tax authorities for the purposes of calculating income tax. The ERFS is based on a sample of approximately 50,000 households, which is equivalent to 130,000 individuals and representative of the population living in ordinary housing in metropolitan France. Detailed documentation of the model exists, including in particular deviations from external targets, in terms of both the number of households affected and the total transfers simulated.

The INES[24] open-source microsimulation model draws upon ERFS data in order to microsimulate French social and fiscal legislation. Other databases are also used to allow for the sound simulation of a large number of transfers[25]. This model allows disposable income to be calculated on the basis of labour income and replacement income (unemployment benefits and pensions) by applying the legislation governing social and fiscal transfers (taxes, contributions, benefits and minimum social security benefits). It simulates the majority of direct social and fiscal deductions – social security contributions, the Generalised Social Contribution (CSG), the Social Debt Repayment Contribution (CRDS), income tax, the solidarity tax on wealth/tax on real estate assets (ISF/IFI), payroll tax, etc. – and indirect social and fiscal deductions – VAT, domestic

24 See https://www.insee.fr/fr/information/2021951 for a brief description and https://adullact.net/projects/ines-libre for more details.

25 The model also makes use of data from INSEE's family budget survey, wealth survey and housing survey, as well as DGFiP data on housing tax and the solidarity tax on wealth.

duty on consumption of energy products (TICPE), excise duty – and social security benefits – housing benefits, main minimum social security benefits, employment incentive, family benefits, grants and certain allocated benefits (supplementary universal healthcare coverage (CMUC), supplementary health insurance (ACS) voucher, access and benefit sharing (APA)). The diversity of the variables from the Labour Force Survey that are integrated into the ERFS allows for the fine simulation of socio-fiscal transfers, particularly:

- social security benefits at the bottom end of the distribution, thanks to variables on housing, family situation and the infra-annual employment calendar;

- social security contributions, thanks to employment status (public or private) or hours worked and other corporate deductions based on the company's payroll, thanks to the link between the household and the company in which the individual works, where applicable.

Thanks to its representativeness and the richness of the transfers that it is able to simulate, the INES model forms the basis for the exercise involving the distribution of national income and its components by stratum, which is described below. For this exercise, the data used in the model as inputs are those from the 2016 ERFS, which will allow for the simulation of the various transfers that took place in 2016, the year to which these studies relate.

Other methods can be used to overcome certain shortcomings, in particular to measure the income of the top hundredths and thousandths in detail. Like the data on which the model is based, the simulations concern a particular field, that of ordinary households in metropolitan France (see Section II.5.b). Its sampling does not allow for accurate results beyond the vigintiles in the case of variables with a continuous basis, such as income or wealth, the concentration of which is very high in the uppermost bands. We therefore supplement the ERFS data with comprehensive administrative sources, Garbinti *et al.* (2018) in order to obtain the distribution of income within the final tenth. The FILOSOFI system could also be used in future studies for certain income or transfers at the top end of the distribution (see II.5.a).

It should also be noted that it would not have been possible to use the ERFS to carry out the entirety of the national income distribution exercise. Although the survey is well-suited to the fine measurement of disposable income, direct taxes and benefits-in-kind received, unlike the INES model, it does not allow for an understanding of the distribution of deductions, such as contributions or indirect taxes. In order to retain the same central source, in so far as is possible (see **Recommendation 16**), the distributions on which this report is based are based on the outputs of the INES model.

Finally, the INES model offers the advantage of producing more recent results than the ERFS thanks to recalibration and ageing. When used for its usual purpose, INES makes use of the ERFS for a given year, N, and simulates the transfers for year N+2 by "ageing" the incomes by two years based on aggregated auxiliary information from other sources, and by recalibrating the socio-demographic structure to that of year N+2 in order to reflect the structure and incomes of the population in year N+2. In order to perform this exercise, the INES model has been modified to ensure that the year for which the legislation is being simulated corresponds to the year of the ERFS database

being used. The working group encourages the use of these *nowcasting* methods (see Fontaine and Sicsic (2015)), which are possible with INES-type models, in order to ensure the best match with the publication schedules of the national accounts.

> **Recommendation 20**: Wherever possible, make use of early estimation methods for the present (*nowcasting*) in order to match the dissemination of distributional accounts with that of the national accounts.

II.1.b. From Principles to Practice

The general logic consists of distributing, by standard of living band, the total amounts in billions of euros shown in the rows of the table of integrated economic accounts, in accordance with the proportions estimated by the INES model and the tax data. As was the case with **Recommendation 3** and **Recommendation 5**, the classification variable is household disposable income per consumption unit, i.e. the standard of living of the households, and the tenths are tenths of individuals (the total population is divided into ten equal parts), while the top end of the distribution is divided into twentieths, hundredths and thousandths.

In order to facilitate the definition of reproducible standards, the working group endeavoured to establish a general nomenclature, while adopting a comprehensive overview and a systematic declination. Each income or transfer item in this table is indicated by a DNA.X nomenclature, where X is the row within the complete table. The labour income row (DNA.3.1), for example, is structured as follows:

- Net wages amounted to 712 billion euros in the TIEA in 2016;
- The net wages of the first standard of living tenth in INES correspond to 1.1% of the total net wages, those of the second tenth correspond to 3.4%, through to 25.8% for the final tenth;
- By multiplying the total amount by these distribution coefficients, it is possible to estimate the total amount received by each tenth: the first tenth received 8 billion euros in net wages, the second 24 billion euros, etc.

The broad aggregates of the table of integrated economic accounts are then calculated in the same way for each standard of living band, adding up each of the sub-categories where applicable. This operation does not just apply to household income and transfers, but also to those imputed to other institutional sectors and not usually allocated to households in national accounting, such as retained earnings.

This general method offers several advantages. Firstly, it makes it possible to compensate for the imperfection inherent in surveys or microsimulation models, in which the total of each simulated transfer, deduction or benefit, never matches the amounts in the national accounts to the nearest euro. In general, corrective coefficients are applied in order to perform the recalibration, which works on the assumption that the difference between the simulated amounts and the real amounts is distributed in the

same way. In particular, if the scope of the data source or microsimulation model is limited, the assumption is made that the out-of-scope profile is identical to the data source or microsimulation model (see the discussion in Section II.5.c). Distributional accounting, however, calls for the out-of-scope data to be limited as far as possible by establishing a distributional profile for wider standard of living components that are not usually included.

Secondly, the method can be rolled out to other data or models, such as those with a larger sample size or data from different sources. Although the method used for the DINA exercise in France (Garbinti *et al*, 2018) makes use of different sources and imputations, it produces similar results to those obtained using the INES microsimulation model described in this report.

However, this approach allows for the mixing of different sources in the case of fragmented information within a single source. Indeed, it is preferable to favour a single "core" that brings together as much statistical information as possible on the same households. The underlying correlation between socio-demographic variables (age, family type, employment status, etc.), income and transfer categories, which are primarily based on income and family configuration conditions, is therefore preserved. This approach minimises the imputation assumptions and the statistical matching processes required in order to distribute all of the transfers. In particular, the correlation between wealth distribution and the position on the income scale is often country-specific and difficult to impute if it is not measured. Having all income in a single database, including that associated with wealth and capital stock, ideally arranged by type of asset, is the best way to distribute the most concentrated aggregates, such as retained earnings (RE, see Section 0).

Finally, the approach is modular in the sense that the transparency of its assumptions allows it to be adjusted, transfer by transfer, depending on the country in which it is being applied or even the categories of transfers involved. For example, collective expenditure (see Section II.4) may be distributed uniformly or in proportion to a specific income category, or even in accordance with methods that use information on the actual or potential beneficiaries of the associated public services, and such assumptions can easily be modified. A country that does not have such fine data sources available can adopt profiles taken from the literature, an external database or even another country. In this sense, it allows international comparisons to be made by enabling the application of reasoning such as "what would the redistributive profile of country A look like if it had the same distribution of transfers in kind according to standard of living as country B?" (see Section I.4.d).

These virtuous properties are thanks in particular to the fact that all of the calculations of the various distributions of income and transfers are established with a fixed classification of individuals, in this case according to their standard of living, defined as disposable income per consumption unit. We will therefore begin our exercise of distributing the rows of the table of integrated economic accounts with this notion of disposable income.

II.2. Household Disposable Income

Let us recall at this point the reasons why the working group identified disposable income as a good candidate to form the backbone of distributional accounting (without excluding other approaches, see Section I.2). This quantity is the one that comes closest to the "monetary" income available to households each year: it does not include non-monetary transfers in kind, but does include deferred or replacement income. It is for that very reason that the concept of income is used to define income poverty or to measure actual inequality. It is a concept that is common to both the microeconomic and accounting approaches.

The concept of disposable income in social statistics differs from gross disposable income in national accounting in a number of respects, such as the inclusion of rents (actual and imputed) in the latter and not in the former and the inclusion of housing allowances in the former and not in the latter. In order to reduce this gap, INSEE regularly publishes estimates of the standard of living in social data, which include, as an alternative, an estimate by stratum of imputed rents; in order to complete this reconciliation, it would be appropriate to re-examine the SNA's decision to link housing allowances to transfers in kind, since their amounts depend on an expenditure in the form of rent paid, but, *a contrario*, they are actually paid in cash in the form of benefits, in the same way as minimum social security benefits.

With this in mind, this section describes the various stages of the distribution of the components making up disposable income (DNA.B), starting with the primary income of households and sole proprietorships (II.a), followed by a review of the various deductions, as well as secondary income resulting from public transfers (II.b), before ending with disposable income itself (II.c).

II.2.a. Household Primary Income

The distribution of primary income in the S14 account is made up of two components. The first part corresponds to the wage income of S14.D1, distributed according to the sum of gross wages (DNA.11) and contributions (DNA.7). The information required in order to estimate the distribution can be found in the ERFS data and the INES model. The net salary is taken from tax returns, which are one of the sources for the ERFS data. It is not simulated by the INES model, but is observed within the ERFS.

Next, both employee and employer contributions are finely simulated by the INES model using information available from the Labour Force Survey, another source used by the ERFS. They take account in particular of the characteristics involved in the calculation of exemptions (public/private, hours worked, remuneration amount, etc.). All of the different rates for old age, sickness, family and unemployment benefit contributions are well integrated in the INES model.

Figure 14: Distribution of gross wage income (63% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	1,183	13	39	59	77	97	113	133	158	190	302	188	59	12
Thousand euros per CU	25.7	2.9	8.9	12.7	16.4	21.1	24.9	29.2	34.3	40.8	64.6	100	140	265

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the wages of the wealthiest 10% amounted to 13 billion euros and 2,900 euros per consumption unit.

The second part is made up of net mixed income and wealth (DNA.2, namely the sum of the net mixed income of self-employed persons, including autoentrepreneurs (DNA.2.1), net property income (DNA.2.2) and actual rents paid and imputed by owners net of depreciation (DNA.2.3).

All of these types of income are present in the ERFS data and are recovered within INES in the same way as labour income (administrative tax sources matched to ERFS households). A specific module for the production of the ERFS allows for the estimation of imputed rents on the basis of actual rents and dwelling characteristics (number of rooms, type of dwelling, surface area, etc.). These are the variables that are carried over to the households in the INES model.

Figure 15: Distribution of mixed income and wealth (16% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	300	8	9	13	15	16	19	22	28	42	126	99	49	14
Thousand euros per CU	6.5	1.8	1.9	2.8	3.2	3.6	4.3	4.9	6.2	9.0	27.0	52.5	117	305

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the mixed income and wealth of the wealthiest 10% amounted to 126 billion euros, i.e. 27,000 euros per consumption unit.

II.2.b. Monetary Transfers and Secondary Incomes

The following four sections describe the breakdown of transfers that allow net disposable income (DNA.B) to be established on the basis of income from labour and capital factors (DNA.A). This relates, on the one hand, to deductions corresponding to taxes on income and wealth, as well as social security contributions and, on the other hand, monetary benefits and allowances and other transfers.

Taxes on Income and Wealth (DNA.6)

They correspond to the S11+S12+S14.D5 accounts of the TIEA. Composed primarily of the Generalised Social Contribution (DNA.6.1), income tax (DNA.6.2) and housing tax (DNA.6.4), these deductions are distributed on the basis of the INES model and in accordance with the general logic of the table.

Income tax is simulated within the INES model on the basis of the tax cells present in the ERFS, which are derived from administrative data. The majority of tax credits and reductions are simulated in this way. The same is true of the Generalised Social

Contribution and other social security contributions. Housing tax is not simulated, but is present within the ERFS data during matching with the tax data.

Corporate tax (DNA.6.3 is distributed in the same way as retained earnings in the absence of reconciliation between the data at the level of households and companies (see below). The remainder (DNA.6.5) is distributed at this stage in the same way as the other deductions and may be distributed on the basis of the INES model in the future (the Social Debt Repayment Contribution and solidarity tax on wealth in particular).

Figure 16: Distribution of taxes on income and wealth (15% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	-277	-2	-4	-7	-10	-12	-16	-20	-27	-40	-138	-109	-61	-24
Thousand euros per CU	-6.0	-0.5	-0.9	-1.4	-2.1	-2.7	-3.4	-4.4	-5.9	-8.7	-29.6	-58.1	-144	-510

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the wealthiest 10% paid 138 billion euros in taxes on income and wealth, i.e. 29,600 euros per CU.

Social Security Contributions (DNA.7)

Social security contributions correspond to account S14.D61 in the TIEA and their distribution also follows the overall logic of the table. As a result, pension contributions (DNA.7.1), sickness contributions (DNA.7.2), family contributions (DNA.7.3) and unemployment contributions (NDA.7.4) are based on the distribution obtained by the INES model thanks to the richness of the Labour Force Survey variables and, in particular, the reconstitution of an infra-annual employment calendar.

The profile of contributions for additional organisations (DNA.7.5) is obtained from the INES-OMAR model developed by DREES.

Figure 17: Distribution of social security contributions (25% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	-471	-5	-15	-23	-30	-38	-45	-54	-64	-78	-119	-75	-22	-4
Thousand euros per CU	-10.2	-1.2	-3.5	-4.9	-6.4	-8.3	-9.9	-11.8	-14.0	-16.7	-25.4	-39.7	-52.9	-77.2

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the wealthiest 10% paid 119 billion euros in social security contributions, i.e. 25,400 euros per CU.

Monetary Benefits and Allowances (DNA.8)

Likewise, the transfers of S14, D62 (DNA.8.1 to DNA.8.6) are obtained thanks to the INES model: retirement pensions, unemployment benefits, family benefits, minimum social security benefits and disability pensions. Deferred income from pensions, unemployment benefits and disability benefits is declared income, upstream of the INES model. This is not simulated, but obtained from the ERFS databases. Conversely, family benefits and minimum social security benefits are simulated on the basis of the socio-demographic characteristics, incomes and social scales within the legislation. They could be read out directly from the ERFS database, but the INES model

simulations appear to more closely match the aggregate accounting amounts.

Pending further calculations, daily allowances and compensation for accidents at work (CND.8.7) are distributed in the same way as other benefits. The reimbursements paid by additional organisations are distributed to them using the INES-OMAR model.

Figure 18: Distribution of monetary benefits and allowances (26% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	486	25	35	41	46	45	47	50	54	63	80	41	8	1
Thousand euros per CU	10.6	5.6	8.0	8.7	9.7	9.8	10.3	11.1	11.8	13.5	17.1	22.0	20.1	20.5

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the poorest 10% received 25 billion euros in benefits in kind, i.e. 5,600 euros per CU.

Other Transfers (DNA.9)

In order to arrive at net household disposable income (S14.B6n), the other transfers (S14.D7) still need to be distributed, particularly the other current transfers paid by households (-26 billion in 2016, made up of fines, fees, permits and payments to non-resident households), and income from public authority property (S13.D4) to be paid to households (26 billion in 2016). Since these represent small amounts relative to the other transfers (less than 1% of NNI), the distribution assumption for these adjustments has little effect on the results. The suggested prototype distributes the amount of these evenly for the other current transfers and retains the mix of benefits and deductions in row DNA.4.2 for DNA.9.2. Other assumptions could be adopted, which would not change the redistribution patterns.

II.2.c Distribution of Disposable Income by Standard of Living Tenth

Disposable income, formed in this manner, displays a ratio of 1 to 8.3 between the standard of living of the wealthiest 10% (72,900 euros per CU) and that of the poorest 10% (8,800 euros per CU).

Figure 19: Distribution of net disposable income (including RE, 70% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	1,320	40	64	83	97	108	119	132	152	184	341	231	97	32
Disp. income per CU	28.7	8.8	14.3	17.9	20.7	23.4	26.0	29.0	33.0	39.4	72.9	123	229	676

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the wealthiest 10% had a net disposable income, including RE, of 341 billion euros, i.e. 72,900 euros per CU.

Based on much more significant primary inequality (1 to 22 for wages and 1 to 15 for mixed income and wealth), these gaps are reduced by taxes on income and wealth and social security contributions (1 to 60 and 1 to 21, respectively), as well as social security benefits paid in cash (including pensions and unemployment benefits), which amount to 5,600 euros per consumption unit for the poorest 10% and 17,100 euros for the wealthiest 10%.

II.3. Household Net Adjusted Disposable Income

In national accounting, adjusted disposable income is a quantity that is deducted from disposable income by adding public transfers in kind. These are valued by means of public collective consumption expenditure, referred to as "individualizable", such as health, education and even housing.

Health Expenditure

The distribution of health expenditure presents a significant challenge, due to the high level of reimbursement expenditure (€176 billion in 2016, i.e. 9% of NNI) as well as the degree to which health care systems are public depending on the country in question.

The French health insurance system is divided between compulsory health insurance (AMO, 78% of consumption of medical care and products (CBSM)) and supplementary health insurance (AMC, 13.4% of CBSM), as per Gonzalez *et al.* (2019) Contributions for compulsory health insurance are based on income, while the rate of reimbursement differs according to the type of care or patient. In addition, assistance such as supplementary universal healthcare coverage (CMUC) and supplementary health insurance (ACS) are aimed at the poorest households. The poorest households may have poorer health, implying that the healthcare profile varies with standard of living. This has the potential to have a significant impact on income, and it is important that any such impact is measured accurately.

The INES-OMAR[26] model allows health expenditure to be broken down and finely distributed to households. Developed and maintained by DREES, it is based on the Health, Health Care and Insurance Survey (ESPS) (IRDES, DREES). This database provides a representative sample of households in ordinary housing in metropolitan France and contains socio-demographic information (income, health status and type of supplementary coverage). The survey is matched with administrative data regarding health insurance reimbursements (National Health Insurance Fund (CNAM), National Health Data System (SNDS)), which provide expenditure presented for reimbursement and AMO reimbursements. The model is based on the survey regarding the most popular contracts with supplementary health insurance organisations (DREES), which provides cover broken down by type of care, as well as the amount of the premiums and the number of beneficiaries. Health expenditure data are taken from the 2017 version of the OMAR model.

This provisional version of the INES-OMAR 2017 model is primarily based on the 2017 Statistics on Income and Living Conditions (SILC), a representative sample of households in ordinary housing in metropolitan France, which contains a great deal of socio-demographic information, including income and type of supplementary cover. Health expenditure is imputed on the basis of the ESPS-EHIS 2014 matched to the SNDS and covers the scope of individualizable services presented for reimbursement in the community and in healthcare establishments (public and private hospitals,

26 A presentation was given by the Bureau of National Health Insurance and the DREES studies on health expenditure in September 2019, for which more precise information is available.

medicine/surgery/obstetrics, psychiatry, follow-up and rehabilitation, home-based care), excluding welfare. The premiums and reimbursements for supplementary insurance are taken from the survey of the most popular contracts taken out with supplementary insurers in 2016. Therefore, the distribution of expenditure by standard of living tenth relates to 2014, while the distributions of contributions and reimbursements for supplementary health care correspond to 2016.

These studies allow AMO expenditure to be distributed according to standard of living (DNA.10.1). This model also allows for the distribution of contributions and reimbursements from supplementary health care organisations (DNA.7.5 and DNA.8.6, respectively).

The resulting profile of reimbursed expenditure decreases slightly overall on the basis of standard of living (see Figure 20 below), with this effect being amplified when hospital reimbursements for long-term psychiatric stays (PSY), home-based care (HAD) and follow-up and rehabilitation care (SSR) are included. The aim here is not to provide an interpretation of welfare, but to provide a breakdown of public transfers according to standard of living.

Education and Higher Education

The other main type of individualizable transfers in kind is education expenditure (€101 billion, 5% of NNI). This relates to primary and secondary education on the one hand and higher education on the other hand.

There is little data available that would allow this educational expenditure to be compared with the standard of living of households. To the best of our knowledge, there is no model that simulates educational benefits at the microeconomic level.

The general principle applied for the distribution of educational expenditure is to establish an educational benefit for each child within a household, the value of which is linked to the level and nature of the education they are receiving. The more detailed the data on children's education, the more precise this method proves to be. As a minimum, children's ages can be used to differentiate between primary, secondary and higher education.

In practice, this involves using data on pupil and student numbers that are considered homogeneous in terms of educational costs and then multiplying them by the average costs found in the education accounts. For the prototype distributed national accounts referred to in this report, two types of calculation are made, one for primary and secondary schooling and the other for higher education.

As regards primary and secondary education, the age and number of children in the ERFS data is used to assign a per-child cost to each household where applicable (taking the average cost per level – primary and secondary – according to the education account). This then allows costs to be distributed by standard of living tenth by aggregating the data for all households in each band.

Two different situations exist for students.

- If they are cohabiting (i.e. living in the same household as their parents),

higher education expenditure is allocated to the household to which they belong;

- If they are not cohabiting, the usual scope of monetary redistribution excludes households in which the reference person is a student (see Section II.5.b). Furthermore, the studies carried out on the basis of the ENRJ survey by INSEE and DREES have shown that it is inappropriate to consider them as separate households in their own right. They would then be considered as having no income, even though they receive private transfers and are mainly from the wealthiest households. Therefore, at this preliminary stage of the prototype distributed accounts, the population of non-cohabiting students, and therefore the related expenditure, is distributed by standard of living tenth, as per the ENRJ survey.

The average cost per student is assumed to be the same across all types of higher education, so no distinction is made between universities, preparatory classes and technological courses. There is considerable room for improvement in this respect by making this distinction of average cost in accordance with the education account and by making use of the variables from the Labour Force Survey.

Educational expenditure is then aggregated by standard of living band by adding together the amounts obtained in this manner for primary, secondary and higher education. The profile obtained for educational expenditure is redistributive and decreases from 14% for the first tenth to 9% for the final tenth. This effect is based on the demographic profile and the composition of the families within the tenths.

Social Welfare and Other Cultural and Associative Activities

These two entries in account D63 are less important and represent €63 billion (3% of NNI) and €38 billion (2% of NNI), respectively. The first, which includes in particular the care package received in retirement homes or long-term care units, the childcare supplement (CMG) and non-profit medico-social accommodation is therefore distributed as a weighted average between the transfers simulated in INES (APA and CMG) in the absence of additional data, and the missing amounts are distributed as family benefits (with a redistributive profile). Non-profit cultural and associative activities, which include in particular sporting, creative, artistic and performing arts activities, are uniformly distributed (i.e. 10% for each tenth).

Housing

The final type of individualizable social transfers in kind is housing expenditure (€16 billion, 1% of NNI). This relates to housing allowances paid to households that are renting their property and are dependent on household income, geographical area and partly on the cost of the rent. The amounts of the allowances are simulated in the INES model based on information present in the ERFS. Like the principle adopted for the other transfers in the table, accounting expenditure is distributed according to the simulated profile, which is heavily concentrated on the first standard of living tenths.

Distribution of net adjusted disposable income

Finally, adjusted disposable income stood at 37,200 euros in 2016 and ranged from 20,800 euros for the 10% of people with the lowest standard of living to 79,400 euros for the wealthiest 10%, 236,000 euros for the top 1% of the distribution and 682,000 for the top thousandth (*top 0.1%*).

Benefits in kind demonstrate a decreasing profile. They increase within the first standard of living tenth (compared with the top tenth), amounting to 4,200 euros per consumption unit for health (compared with 3,300), 3,100 euros for education (compared with 2,000), 2,200 for social welfare (compared with 400) and 1,600 euros for housing (compared with 0).

Figure 20: Distribution of net adjusted disposable income (incl. RE, 91% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	1,714	94	116	129	139	145	155	164	185	216	372	247	100	32
Adjusted disposable income (thousand euros/CU)	37.2	20.8	26.0	27.7	29.6	31.4	33.9	36.0	40.1	46.3	79.4	131	236	682
Of which disposable income	28.7	8.8	14.3	17.9	20.7	23.4	26.0	29.0	33.0	39.4	72.9	123	229	676
Health	*3.8*	*4.2*	*4.7*	*4.2*	*4.2*	*3.7*	*3.8*	*3.0*	*3.6*	*3.7*	*3.3*			
Education	*2.2*	*3.1*	*2.7*	*2.3*	*2.0*	*2.1*	*1.9*	*1.9*	*1.9*	*1.9*	*2.0*			
Social welfare	*1.4*	*2.2*	*2.4*	*1.9*	*1.6*	*1.3*	*1.3*	*1.2*	*0.9*	*0.5*	*0.4*			
Housing	*0.4*	*1.6*	*1.0*	*0.5*	*0.2*	*0.1*	*0.1*	*0*	*0*	*0*	*0*			

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, the adjusted disposable income, including RE, of the wealthiest 10% amounted to 372 billion euros (79,400 euros per consumption unit).

II.4. Other Components of National Income

We have so far detailed the income that the national accounts attribute directly to the household sector, as well as individual consumption expenditure by the public authorities (also attributed to households by means of the concept of adjusted disposable income). This income does not cover national income in its entirety: the remaining fraction is assigned to the public authorities, to companies and to non-profit corporations.

One of the most interesting things about national income is that it is the income indicator most directly linked to GDP, which is the most commented on aggregate in national accounting. Indeed, the following equation can be written:

NNI = GDP – fixed capital consumption + net income from the rest of the world

In order to calculate net national income on the basis of GDP, one must first subtract fixed capital consumption (i.e. capital depreciation). We have previously

provided justification for measuring income net of capital depreciation, and we continue to follow that principle here.

The net income from the rest of the world (RoW) must then be added, i.e. the income produced in France but held abroad must be subtracted and the income produced abroad but held in France must be added. French GDP amounted to 2,234 billion euros in 2016. In comparison, net national income was 1,881 billion euros. In order to get from one to the other, 400 billion euros of fixed capital consumption are subtracted and 48 billion euros of net income from the rest of the world are added.

Therefore, in order to establish the distribution of national income before transfers by standard of living stratum, account must be taken of the following value added components, which are added to the primary income of households:

- Taxes on production and consumption (300 billion euros) and the net operating surplus and net property income of the public authorities (-26 billion euros)

- Net primary income of companies (124 billion euros, 55 billion of which are paid in corporate income tax).

Finally, the distribution of national income after transfers is deducted from that of disposable income by adding the following, stratum by stratum:

- Gross collective consumption expenditure of FCC (183 billion euros).

- Net savings of the public authorities (-60 billion euros).

With the exception of corporate income (financial and non-financial corporate sectors)[27], these items fall under the public authorities sector and are discussed in the following section.

II.4.a. The Public Authorities Sector

National accounting adds the primary income of public authorities to the primary income of households or the private sector. Indeed, part of their value added to market prices is constituted in resources by levies on production and products and in uses by means of production subsidies (see the detailed discussion in Section III.1.d). In national accounting, factor income is established by deducting taxes on production and products from the value added to the market prices. In distributional accounting, the opposite reasoning is applied: the distributional profile of value added is established by adding a distributional profile of taxes on products and production, which is simulated on the basis of tax incidence assumptions (essentially the assumption of proportionality to

27 In the interests of simplicity, we are including the primary income of non-profit institutions (very small) in primary corporate income here. Public authorities receive a primary income that is primarily made up of taxes on production and consumption, net of the production subsidies that they pay.

consumption, see below) to the distributional profile of factor income, which is observed.

The distribution of income in the public authorities sector is broken down into two stages. These resources are calculated within the scope of the TIEA distribution operations, within rows D2 and D3. Each of the available deductions is distributed by standard of living group, following the distribution observed in the INES model data as far as is possible. As regards VAT, TICPE and excise duties, these are distributed as observed consumption (see the discussion in Section II.4.a). The remainder is distributed as the total of the rest.

In addition, the property income paid out and the net operating surplus (NOS) of the public authorities must be distributed before the NNI can be calculated. They are distributed as an average of deductions paid and benefits received. It is this distribution by standard of living group, and in particular of levies on production and consumption, that allows us to obtain a breakdown of income before transfers.

Finally, as is the case for the balance of income between resident and non-resident households (see below), it would, strictly speaking, be necessary to draw a distinction between taxes paid by non-residents, particularly VAT paid by tourists, and which may vary from one country to the next.

The public authorities have a primary income of 274 billion euros, of which -26 billion is net operating surplus and net property income of the public authorities. The bulk of this aggregate (300 billion) is comprised of taxes on products and production (minus subsidies, i.e. D2-D3): primarily VAT, but also property tax or payroll tax. The total of 300 billion is then equal to the sum of each of the deductions, both in terms of the aggregate amount and for each standard of living group. This gives the row, marked as DNA.4, for the primary income of the public authorities:

Figure 21: Distribution of the primary income of the public authorities (16% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	274	16	18	20	22	25	27	29	32	38	50	31	11	3
Thousand euros per CU	6.0	3.5	4.0	4.4	4.7	5.4	5.8	6.3	6.8	8.1	10.6			

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading Note: The primary income of the public authorities amounts to 274 billion euros, 16 billion of which are received by the first standard of living tenth, with 50 billion being received by the wealthiest 10%.

Taxes on Production and Consumption

According to national accounting conventions, taxes on consumption are included in a separate institutional sector of consumption and goods and services, and not an income that is subtracted from household income after tax, as would be the case for a direct tax.

Two discussions are needed on the subject of the integration of product taxes, and therefore of VAT, in distributional accounting. On the one hand, which data form the basis for the distribution of these taxes and is this based on income or consumption? This is the subject of the following paragraphs, the outcome having been presented

earlier in the table in Figure 21. On the other hand, how can the amounts deducted in the form of consumption taxes be integrated into a national income that may be valued at basic prices or market prices? Section III.1.d details the associated challenges.

As regards the first aspect, the question can be rephrased as: what is the distributional impact of a change in prices following a change to VAT? There are two possible responses to this question. The first consists of stating that the reduction in prices benefits everyone: the nominal reduction in income is borne by the public authorities, while the fall in the deflator increases income for all. As a result, the impact on the distribution of incomes is neutral and the VAT is to be distributed proportionally.

Alvaredo *et al.* (2016) adopts this first approach as a reference assumption: taxes on production are distributed in proportion to factor income (labour and capital), with the exception of those with a clearly identified taxable base (for example property tax, which is distributed in proportion to rental income, both actual and imputed). This solution has the benefit of being simple and not especially demanding in terms of the data required.

The second approach that we take involves stating that the reduction in prices primarily benefits consumers (since VAT generally excludes capital goods) and distributing VAT in proportion to consumption. This second solution offers the advantage of being consistent with the standard approaches, which interpret VAT as a consumption tax.

If VAT is allocated on the basis of consumption, it is desirable to take account of the way in which the effective VAT rate varies according to the basket of consumer goods, which will itself vary depending on income. It should be noted that, if we were to follow this logic to its logical conclusion, we would have to systematically distribute inflation differently to individuals, even though this difference is, in principle, of secondary importance. This is possible in theory, but, as was demonstrated in the study by Jaravel (2019), would require highly detailed data in order to be performed to a satisfactory level.

Recent studies by INSEE on the redistributive effects of an increase in VAT make use of consumption data gathered by the family budget survey. André and Biotteau (2019) make use of the INES model and its indirect taxation module in order to integrate the delayed effects of a price increase following an increase in VAT. This approach allows for a detailed breakdown of changes in income and transfers, particularly social security benefits.

As part of a study into inequality in Europe, Blanchet, Chancel and Gethin (2018) tested a number of alternative hypotheses and found that, at the European level, distributing taxes on products in proportion to consumption changes the share of income held by the richest 10% by around 2 to 3 percentage points, without having any significant impact on the trend. Distributing VAT in proportion to consumption makes the poorest people pay more tax in proportion to their income. This has the effect of reducing inequality in income before tax. Since income after tax is not affected, this also has the effect of rendering the tax system less progressive overall.

However, studies of this type rely on microeconomic data that are not always available. As was demonstrated by the studies by Blasco, Guillaud and Zemmour (2020)

on international data, the share of income consumed varies across the income distribution scale: 100% for D1 compared with 50% for D10. Based on a distributional model of household consumption, these studies suggest that it is not necessary to know the basket of goods consumed by households based on their income in order to capture the most significant part of the redistributive effect of VAT. They demonstrate that the differences between countries are primarily explained by variations in the average VAT rates applied.

In the prototype distributed national accounts proposed by the working group, VAT and TICPE are distributed by means of the indirect taxation module of the INES model (André, Biotteau and Duval (2016)). The distribution is therefore based on consumption data taken from INSEE's Family Budget Survey, which have been statistically matched to the ERFS data (DNA.5.1 and DNA.5.2).

In addition, property tax on built properties (TFPB) is distributed according to preliminary studies carried out within INSEE's studies department (DNA.5.3). Other taxes (DNA.5.4) adopt the profile of the previous ones in the absence of available additional information.

Other Primary Incomes

The other component making up the primary income of the public authorities (-26 billion) is property income of the public authorities (D4). This component is generally negative, as it includes the payment of interest on national debt (41.5 billion in 2016).

What role does this component play in the distribution of income? At the aggregated level, the impact of interest on debt is relatively neutral with regard to national income, since it is primarily a transfer between the public authorities sector and the households sector. From a distributional point of view, this relative neutrality disappears. Indeed, the entire community pays interest, but it benefits the – generally wealthy and non-resident – households that hold (most often indirectly) the debt securities. The convention in DINA (Alvaredo *et al.*, 2016) is to allocate this income proportionally to factor income. However, since the distribution of debt securities is generally less equal than that of income, the payment of interest on debt increases inequality and there may be justification for distributing it more than proportionally. Nevertheless, given the amounts involved, the impact of any particular assumption is small.

In practice, there is also a small, but not non-existent component referred to as net operating surplus of the public authorities. The convention in national accounting is to consider the net operating surplus of the public authorities to be zero. This convention was adopted because it is impossible to directly ascertain the market price of government activities, which are, by definition, carried out at prices that are not economically significant. Nevertheless, some public authority activities are still carried out in a market setting, for example when local authorities engage in market production in connection with transport, water or sanitation, which contributes to their non-zero net operating surplus. The contribution that this element makes to the primary income of the public authorities is negligible in practice.

In the prototype distributed national accounts proposed by the working group, this component of primary income is distributed as the average between benefits and deductions (DNA.4.2). The property income of the public authorities (14.8 billion in 2016) could also be distributed differently, for example in accordance with the contributory capacity of households as measured by net savings. As regards the debt burden, it might be more accurate to separate out interest paid in the rest of the world in order to distribute this differently to the interest paid by resident households.

Collective Consumption Expenditure

In 2016, the collective consumption expenditure of the public authorities amounted to 183 billion euros (gross FCC accounts). This component includes expenditure such as defence, police, justice and the operation of the government. The distribution of this expenditure raises more conceptual issues than that of individualizable consumption expenditure (see Section III.2.b).

At this stage, the suggested approaches remain exploratory. There is no consensus on the issue, nor have there been any research studies that we are aware of that explore this in detail. Two polar normative assumptions can be considered: flat-rate distribution or distribution in proportion to income.

Flat rate distribution suggests that each individual benefits equally from collective consumption expenditure: it therefore has a strong equalising effect on the distribution of income after transfers. Conversely, proportional distribution considers public goods to be neutral from the point of view of distribution. The latter approach can be interpreted as a service rendered in proportion to income[28].

Is it possible to refine these two approaches using microfounded methods? One option explored in this report involves valuing public services according to their geographical accessibility. The territorial distribution of expenditure by the public authorities can be used for this purpose. In particular, it is possible to know how the civil service payroll is distributed across the national territory, and to use that data to modulate the distribution of collective consumption expenditure. This approach raises some questions, and it is certainly more appropriate for some types of expenditure (such as the police) than others (such as government operating expenditure).

All of these approaches are still preliminary. There is no doubt that it is desirable at this stage to test several hypotheses in a simple and transparent manner to see the extent to which they affect inequality levels and trends. This could allow for a better understanding of how public consumption expenditure affects citizens differently.

The average salary of government and local authority employees is calculated for each living area (department, living zone, etc.). This average expenditure is then allocated to each household in the INES model and then averaged by standard of living tenth (DNA.11.1 and DNA.11.2). It is notable that, in spite of marked geographical

28 Taking this logic further, a specific approach for certain items of expenditure, such as for the national policing budget, one of the missions of which is to protect property, would consist of distributing them in proportion to the value of that property, i.e. to the wealth. That would have the effect of making such expenditure anti-redistributive. This goes beyond the scope of a distributional accounting exercise without substantially changing its overall results.

disparities, the distribution obtained is close to the uniform distribution[29].

Figure 22: Distribution of collective expenditure (16% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P99	P99.9
Billion euros	183	23	21	19	18	17	16	17	17	17	17		
Geographically microfounded method *	4.0	5.1	4.7	4.0	3.9	3.7	3.6	3.8	3.7	3.7	3.7		
Flat rate method *	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Proportional method *	4.0	2.5	3.0	3.1	3.3	3.4	3.7	3.9	4.2	4.8	7.9	23.3	66.8

Sources: prototype distributed national accounts for 2016, authors' calculations. (*) thousand euros/CU
Reading note: in 2016, collective expenditure represented 183 billion euros, 23 billion of which was for the poorest 10%, i.e. 5,100 euros per CU.

Net Savings of Public Authorities

The gross savings of the public authorities (B8g, 14.6 billion euros in 2016) corresponds to the difference between their revenue and their expenditure, excluding investment expenditure. The net savings of the public authorities (B8n) is equal to the gross savings minus fixed capital consumption (FCC), which measures the investments that will need to be made in order to reconstitute the capital (in this case, public assets). Negative net savings means that the primary balance of the public authorities (revenue minus current expenditure) is not sufficient to maintain public assets at the same level.

This net savings balance of the public authorities must be included if you are looking to ensure that income after transfers is equal to national income. Otherwise, the underinvestment by the public authorities would result in the economy as a whole being richer after transfers than before transfers. This negative balance only represents a small proportion of total transfers, so the impact of the imputation assumptions is limited.

Alvaredo *et al.* (2016) allocate the balance of transfers, which can be considered as a deficit or surplus of fixed capital investment capacity[30], at 50% in proportion to taxes and 50% in proportion to allowances and transfers in kind. This choice is based on the idea that, in the absence of provisions governing the way in which a deficit is to be remedied, the assumption that this will be achieved through a combination of increased deductions and reduced benefits is the most likely. A neutral approach to redistribution could also be based on proportional distribution. In the prototype distributed national accounts proposed by the working group, the net savings of the public authorities is distributed as the average between deductions and benefits

29 In the prototype distributed national accounts proposed by the working group, the distribution of collective expenditure is based on the ERFS data for each department. An identical study was carried out on the basis of the DADS administrative data by disaggregating the total salaries paid to government employees to the households in each department. The profile obtained by further aggregating by tenths of households is similar to that obtained with the ERFS. Robustness studies have shown that the distribution by tenths is also similar when carried out at the level of living zones, departments or prefectural districts.

30 The deficit within the meaning of the Maastricht criteria regarding imbalance in public accounts is shown in B9NF in the TIEA (79.1 billion in 2016).

(DNA.13.1).

II.4.b. Corporate Income and Retained Earnings

The business sector has 124 billion euros in net primary income. Companies pay 55 billion euros in corporate income tax on that income. Net of corporate income tax, this represents 3% of national income (69 billion). There are several reasons why it is of interest to distribute any income beyond that amount to households. Firstly, this income forms part of the national income; it must therefore be distributed to allow for an understanding of how the wealth produced is used and distributed among the population.

Secondly, the boundary between the household sector and the corporate sector is porous. Some tax incentives may result in corporate income remaining within the companies or even being redistributed to shareholders without bringing about any change in the standard of living of the individuals concerned. One of the best examples of this is the 1986 tax reform in the United States. In the United States, the owner of a company can choose between two legal forms: *S-corporations* and *C-corporations*. Large companies tend to choose to be *C-corporations*. This means that they are subject to corporate income tax. They can pay dividends to shareholders, which are then subject to federal income tax. Small companies generally choose to be *S-corporations*. In this case, they are not subject to corporate income tax. Instead, the profit made by these companies is directly included in the taxable income of their owners, who must pay federal income tax. There are many reasons why a company would choose one legal form over another. However, for marginal companies, it is mainly a question of tax arbitrage. The 1986 tax reform brought the marginal income tax rate to below the corporate income tax rate. As a result, many business owners have been prompted to change the legal form of their companies from *C-corporations* to *S-corporations*. During the two years that followed, a large amount of capital income appeared in the tax statistics as a result of this change. This brought about a significant increase in inequality with regard to taxable income during those two years. A change of this nature in the corresponding series is the result of a legal change without economic significance and is therefore not desirable.

One of the objectives pursued by Piketty, Saez and Zucman (2018) was to correct for these effects by taking account of the retained earnings of companies. More recently, in 2005, Norway underwent a similar reform. Alstadsæter *et al.* (2016) performed a detailed analysis of the impact of this reform on inequality, taking advantage of the highly detailed administrative data available in Norway. They show that, around the time of the reform, significant breaks are seen in the series concerning the level of inequality (share of the richest 0.1%) and mobility at the top end of the distribution (probability of remaining in the richest 0.1% from one year to the next). By allocating retained earnings to the individuals who own the corresponding companies, these effects disappear. In France, Boissel and Matray (2019) demonstrate that, in response to an increase in taxes on dividends for some firms, those firms have significantly reduced their dividends, but only a fraction of the additional savings are actually used for further investment.

Thirdly, where companies retain their profits rather than redistributing them, they

increase their assets, which mechanically contributes to increasing the company's value. This increase in the value of the company constitutes an unrealised gain for its owners. This increases their wealth and therefore constitutes income in the Hicksian sense of the word. It should be noted at this point that national income in the sense of national accounting does not directly include capital gains. Although they are of interest, these capital gains are highly volatile and difficult to measure, and their inclusion in inequality statistics raises a number of challenges (see Robbins (2018) for a discussion regarding the situation in the United States). The price of the assets can vary massively in the short term, sometimes without any real reason. The retained earnings of companies are more stable in comparison. Their inclusion makes it possible to take account of an important structural factor in the increase in the value of companies without having to deal with variations in market prices, which are often erratic and excessive.

Fourthly, it is desirable to take these profits into account if corporate income tax is also to be included in the redistribution analysis. Corporate income tax constitutes a significant part of the taxation of capital within the economy. It is also a tax that is largely paid by the wealthiest people. Excluding corporate income tax from the redistribution analysis would result in the progressiveness of the tax system being underestimated. However, it would not be consistent to make individuals pay this tax without also assigning the income on which the tax is paid to those same individuals.

A distinction must be made between two issues underlying the distribution of retained earnings. On the one hand is the issue of knowing who to assign these profits to. On the other hand is the issue of knowing how to perform this distribution in practice, given the limitations of the data. As regards the first issue, the consensus seems to be that these profits should be distributed to the owners of the companies in question (see also Section II.5.2). One aspect that has been raised involves knowing whether it is desirable to distribute the retained earnings in their entirety. Indeed, the tax arbitrage effects discussed above with regard to the taxation of companies and dividends must be observed at the margin. In other words, it could be considered that part of the cash flow of companies is treated by shareholders as part of their own income, while the rest is considered as belonging more fundamentally to the company. Following this principle, only the first aggregate would be attributed to individuals. In practice, distinguishing between these two aggregates raises significant technical and conceptual difficulties. Moreover, it is not uncommon for the retained earnings of companies (following the payment of corporate income tax) to be close to zero (or even negative in extreme cases), which suggests that the aggregate to be distributed is largely dominant. Finally, this raises the question as to what happens to the aggregate that is not distributed. As things stand, it is more simple and more direct to distribute retained earnings in their entirety.

As regards the second question, a number of issues have been raised. In an ideal world, it would be possible to link individuals' tax revenues with the accounts of the companies they own (see Alstadsæter *et al*. (2016) for such a case in Norway). The data do not currently allow for such a degree of precision. Alvaredo *et al*. (2016) distribute these profits in proportion to the value of the shares held in companies (directly or indirectly). However, these company shares are themselves imputed on the basis of the dividends received (due to the use of the capitalisation method, Saez et Zucman (2016)). In practice, retained earnings are therefore imputed in proportion to distributed profits, i.e. the dividends received by households in the ERFS data of the INES model.

Figure 23: Distribution of retained earnings net of corporate income tax (2% of NNI)

	Total	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	P95	P99	P99.9
Billion euros	44	0	0	0	0	0	1	1	2	4	35	31	22	11
Thousand euros per CU	1.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.5	0.8	7.4	16.7	53.2	239.1

Sources: prototype distributed national accounts for 2016, authors' calculations.
Reading note: in 2016, retained earnings net of corporate income tax amounted to 44 billion euros, 35 billion of which were paid out to the wealthiest 10% (7,400 euros per CU).

Without making any claim that such an assumption is systematic at the individual level, the question surrounds the extent to which it provides plausible distribution results. The main effect of this is that corporate ownership is highly concentrated, which results in these retained earnings making up a large share of the profits of the wealthiest people. It would be worthwhile exploring this issue in the future and seeing whether improved data would allow it to be handled in a more satisfactory manner.

Another issue concerns the allocation of capital depreciation to individuals. The calculation of this depreciation in national accounting is based on conventions that are sometimes arbitrary, and that are not always directly comparable from one country to the next. By distributing the *net* primary income of companies directly to individuals, it is implicitly assumed that the overall depreciation rate applies uniformly to all companies. It would be desirable to explore opportunities for improvement here too. However, this would require precise data on companies' balance sheets.

Alvaredo *et al*. (2016) also take account of the fact that, in certain countries at least, the public authorities hold a significant share in national companies. A fraction of the retained earnings is therefore allocated to the government and handled in the same way as government property income from a distributional point of view. This fraction is calculated on the basis of the proportion of shares owned by households and the public authorities within the wealth accounts. In France, it is therefore estimated that 25% of retained earnings can be allocated to the public authorities. The corresponding income is therefore reallocated to them and is handled similarly to the property income of the public authorities.

This is a case of distributing national corporate income to "national households", in other words there may be a balance between resident households when it comes to corporate savings (shares owned by non-resident households on the one hand and shares owned abroad on the other hand). This amounts, for example, to allocating retained earnings from foreign pension funds that are to be paid out to non-residents to resident households. Likewise, this convention fails to take account of the fact that French households hold shares in non-resident companies, either directly or *via* investments. For a country like France, this framework is a priori relatively neutral, but for other countries, such as Ireland, this convention must be interpreted with caution.

In order to develop international accounting conventions that are suitable for all situations, it is therefore necessary to allocate to the rest of the world the retained earnings of companies according to the national economy that they fall under. Conversely, the retained earnings from abroad must also be repatriated and distributed to resident households. This only concerns portfolio investments in shares, since a D43

transaction imputes the property income associated with foreign direct investment (FDI).

Assuming that the profitability of portfolio investments in shares is the same as the profitability of FDI[31], it is possible to deduce the imputed income related to portfolio investment stocks on the basis of data from Banque de France[32]. Therefore, in 2016, for the D43 transaction, the use of S2 = 14.2 billion corresponds to the imputed income for French households from retained earnings from FDI abroad; for the D43 transaction, the resource of S2 = 7.9 billion corresponds to the imputed income for foreign households of retained earnings from FDI in France. The imputed income for French households in connection with retained earnings from portfolio investments abroad therefore amounts to 5.7 billion euros and the imputed income for foreign households in connection with portfolio investments in France amounts to 8.1 billion euros.

This provides two options for taking account of this reality. The first method may consist of modifying the total distributed national income by adding the balance of retained earnings from the rest of the world (8.1 - 5.7 billion euros for France in 2016). However, the disadvantage of this is that it departs from the international accounting framework by relying on a new concept of national income. A second possibility could be based on a different distribution of retained earnings to be paid out to those to be received. Given the lack of available information and the negligible amounts involved in the case of France (0.1% of NNI), the prototype proposed does not specify the origin of ownership of retained earnings from portfolio investments of resident enterprises.

II.5. Extremities of Distribution and Precision

II.5.a. Very High Incomes

The inclusion of very high incomes raises specific methodological issues. These very high incomes can have a significant impact on the estimates of the concentration of distributions, particularly in countries with a high degree of inequality. However, the survey data that is traditionally used to measure the distribution of income often have difficulty in capturing these very high incomes correctly.

There can be a number of reasons for this. The first is linked to the limited size of the survey samples: therefore, the number of observations present within the wealthiest 5% or 1% is often not sufficient to obtain an adequately precise statistical analysis. It is even more true that income (and *a fortiori* wealth, which is more concentrated) has a thick distribution tail, which means that the empirical averages can become unstable from one year to the next. Surveys can also suffer from bias associated with the issue of

31 The profitability of outward FDI (from France to abroad) is equal to the ratio of the D43 paid by the rest of the world to France and the stock of outward FDI. Likewise, the profitability of inward FDI (from abroad to France) is defined at the ratio of the D43 received by the rest of the world to the stock of inward FDI.

32 This information is provided by the document published by Banque de France in July each year, entitled "France's balance of payments and international investment position".

non-response, or reporting bias, which can result in the under-representation of the wealthiest people and the under-estimation of their income. A great deal of progress has been made recently with regard to this last aspect in some countries thanks to the integration of administrative data in household surveys. However, the situation remains much more problematic in other countries.

In order to counteract these limitations, INSEE uses comprehensive tax data to measure very high incomes (RFL system, then the FILOSOFI system, also making use of comprehensive social data) with effect from the 2012 incomes and each year publishes the share of declared income per consumption unit received by the wealthiest 1% of individuals.

Likewise, Alvaredo *et al.* (2016) primarily make use of tax sources that are statistically reconciled with survey data (ERFS, Wealth, etc.) to take account of income that is not included in the tax sources. In comparison, this report is primarily based on the ERFS, which forms the basis of the INES model. In practice, the differences between the results of this report and the results of the studies by Garbinti, Goupille-Lebret and Piketty (2018) and Bozio *et al.* (2018) are relatively small. This result can undoubtedly be attributed to the quality of the underlying survey data and the relatively low levels of inequality in France. It provides justification for allocating the top 5% of the distribution in the results of this report using tax data from the DINA project rather than the survey data.

Indeed, performing a breakdown beyond the richest 5% based on INES/IRFS data still remains problematic. In order to provide an overview of the role of the richest 1% and 0.1% with regard to inequality, we have chosen to make use of the comprehensive data from the DINA project and to combine them with the INES/ERFS data from this report as described below. The FILOSOFI system is a comprehensive matching of social and tax sources and may also allow the top end of the distribution of transfers to be supplemented. The share of the wealthiest 5%, 1% and 0.1% within the wealthiest 10% is estimated in the DINA data. These shares are applied to the wealthiest 10% as calculated in the INES/IRFS data. This allows the two sources to be combined to ensure the consistency of the resulting distributions.

In the future, it would be desirable to directly link the INES *open source* model with the comprehensive tax data by using them to improve the top end of the distribution and therefore directly obtaining the desired results. Although tax sources allow for a better measurement of the highest incomes and the deductions at the top end of the distribution, they do not include all of the information required in order to simulate social security benefits at the bottom end of the distribution, and the social security contributions and deductions across the distribution as a whole. Following on from the studies by Sicsic, Schmitt and Paquier (2019), reviews must be conducted into the proper measurement of the advantages and disadvantages of using tax sources and to test how best to reconcile ERFS and the INES model with the comprehensive sources.

There are several avenues to explore. In order to limit matching problems, particularly at the bottom end of the distribution, tax data may only be used at the top end of the distribution, for example by adequately concatenating the last tenth with the bottom 90% of the ERFS.

Recommendation 21: Directly link household data (survey or microsimulation model) to comprehensive tax sources in order to produce a breakdown of high incomes within the distributed national accounts.

II.5.b. Out-of-Scope Data: Low Incomes and France's Overseas Territories

The scope of dissemination of the ERFS on which the INES model is based is incomplete[33]. For reasons of survey method or statistical methodology, it actually excludes a fraction of the population resident in France where the poorest people are *a priori* over-represented. More precisely, of a resident population in France of 66.9 million in 2016, the scope of dissemination of the ERFS only covers 62.6 million or 93.5%.

The persons who fall outside of the scope of dissemination of the ERFS, i.e. around 4.2 million people (in 2016), are broken down as follows:

- P0: 0.3 million living in Mayotte;
- P1: 1.9 million residing in the overseas departments, excluding Mayotte[34];
- P2: 1.4 million residing in households in metropolitan France in non-ordinary housing;
- P3: 0.6 million residing in a household within the scope of the ERFS, but outside of the scope of dissemination;
    - P3a: 0.5 million in a household where the reference person is a student;
    - P3b: 0.1 million in a household that declares a negative income for taxes.

In particular, among those persons who are not living in ordinary housing (P2):

- P2a: 375,000 young people between the ages of 18 and 24 whose habitual residence is communal accommodation (2014 figure);
- P2b: around 80,000 are incarcerated;
- P2c: around 140,000 are homeless (2012 INSEE figure);
- P2d: around 700,000 are residing in residential care facilities for the elderly (2015 DREES figure).

Outside of the scope of dissemination of the ERFS, there is no estimate of household incomes and characteristics (wages, pensions, socio-demographic variables, etc.) that is as reliable and as detailed as the ERFS. Nevertheless, there are sources that

33 The "ERFS field" refers to persons residing in metropolitan France in ordinary housing, i.e. excluding communal accommodation, mobile homes and makeshift housing (as defined by the population census). Within this framework, the "scope of dissemination of the ERFS" corresponds to the individuals living in a household in which (i) the income declared to the tax authorities is not negative and (ii) the reference person is not a student. In these two cases, the income indicated by the ERFS is considered to be a partial indicator of their actual resources, which justifies their exclusion from the disseminated standard of living statistics. This restriction excludes 0.6 million people.

34 However, due to the poor quality of administrative data in Guadaloupe and French Guyana, INSEE only disseminates data relating to metropolitan France, Martinique and Reunion.

allow some of the P0 to P3 populations to be placed on the standard of living scale and the impact that the restriction of this scope of dissemination has on the estimation of the distribution to be assessed:

- The FILOSOFI file provides coverage for persons residing in the overseas departments, excluding Mayotte (P1);

- The National Survey on the Resources of Young People (ENRJ) performed in late 2014 allows for the coverage of young adults (18 - 24 years) living in communal accommodation (P2a).

The resulting distribution covers around 65 million people, i.e. 97% of the population. If we assume that the distribution of standards of living observed in the ENRJ applies to the student households in the ERFS (P3a), we can add a coverage point.

The ENRJ measures the support that young adults receive from their parents and shows that it represents a very important element of the overall resources. The true distribution of standards of living must take account of this: it only brings about a small increase in the average standard of living (€72) to €23,271 (€23,580 within the scope of dissemination of the ERFS), but it results in 40% of the people living in a student household within the scope of the ERFS and 14% of young people living in collective housing being reclassified from the first tenth to higher tenths.

In addition, more than a quarter of people living in the overseas departments are in the first tenth.

There are no sources detailing the incomes of senior citizens living in the community. To allocate the average distribution of living standards to them would probably represent a heavily biased estimate. However, since this group only represents 1% of the population, the impact of this assumption regarding overall standard of living is very small. On the other hand, given the high health care costs involved, the absence of detailed information on their income may hamper redistribution analyses.

II.5.c. Information Regarding the Precision of Estimates

Due to the microfounded distribution method, the precision depends on the representativeness of the data used. The two previous sections detailed possible improvements to the scope of the usual household databases. However, even if incomes and transfers are present within the data, the estimates may also include coverage inaccuracies. For example, a microsimulation model may provide more or less precise aggregated results when compared with the accounting quantities it simulates. It is also recommended that information is provided regarding the coverage rates for the categories of income and transfers. This is calculated as the ratio between the amounts for which the distribution is microfounded on the basis of tax and social security data on the one hand and the corresponding national accounting aggregate on the other hand. **Erreur ! Source du renvoi introuvable.** annexed hereto details the precision of the estimates within the prototype DNA, together with various sources and methods used for the distribution of income and transfers.