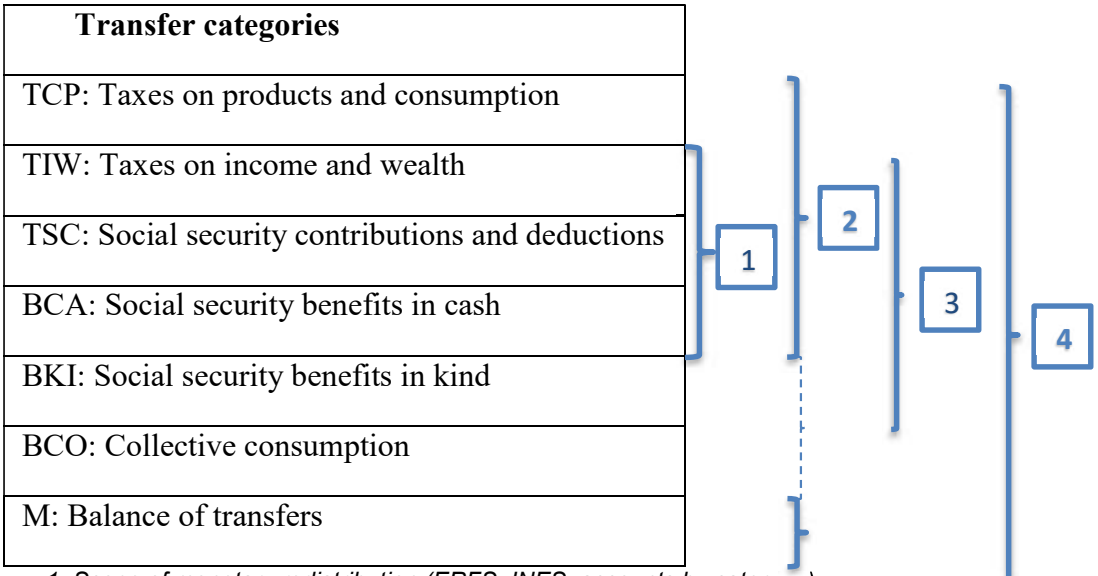
I. Conceptual Framework for Redistribution Statistics

Based on a detailed comparison of studies into inequality, the working group set out to agree upon precise and shared statistical practices for the study of redistribution, which are described in this first part of the report. The first section argues that the broadest analytical framework should be adopted in order to perform a comprehensive comparative analysis of the effect that transfers have on inequality. The second defines the main income concepts used as a reference when studying redistribution. The third section examines the statistical conventions governing the positioning of individuals on the income scale, while the fourth looks at inequality indicators and their use in measuring redistribution. Finally, this part discusses the limitations inherent in the statistical study of redistribution within the accounting framework, i.e. annual and static.

I.1. The Need for a Comprehensive Approach to Income and Transfers

The analyses conducted by the working group show that the main factor behind the differences in the studies that it is examining is the scope of redistribution that they consider (see Figure 4). INSEE's annual publications and the studies looking into redistribution by DREES or the OFCE usually focus on transfers, including direct taxes, social security contributions and cash benefits. The work carried out by the WIL on distributional accounting (DINA project) adds taxes on production and products to this. The OECD (EG DNA) excludes the latter, but takes account of social security benefits in kind and public services that can be individualised, which INSEE also includes in its analyses but on a more ad-hoc basis. The work carried out under the DINA project aims to integrate benefits in kind but, by assuming them to be proportional pending further studies, cancels out their effects on redistribution at this stage. None of these approaches take account of the redistributive aspect of fully collective public expenditure.

Figure 4: Difference in the scope of redistribution



1: Scope of monetary redistribution (ERFS, INES, accounts by category)
2: Scope of the DINA studies
3: Scope of the OECD (EG DNA) studies
4: Scope of the distributed national accounts

This situation poses several overlapping problems, which have already been mentioned in the foreword. By their very nature, different definitions lead to different assessments of the extent of redistribution. The fact that the coverage is only partial leads to the consideration of "unbalanced" sets of transfers, which distorts the analyses, since we are led to consider either services for which there is no mention of how and therefore by whom they are financed, assuming they are financed upstream of the field in question, or deductions that will be described as being "at a loss", since they are used to finance services positioned downstream of the field in question.

At the same time, partial coverage lends bias to international comparisons given the highly variable nature of redistribution and the financing thereof from country to country, with proportions of out-of-scope coverage that will vary greatly from one country to the next. As a minimum, a comprehensive analysis of redistribution should be based as far as is possible on balanced transfers and, where this is not practicable[8], the extend to which the results are dependent on the transfers that have not been taken into account should be discussed (see **Recommendation 13**).

In particular, studies conducted into household income often present two blind spots, which we will attempt to address: taxes on production and consumption on the one hand and public expenditure in kind on the other hand, i.e. the contribution made by public services towards reducing inequality.

The table in Figure 5 applies orders of magnitude to the mechanisms described in these two examples to enable comparison between France and the United States. It describes the variation in the Gini index between pre-transfer income and post-transfer income, and also provides a breakdown of the reduction in inequality subsequently

8 For example, when analysing a benefit, the financing of which is not known, or a decrease or increase in tax, the use or financing of which has not been defined.

measured, according to the type of transfer[9].

Figure 5: Contribution of transfers to reducing the Gini indicator (in percentage points)

Distributional accounts	France (DNA-INES)	USA (DINA-WIL)
IBT: Income Before Transfer	38.3%	58.3%
TCP: Tax on Cons&Prod	3.1%	-0.2%
TIW: Tax on Inc. and Wealth	-3.0%	-2.3%
TSC: Social Security Contributions	0.3%	0.6%
BCA: Social Security Benefits in Cash	-5.9%	-2.1%
BKI: Social Security Benefits in Kind	-10.5%	-6.0%
BCO: Collective consumption	-4.3%	-1.0%
MBT: Balance of other transfers	-0.6%	-2.1%
IAT: Income After Transfer	17.5%	45.1%
Tax redistribution (TCP+TIW+TSC)	0.4%	-2.0%
Benefits redistribution (BCA+BKI+BCO)	-20.7%	-9.1%
RDN: Net Redistribution	-20.9%	-13.2%

Notes: the nomenclature is described in Section III.1.f. Collective expenditure for the United States is allocated here in proportion to income after transfers. Assuming that their distribution is flat increases the Gini index by 5.8 points (see III.2.d).
Sources: 2016 DNA table, authors' calculations.

According to this breakdown, transfers reduce inequality by about twenty Gini index points in France and by about ten in the United States. In terms of deductions, France appears to be more redistributive than the United States if we do not take account of taxes on consumption and production (TCP). However, the result is reversed if those taxes are taken into account, since the deductions in question contribute to lowering the Gini index by 2.3 Gini index points in the United States, but increase it by 3 points for France. France is widening the gap on benefits, partly as a result of cash benefits being more concentrated on low and very low incomes and partly as a result of better developed public services (education, health, etc.). Cash benefits contribute to lowering the Gini index by 5.9 points in France, compared with 2.1 points in the United States, a difference of 3.8 points.

Public services in kind (BKI) bring about a decrease of 10.5 Gini index points in France compared with 6.0 points in the United States, and collective expenditure a further 4.3 points compared with 1 point in the United States.

9 The results are obtained by applying the Kakwani breakdown to the prototype distributional accounting table developed by the authors of the report in accordance with the methodology drawn up by the working group.

It is therefore desirable to adopt a comprehensive overview of redistribution including all modes of financing and all types of public benefits or services. Everything that is provided by the community, directly or indirectly, is directly or indirectly financed by the population. The full comparison of one against the other therefore allows an unbiased assessment to be made of the redistribution performed by means of the transfers.

Of course, adopting such a broad view then raises questions of imputation as soon as you start examining transfers beyond the traditional scope of directly measurable redistribution. It involves quantifying all that individuals or households receive for free or are able to buy in the observed state of the world, compared with what they would have been able to or would have needed to buy in a world without government intervention. It must specify who ultimately pays the VAT or production taxes; how much market income individuals would have if these taxes did not exist and what pricing systems would be in place; which households benefit from retained company earnings, and which key should be used to distribute the benefits of collective expenditure to individuals.

The working group offers a structured, micro-founded response to these questions in the form of the "distributed national accounts" (DNA) mentioned previously, to which the third part of this report is devoted. Using the rows in the table of integrated economic accounts (TIEA) for national accounting as a starting point, this involves building a table of integrated distributional accounts (TIDA), each row of which breaks down income and transfers in accordance with standard of living bands, arranged in ascending order.

Recommendation 1: Establish distributed national accounts that meet the standards of coherent international accounting standards based on those governing national accounts (*System of National Accounts*).

It should be noted at this point that distributional accounting seeks to distribute net national income to all resident individuals or households (whether in ordinary housing or not), which represents the same coverage as that of national accounting (ONU, 2008). The coverage here is significantly broader than that of standard inequality statistics, which raises specific methodological issues (see Part III).

I.2. The Different Income Accounting Concepts

Based on this objective of comprehensiveness, the working group looked at different concepts of income and transfers and considered it necessary to agree upon a shared vocabulary to facilitate comparisons and public debate. With regard to nomenclature, three-letter acronyms are also proposed, which are the same as the English-language acronyms. In this shared lexicon:

"Transfers" refer to both the "deductions" paid by individuals or companies and the "benefits" received by households, whether directly or indirectly.

"Deductions" include taxes on different types of income or wealth (hereinafter referred to as TIW, which stands for *Tax on Income and Wealth*), taxes on consumption or production (TCP: *Tax on Consumption and Production*), and contributions on wages or self-employed income used to finance Social Security (TSC: *Tax as Social Security Contribution*).

"Benefits" consist of monetary allowances (BCA: *Benefits in Cash*), transfers in kind (BKI: *Benefits in Kind*) and non-individualizableindividualizable collective expenditure (BCO: *Benefits from Collective expenditures*).

When we talk about income, we are referring to a number of concepts that the working group has endeavoured to clarify, in terms of both outline and denomination:

"Disposable income" is a well-established concept with a widely shared denomination. The concept used in national accounting most closely resembles the income assessed within the scope of social statistics, although there are still some differences (see below) and, in this regard, it plays a key role in reconciling macro and microeconomic data. The concept involves income after transfers, but only takes account of cash transfers. It offers the advantage of being measured in a very direct manner; however, the disadvantage is that it excludes several types of large-scale transfers. It is possible to choose whether or not to include retained earnings in the same way as for national accounting. Where necessary, we distinguish between the two by referring to the latter as "household disposable income" and the former as "extended household disposable income" or "disposable income", hereinafter referred to by its three-letter acronym, IDI, which stands for *Income Disposable*.

Net National Income Before Transfers (NNIBT) and *Net National Income After Transfers* (NNIAT) will be referred to in the three-letter nomenclature as IBT and IAT (*Income Before Tax* and *Income After Tax*). Overall, since the transfers received mirror the transfers paid, it goes without saying that NNIBT and NNIAT are identical and correspond to net national income (NNI), as per national accounting. The same is of course not true when this national income is broken down into different strata. Income after transfers is deducted from the primary income and is calculated by adding the various social security benefits, transfers in kind and collective expenditure and deducting social security contributions and taxes on income and wealth.

The "expanded standard of living" is national income after transfers and is related to the number of individuals, possibly corrected to take account of scale effects (see below). It measures the real standard of living, in the broadest sense of the term, i.e. by integrating a monetary valuation of services provided by public authorities and non-profit organisations.

"Expanded primary income" is the national income before transfers, scaled down to the individual level, which serves to demonstrate the standard of living each individual would have in the absence of public transfers; income that the economic literature generally describes as "market income".

"Expanded redistribution". Having established these two concepts of income before and after transfers, both at the individual and aggregate levels, redistribution can be measured by comparing them with one another. By design, this represents an accounting approach to redistribution. It does not prejudge any behavioural adjustments

(see Section I.5) to take account of the fact that market income and pre-transfer income only coincide perfectly if the former has not been modified by public transfers.

"Individualizable income" is obtained by adding transfers in kind to disposable income. This concept relates to a notion that is somewhere between disposable income and income after transfers and is equivalent, in the vocabulary of national accounting, to the concept of "adjusted disposable income". It is also a concept of income after transfers, but one that does not completely follow through with the logic of valuing public services, with the exception of those classified as non-individualizable (justice, police, research, etc.). As is the case for disposable income, we refer to household or private sector income depending on whether or not retained earnings are included. A concept of "individualizable income before transfers" can also be defined in the same spirit, allowing for the measurement of "individualizable redistribution". This concept is less broad than the previous one, but offers the advantage of reducing the imputation assumptions in areas where the exercise is less easy.

"Net national wealth": this concept relates to wealth rather than income. In other words, it relates to stock rather than flows. It measures the assets of households, net of their debts. Just like in national accounting, where the table of integrated economic accounts compiles income and wealth data, it is important that it is integrated with distributional income accounting, since wealth inequality is even greater than income inequality. Wealth accounts distributed in accordance with income level and their variation from one year to the next also allow for the calculation of rates of return on wealth based on income. Their integration will be facilitated by the ongoing work of the Monetary and Financial Account Statistics Directorate at the Banque de France within the scope of the recommendations made by an ECB expert group, and should lead to the establishment of distributional wealth accounts.

Recommendation 2: Integrate the distribution of wealth into distributional national accounting in order to guarantee its overall consistency.

It should be emphasised that all income aggregates listed here – and in the rest of this report are, unless otherwise stated – net income concepts, which means that they are given less of fixed capital consumption (FCC). The working group therefore endorses the recommendation made by the Stiglitz Commission, which noted that, while gross values are useful concepts for macroeconomic modelling, it is actually net income and transfers that best capture redistribution.

It should also be noted that disposable income is the concept that most closely approximates the income actually received by households, even more so now in France that deduction takes place at the source. It is also within disposable income that the trade-off between consumption and savings or debt is determined, taking account of the now well-documented issue of constrained spending. Retained corporate income and collective public expenditure are less tangible concepts that may be far from the thoughts of households, particularly the poorest among them. NNIBT and, to a lesser extent, NNIAT are aggregated and more abstract interpretations that are specific to distributional accounting. This is why it is advisable to use the broad concepts defined

above, whether it be primary income, standard of living or redistribution, particularly in publications aimed at a wide audience.

Household disposable income is also the simplest income variable to establish using traditional sources, as well as being the most commonly used by statistical institutes, particularly for calculating the standard of living of the persons making up those households. In this report, we use standard of living to classify individuals and to divide them into different groups. This choice means that we avoid having to take account of any reclassification effects brought about by other forms of income or transfers.

Nevertheless, there is no consensus in the literature at this stage as to the "right" way of classifying individuals: the method may vary from one study to the next depending on the topic of research. Other concepts may be considered, such as national income before or after transfers. For example, in the same way as a tax rate is usually calculated on the basis of pre-tax income, one may wish to calculate average tax rates on pre-transfer income by category and, on that basis, to classify individuals based on their pre-transfer income (see **Recommendation 5**).

Another oft-debated issue, which is likely to have a strong influence over the outcome for the structure of pre-transfer income, concerns the inclusion of deferred income such as unemployment benefits and pensions (see **Recommendation 22**). Indeed, it is possible to imagine several concepts involving income before transfers. Factor income is the income received by individuals as a result of their possession of factors of production (labour or capital). It excludes all forms of public transfers, regardless of whether they take place via the social insurance system or by means of other social transfers. This factor income includes in particular all "super-gross" labour income (including employers' contributions) and self-employed income. It is similar to the concept of market income, which is sometimes found in the literature (see Section I.5) and therefore excludes deferred income.

However, the relevance of any comparisons based on this concept is subject to debate. Indeed, in countries with a pay-as-you-go pension scheme, the retired population often receives factor income of close to zero (see Section III.1.e). Considering such income as almost zero gives a distorted view of the standard of living or the social category of the individuals concerned. This complicates the international comparison with countries with funded pension schemes, within which this income is considered as factor income from savings. Furthermore, this approach makes the structure of inequality particularly dependent on the age structure of the population[10].

The working group therefore agreed to introduce, as an alternative, the additional concept of **income before transfers including deferred income** (or replacement income). This is factor income plus replacement income (pensions and unemployment benefits), less the associated social security contributions. In order to ensure that the impact of this transformation does not bring about any changes to aggregate primary

10 It is possible to partially get around these problems by limiting the comparison to the employed or working age population. However, this approach does not allow for the distribution of national income in its entirety, nor does it allow for the comprehensive estimation of inequality and redistribution.

income, where necessary, the balance between these deferred incomes and the deductions used to finance them is subtracted, with that balance then being distributed among the individuals[11].

Integrating deferred income as opposed to limiting the research to factor income corresponds to an insurance-based approach to the pay-as-you-go pension system. Social insurance systems are primarily based on a contributory logic: at some point in my life, I will receive the sums that I have paid in or the social rights that I have gained at another point in time. For various reasons that we will not go into here, particularly with regard to demographics, but also as a result of successive decisions by the authorities governing these schemes, they nevertheless almost always include, to a greater or lesser extent, a redistributive dimension. Ideally, it would be desirable to distinguish between these two components to ensure that only the contributory element is taken into account (see Cheloudko, Martin and Tréguier (2020)). On the contributions side, for example, this involves separating the contributions made before the application of exemptions from the exemptions from contributions themselves[12].

The report has chosen to use the first of these two approaches as a reference in order to ensure the best fit with national accounting and to measure the redistributive effects of public transfers. Net national income before transfers therefore does not include pensions paid or unemployment benefits received. However, the working group recommends that, as far as possible, the indicator that takes account of pensions and unemployment benefits as primary income be produced as a variant in order to test and comment on the sensitivity of the results to this fundamental choice. In practice, if individuals are not reclassified as part of the process of breaking them down by income type or transfer category, but are always kept in the same standard of living band, the before and after differences seen in the inequality indicators are small.

I.3. How Should Individuals be ordered?

Having defined the various concepts associated with income and transfers, since the study of redistribution involves quantifying who pays and who receives what based on their position on the income scale, it is appropriate to consider the relevant methods for performing this classification. The issue is as simple as the solution is complex, since it is clear, for example, that a couple with two children and a monthly income of 2000 euros cannot be considered to be richer than a single person earning 1500 euros. There are several important points when it comes to establishing or comparing income distributions:

1. What is the composition of the entities (households, housing units or individuals)?
2. What assumption has been made regarding "economies of scale" within the

11 In this report, this distribution takes place on the basis of a weighted average of individualizable taxes.

12 This part is, for example, balanced by deductions that may be more or less progressive, as is the case in France, where the State reimburses the Social Security system for all or part of the amount of the exemptions.

household and how is the associated statistical unit defined?

3. Which income concept is used as a basis for classifying individuals, and if individuals are reclassified, what are the Noria effects?

4. What is the relevant granularity for the quantiles based on the precision of the data, how are these quantiles composed and how are the quantile variables (means, masses) calculated?

We will return to look at this in more detail, but first, we would like to highlight that a potential source of differences in the measurement of income redistribution through inequality indicators or the comparison of pre- and post-transfer distributions may arise as a result of the distinction between the tax household, i.e. the legal unit that declares and pays taxes jointly, and the household that is used in statistics to define the aggregation of transfers. There are also discrepancies in the delineation of social housing according to the benefit received, for example, the age of dependent children differs between the definition of housing for recipients of RSA (a statutory minimum income) and that of the tax household.

The results produced specifically by the working group[13] have revealed that the distributions of standard of living are fairly close where the tax household or the household is considered as the statistical unit, even if the household distribution is more spread out. While not significant, the differences in the inequality and poverty indicators are far from negligible. There are no significant differences in the way they develop over time. The basic entity considered, be it an individual, a housing unit or a household, nevertheless constitutes a possible first dimension for the differences between the various studies, which should be taken into account.

Household are themselves made up of individuals. Resources are generally considered to be shared between the individuals living within the same household, both for conceptual reasons concerning the actual sharing of resources within a household and for practical reasons, since certain types of income are difficult to attribute to just one member of the household. In certain cases, particularly labour income, it may be appropriate to distribute such income individually to those who receive it, without sharing it with dependants within the household. In other cases, income may be non-individualizable, such as household income from land or savings. For the purposes of this report, we consider income to be shared between the members of a household. The way in which income is distributed within households revolves around equivalence scales, which we will discuss in detail in Part I.3.a.

An additional question, which is not studied here, could, for example, be the subject of future developments: with the introduction of withholding tax in France, data are now available in our country that will allow us to examine the distribution of income

13 A short note entitled “distribution des niveaux de vie : foyer *vs* ménage” [Distribution of living standards: housing unit vs household] was produced by Jérôme Accardo in May 2019. It draws upon the Tax and Social Incomes survey (ERFS) to compare different indicators using the conventions for allocating income within housing units and the distribution of standards of living. The differences seen in the traditional indicators are, for example, 2 Gini points higher in the case of distribution by household and + 1.2 points for poverty.

within households.

I.3.a. Income Standardisation Scales

During the preparatory work for this report, the working group noted that the choices made with regard to standardisation or equivalence scales can play a key role in measuring income and can therefore have an impact on inequality. Indeed, the needs of a household increase if its size increases; however, as a result of economies of scale for consumption, the increase in expenditure that this brings about is not proportional. For example, requirements with regard to housing space, electricity or individual transport, particularly cars, are not three times higher for a household of three people than for a single person. A monthly income of four thousand euros therefore provides a higher standard of living for a couple with two children than a monthly income of one thousand euros would for a single person without children.

In many cases, in particular when analysing poverty, it is essential that such effects are taken into account. Therefore, an indicator such as the INSEE, Eurostat or OECD standard of living is standardised in order to take account of these disparities. This involves dividing the calculated household income by a coefficient measuring economies of scale, referred to as the standardisation scale. The studies aiming to measure inequality have made many uses of this, most often for reasons of interpretation of these equivalence scales, and sometimes as a result of constraints associated with the availability of data.

An initial approach involves measuring comparable situations between households of different sizes and compositions. INSEE and the official statistics institutions therefore use consumption units (CU). This concept, used to calculate standard of living, is based on the "OECD-modified equivalence scale", which was introduced in the 1980s and which assigns a weighting of 1 to the first adult in the household, 0.5 to any other persons aged 14 or over and 0.3 to other members of the household (Hourriez & Olier, 1998). Where it does not have access to the ages of individuals in the household, the OECD uses a "*square root*" (SQR) scale, which standardises disposable income to the square of the number of individuals in the household.

Figure 6: Comparison of standardisation scales by type of household

Type of household	Standardisation weighting applied to the household				
	Non-corrected income	CU	ESA	SQR	Per capita
1 adult	1	1	1	1	1
2 adults	1	1.5	2	1.4	2
2 adults, 1 child	1	1.8	2	1.7	2
2 adults, 2 children	1	2.1	2	2	4
2 adults, 3 children	1	2.4	2	2.2	5
1 adult, 1 child	1	1.3	1	1.4	2
1 adult, 2 children	1	1.6	1	1.7	3
1 adult, 3 children	1	1.9	1	2	4

Notes: it has been assumed that children under the age of 14 are present for the calculation of CU.

A second approach divides the income between the individuals in the household who are the direct recipients of that income, either equally or in accordance with the observed distribution where data are available[14]. The World Bank's *PovcalNet* data are therefore provided on a "*per capita*" basis, i.e. by dividing the household income equally among all its members, without taking into account any economies of scale. The WIL, which forms part of the DINA project, uses the "*equal-split adults*" (ESA) scale, which assigns equal weight to each adult in a couple, with minors in the household not being taken into account as a result of them not earning their own income. Adult dependants are individualised with their own income.

This section will compare the different practices and will measure the resulting differences for France. In order to achieve this, the analysis must be performed using the same income basis[15], in this case, disposable income according to the Tax and Social Revenues Survey (ERFS). In theory, the discrepancies could be significant if the distribution of standards of living is heavily dependent on the configuration of families. In practice, the differences between the conventions differ according to the indicators, the angle of analysis adopted and the granularity of the breakdown.

Therefore, to summarise the main conclusions of the explorations made by the working group in this area, the ESA and CU analyses are close in terms of the distributions of income variables, but diverge when it comes to studying poverty, family configurations and the extremes of distribution. The SQR approach differs from the previous two in that it has a smaller "population", i.e. a smaller total number of units, and higher income variables. The differences are partly due to demographic effects and increase with the standard of living. The distribution of family configurations in accordance with standard of living is fairly similar for the CU and SQR approaches.

14 Withholding tax data provide information on income sharing within households in the United States and in France, dating back to 2018.

15 This section is taken from a May 2019 note by Jorick Guillaneuf entitled "Impact du choix d'une échelle de standardisation du revenu disponible sur les indicateurs d'inégalité" [Impact of the choice of a standardisation scale for disposable income on inequality indicators]. It contains the series and graphs discussed in this section. Additional elements provided by Jérôme Accardo during the second meeting of the working group are also available.

However, for the ESA approach, couples with children are more heavily represented towards the top end of the distribution obtained.

The per capita income approach offers the same advantages as the ESA approach in terms of its simplicity in switching from income measured at the individual level to the aggregated income pool. In addition, it offers the advantage of including children in the analysis, who represent a significant proportion of the population, which can vary greatly from country to country, and the number and age of whom is taken into account when calculating numerous types of benefits. However, it also offers the disadvantage of not taking account of the effects of economies of scale. For the sake of simplicity and because it is not widely used in redistribution studies, we have not included this approach in the below comparisons.

As regards the three other uses, the indicators calculated on the basis of the ERFS reveal discrepancies between the distributions of disposable income depending on the standardisation scale used: these are fairly small between the deciles calculated using CU and ESA approaches (always less than 1% in absolute terms), but significantly larger with the SQR scale (between 8 and 10%). These differences in levels remain relatively stable over time, such that the evolution of inequality would retain a similar profile no matter which scale is used, as is demonstrated by the following findings:

- The median standardised disposable income for 2016 is €20,520 for the CU approach, €20,370 for the ESA approach and €22,420 for the SQR approach. However, the changes to the median over the last 10 years are very similar for the different scales.

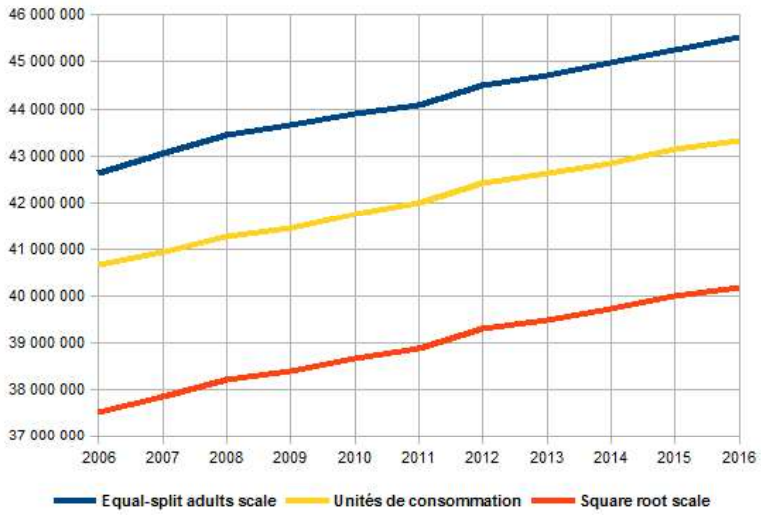
- At the extreme ends of the distribution (1st tenth and 95th hundredth), the differences are slightly more pronounced: The ESA and CU approaches are very similar; however, the SQR approach is consistently around 10% higher. Nevertheless, the trends remain broadly similar.

- The Gini index calculated on the basis of the SQR scale is also slightly higher (0.291 compared with 0.288 for the CU approach and 0.287 for the ESA approach), but the variations of the three indicators are very similar.

The poverty rates calculated on the basis of the three scales differ more, however, while remaining relatively similar for most of the commonly used indicators: in 2016, the 60% poverty rate calculated on the basis of the CU scale usually published by INSEE was 14.0%; had it been calculated using the ESA scale, it would have been lower (13.2%), and it would have been slightly higher if calculated using the SQR scale (14.4%).

The trends in the indicators also differ significantly, with the gap widening over five years: had the fall in the poverty rate between 2012 and 2016 been calculated using the ESA scale (-0.6 points), it would have been much more pronounced than if it had been calculated using the other two scales (-0.2 points). The differences may be even more pronounced for sub-populations, for example for certain types of households, such as single-parent families. These differences can largely be explained by differences in weightings depending on the configuration of the household (see Figure 6) and by differences in the sizes of the populations (see Figure 7 below).

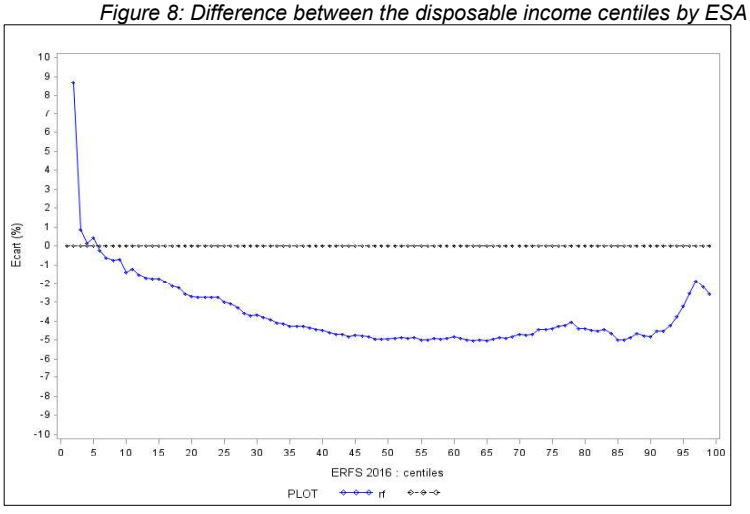
Figure 7: Changes to the total standardised population according to the equivalence scale in France, 2006-2016



Coverage: Metropolitan France, individuals living in a household for which the declared income is positive or nil and where the household reference person is not a student.
Sources: INSEE-DGFiP-CNAF-CNAV-CCMSA, Tax and Social Income Surveys 2006 to 2016.

A more detailed comparison of the CU and ESA approaches shows that, ultimately, there is only a slight difference in the total number of units. When performing the calculation on the basis of the ERFS 2016, there are 43.8 million CU compared with 45.2 million adults. As a first approximation, the distribution of disposable income using the ESA approach will, on average, be around 3% lower than that for standard of living. However, this difference varies substantially along the standard of living scale, particularly at the very bottom end of the income scale (see Figure 8).

Figure 8: Difference between the disposable income centiles by ESA and by CU in France

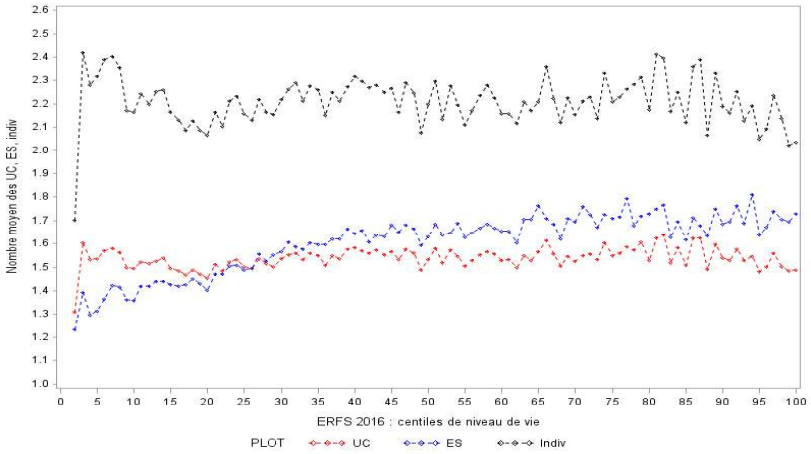


Coverage: Metropolitan France, individuals living in a household for which the declared income is positive or nil and where the household reference person is not a student.
Notes: centiles of households; the difference for the 1st hundredth (>70%) is truncated on this graph.

These differences can be explained in particular by the differences in the

composition of households along the standard of living scale under the two conventions. Figure 9 shows that the number of ESA increases in accordance with standard of living when individuals are classified according to the standard of living of their household.

Figure 9: Average number of units by standard of living centile in France



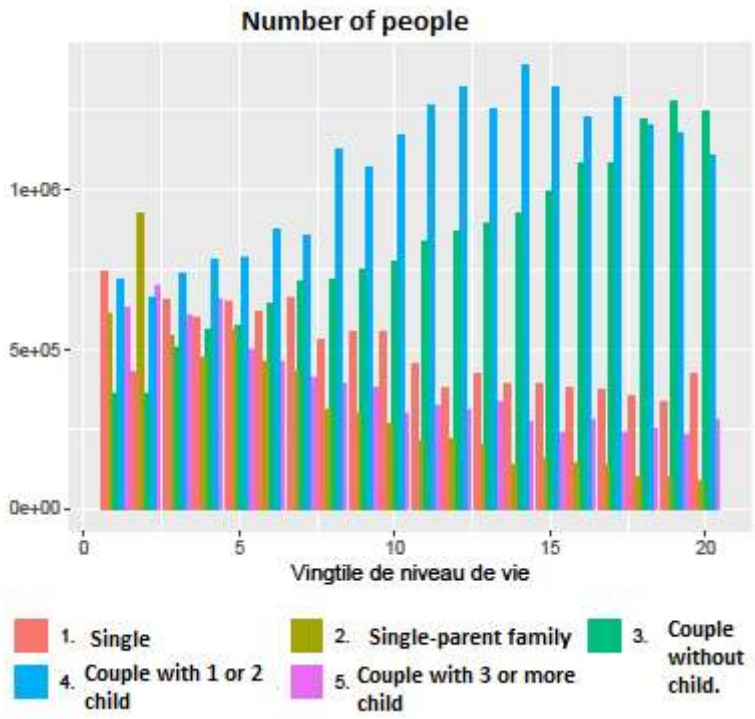
Coverage: Metropolitan France, individuals living in a household for which the declared income is positive or nil and where the household reference person is not a student.
Notes: household standard of living centiles = disposable income per CU.

Recommendation 3: Present the choices regarding the equivalence scales used to compare the different types of household composition in an explicit manner and, in so far as is possible, detail the consequences of the choices made, taking account of limitations associated with the availability of data (household composition, age of children, etc.). Several complementary approaches exist, one more oriented towards the study of the standard of living of households and its distribution (number of consumption units), another geared more towards the distribution of primary income (number of adults or number of individuals); they are used and interpreted in different ways.

Recommendation 4: Consistently adopt the convention of equivalence scales, i.e. do not change them to compare the redistributive effects of transfers.

The relative stability of CU across the distribution of standards of living results from two demographic effects that counterbalance one another in France. The households at the bottom end of the distribution tend to be single-parent families and single people. The households at the top end of the distribution tend to be couples with few or no children. The median households tend to be couples with children.

Figure 10: Family configurations according to standard of living



Sources: 2016 INES model, graph taken from (André & Sireyjol, 2019)

The use of CU differs from that of ESA in another important respect. By assigning notional income shares, the aggregate accounting amounts do not equal the sum of the individual amounts. Therefore, for example, the per tenth average is not equal to the aggregate divided by the number of CU. For the same reason, the total income per CU for each individual does not correspond to the national accounts aggregate (the difference is linked to the number of CU). Consequently, simply knowing the aggregate and the number of CU per tenth is not sufficient to allow for an exact calculation of the average equivalised income for that tenth.

Conversely, if we add up the income for each individual using the ESA or per capita income, we arrive at the national accounts aggregate. If we then divide this by the number of individuals, we find the average (i.e. the aggregate divided by the size of the population), which is especially useful within the scope of a distributional accounting exercise.

Figure 11: Classification within a standard of living decile according to the equivalence scale

CONSUMPTION UNIT	EQUAL-SPLIT ADULTS									
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
D1	7.5	1.5	0.5	0.3	0.2	0.1	0.1	0.0	0.0	0.0
D2	2.3	3.1	2.6	0.6	0.4	0.3	0.2	0.1	0.0	0.0
D3	0.5	2.7	2.5	3.3	0.4	0.5	0.3	0.2	0.1	0.0
D4	0.1	1.7	1.9	1.8	3.8	0.4	0.4	0.3	0.1	0.0
D5	0.1	0.4	2.2	1.2	1.3	3.7	0.5	0.4	0.2	0.1
D6	0.0	0.2	0.5	2.7	0.9	1.3	3.3	0.5	0.3	0.1
D7	0.0	0.2	0.1	0.6	2.7	1.1	1.5	2.9	0.5	0.1
D8	0.0	0.0	0.2	0.1	0.5	2.4	1.7	1.9	2.6	0.3
D9	0.0	0.0	0.0	0.2	0.2	0.3	1.6	2.7	3.0	1.9
D10	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	2.6	6.8

Reading Note: 3.1% of households belong to D2 when classified by both CU and by ES.
Sources: INES 2018 (ERFS 2016), authors' calculations.

The table in Figure 11 shows changes to the tenth as a result of the two classifications, CU and ESA. The elements are primarily diagonal in the sense that there are very few households where the difference between the two types of equivalence scale amounts to more than a tenth.

Based on the INES model and making use of the ERFS data, the difference in the number of ESA-CU units falls into a bracket of [min = -2.3; max = 5.0] (minimum value and maximum value), which gives an average value for this difference of 0.22. The distribution of the two equivalence scales is fairly similar: P01 = -0.9 and P99 = 1.5, which gives a median of 0 and a third quartile (P75) of 0.5.

CU are useful for measuring how redistribution to children and families affects their standard of living. By calculating disposable income using the ESA approach, we change the composition of the lower end of the distribution, particularly the area occupied by single-parent families. Nevertheless, without this limitation presenting a barrier, aside from the abstract nature of the concept, classification by CU relies on consumption data, the measurement of which is, by its very nature, imprecise (see Accardo (2007), Hourriez and Olier (1998) or Lechene (1993) for a literature review). Estimates may also vary over time or in space (see, for example, Martin (2017), Martin and Périvier (2018) and Martin (2015)). The weightings assigned to individuals on the basis of age and family composition are the subject of debate.

I.3.b. Which Income Concept Should be used to Order Households?

Once the question of the denominator – i.e. the number by which household income is to be divided – has been clarified, the question of the numerator arises. Which of the various income concepts selected should be used (I.2)? Before we make a choice, a distinction must be drawn between the income used to classify individuals and the income used to measure redistribution. These two concepts are often used interchangeably. However, it is often useful to separate them in order to rule out reclassification effects when comparing two distributions. Indeed, if the result of the measurement of the distribution between two income concepts is first linked to the contour of the incomes being compared and therefore to the transfers that may or may

not have been taken into account, the classification method chosen does actually make a difference.

A first option would be to perform the classification according to income before transfers on the one hand and income after transfers on the other hand. By standardising where appropriate, individuals are ordered in accordance with the value of this income in order to compare the two distributions by tenth, twentieth or hundredth, for example. This is what actually happens when the Gini coefficient is calculated before and after transfers on the basis of microeconomic data. The difficulty lies in the fact that households do not always belong to the same income group; the transfer effects are not directly comparable due to reclassification effects, which can be significant. This is the case, for example, with pensions (see Section III.1.e). If we consider pensions to be a benefit, as is the case in national accounting, wealthy pensioners would find themselves at the bottom of the income scale before transfers and at the top of the scale after transfers. Therefore, comparing incomes at the bottom of the scale before and after transfers becomes meaningless, since it is no longer the same individuals who are present.

For the purposes of measuring "who pays what" and "who receives what", it is imperative that the classification of individuals remains fixed throughout the distribution. Returning to the example of the Gini index calculation, we will not reclassify individuals in order to move them from one income dimension to another. Once the principle of a fixed classification has been accepted, three main options can be envisaged, which the group discussed in detail: classification according to income before transfers, classification according to income after transfers and classification according to disposable income or standard of living.

The group agreed that, if a UN accounting standard were to be defined, the disposable income per consumption unit, i.e. the standard of living, is the classification variable most likely to favour robust international comparisons, both as the most tangible concept for citizens and as the type of income that is least dependent on imputation standards. However, this choice of standard does not detract from the relevance of other options, in particular classification according to income before transfers for the purpose of studying the behavioural effects of the elasticity of labour input and capital on the transfers performed, for example.

Recommendation 5: For the purposes of producing distributed national accounts, and within the scope of international accounting standards, prioritie disposable income per consumption unit as the primary classification variable.

Recommendation 6: For research purposes, other classification options may be considered; in this case, the classification variable and the method for calculating the amount received or paid must be clearly shown for each transfer (aggregation at household level, for example).

Recommendation 7: Once classification has been carried out according to one of the income concepts, the standard of living bands must remain fixed (in order to prevent reclassifications and the resulting bias); focus on an identical number of individuals for each band (rather than an identical number of households) and, failing that, indicate the number of individuals in each band.

I.3.c. What Degree of Granularity Should be Used for Income Groups?

In the interests of avoiding a misuse of common parlance, the words decile, centile and millile will be used solely to designate quantiles (distribution thresholds). The words tenth, hundredth or thousandth will be used to designate the groups of individuals classified using these quantiles. Therefore, the final centile of the distribution refers to the minimum income that would place people in the richest 1% of people. The final hundredth refers to the group of individuals comprised of that richest 1% of people.

In Alvaredo *et al.*, (2016)the top hundredth is divided into thousandths, the top thousandth into ten thousandths and the top ten thousandth into hundred thousandths in order to obtain the greatest possible precision at the top end of the distribution. This approach can be explained in particular by the high concentration of wealth within the top tenth. Therefore, the richest tenth accounts for almost three quarters of the wealth in the United States (WID.world, 2020), and the top hundredth accounts for almost 40% of total wealth. When looking at the redistribution of wealth, it becomes essential to use a fine scale.

In the case of variables with unbounded variance at the top end of the distribution, as is the case for income or wealth, for example, the granularity with which such estimates are made plays an important role. If the source data includes too few people at the top end of the distribution, a variation seen from one year to the next may therefore be purely the result of a sampling bias rather than an actual variation. This is the case, for example, where the richest person is present in the survey one year and is no longer present the following year.

In the case of the INES model or the ERFS data (130,000 individuals), it is possible to perform an analysis of discrete variables (bounded by construction) by hundredth, but for concentrated continuous variables (such as income or wealth), the

robustness of the results is rather limited where the analysis is performed by tenth (top 10%) or twentieth (top 5%).

It is important to always pay attention to the size of the cells being studied: cross-referencing by twentieth, employment status and family type, for example, may not be sufficiently robust. The use of comprehensive tax files is the most direct means of gaining an accurate picture of inequality, right up to the very top end of the distribution. This is why INSEE makes use of resources such as the comprehensive social and fiscal localised income system, FILOSOFI, to study the very top end of income distribution.

Recommendation 8: Make a linguistic distinction between quantile (lower threshold) and fraction (group) by using the terms deciles/tenths or centiles/hundredths, for example.

Recommendation 9: Always indicate the number of entities within the band (households, individuals, children, number of equivalence scales, etc.) in order to facilitate comparisons between the different approaches.

Recommendation 10: Wherever possible, describe the top end of the distribution to the hundredth and thousandth by making use of comprehensive data; failing that, it should be described by the tenth or twentieth for the usual household survey data. Results should only be presented to the extent that they are statistically robust, or accompanied by their margins of error.

Recommendation 11: Ensure consistency of use when calculating the amounts of transfers within the groups, either by calculating the total transfers or by calculating the transfers per unit, but retaining the same scale as was used to establish the groups.

I.4. How Can Redistribution and Inequality be Measured?

Once the before and after transfer distributions have been established, it is customary to measure redistribution by comparing the inequality indicators for these two distributions. As was highlighted in the previous section, the way in which income is defined and distributed has an impact on the redistribution measurement shown. This section stresses the fact that the choices made with regard to inequality indicators have a heavy influence on the messages that emerge as a result of their use.

I.4.a. The Main Existing Indicators

The main inequality indicators can be broken down into two categories[16]. The first serves a mainly descriptive purpose. It includes indicators such as:

- the Gini coefficient, based on the Lorenz curve;
- the shares of total income going to each income group (the wealthiest 1%, the wealthiest 10%, the poorest 50% and the 40% falling between these two groups);
- or the different income ratios per population quantile or group, such as the interdecile ratio, the (100-S80)/S20[17] ratio used by the UNDP and by INSEE in France, the Palma ratios, which focus on the gap between the wealthiest 10% and the poorest 40% and the T10/B50, M40/B50, T10/M40 and T10/B90 series of ratios[18];
- or the Hoover index, which measures the sum of the deviations from the egalitarian distribution for below-average incomes.

The second category aims not only to measure inequality, but also to quantify its consequences in terms of welfare. It draws upon the studies by Dalton (1920), Atkinson (1970) and Sen (1973). In order to achieve this, the link between the distribution of income and the collective welfare gained as a result of that income must be specified. These studies work on the assumption that there is a function that relates collective welfare to the distribution of individuals' income, an additive function in the case of Atkinson.

The Dalton index therefore measures the difference, as a welfare percentage, between the actual distribution and the egalitarian distribution; the Atkinson and Sen indices offer a monetary quantification of welfare based on the notion of equivalent equal income. Equivalent equal income is the egalitarian income that provides the same level of welfare as the actual distribution of income.

For balanced redistribution operations, first of all, the variation in equivalent income measured as a percentage of net national income is proportional to the change in welfare. For that reason, this equivalent equal income can also be referred to as *monetary welfare*.

The Atkinson inequality index[19], which measures the percentage difference

16 This Section draws upon the ongoing studies collated in André M. and Germain J.-M. (2021).

17 Which provides the ratio of the average income of the richest 20% to the poorest 20%, known as the QSR (*Quantile Share Ratio*).

18 T10, M40, B50 and B90 represent the average income of the wealthiest 10%, the middle 40%, the poorest 50% and the poorest 90%, respectively.

19 The Sen index is a generalised version of this where the utility function is not additive. The Dalton index directly compares the welfare associated with the actual distribution with that of the egalitarian distribution.

between the equivalent equal income and average income, therefore possesses an important property, particularly when it comes to studying the redistributive nature of a socio-fiscal system: its variation can be directly interpreted in terms of welfare.

I.4.b. Gini Indicator: Welfare and Redistribution

In reality, the boundary between the descriptive and welfare approaches is not fixed. Yitzhaki (1979) has highlighted an interpretation of the Gini coefficient for monetary deprivation, as described by Runciman (1966). In this regard, differences in income bring about a feeling of deprivation that is equal to the average of the differences at higher incomes. As for collective welfare, this is equal to average income minus average deprivation. Yitzhaki (1979) demonstrates that the Gini coefficient is equal to the ratio of average deprivation to average income. The Gini coefficient does not fit into Atkinson's analytical framework, since its utility does not just depend on one's own income, but also on that of others. It falls within the more general framework proposed by Sen (1973).

The underlying welfare function defined in this way presents a number of interesting properties: in particular, as is the case for the Atkinson index, its variation in terms of average income points is equal to the variation within the Gini index, as long as the transfers are balanced in terms of income and expenditure. Indeed, the welfare gap is calculated on the basis of the variation within the difference in the welfare function.

These theoretical considerations help to guide practices in the sense that it is preferable to compare inequality indices before and after redistribution as a level rather than a percentage; the values obtained in this manner are interpreted in terms of net national income points.

> **Recommendation 12:** When interpreting the impact of redistribution on welfare via the national income scale, the commentary should preferably discuss the inequality indicators before and after transfers in terms of a difference in level rather than a ratio.

This interpretation of index variations in terms of monetary welfare is only valid when the before and after incomes are deducted from one another by balanced transfers. Conversely, where the redistribution in question is not balanced in terms of expenditure and income, the comparison of the Gini coefficient before and after redistribution provides a biased measurement of the impact of the transfer system on welfare; moreover, it is possible to demonstrate that this bias is negative[20], and all the more negative when the country concerned offers a high level of public services.

In general, a number of different practices exist within the studies in these areas, for example, the decision as to whether or not to include pensions in the income before

20 See the studies currently under way in André, Germain (2021), op. cit.

transfers (see I.3.b), and each of these conventions provides additional information. However, if an assumption leads to an imbalance between two different income concepts, as a result of the integration of a portion of the deductions that are used to finance a certain non-zero balance benefit, for example, the redistributive effect may be reduced or increased.

A stylised example shows the importance of paying attention to the balance of a set of transfers. Consider a country that finances a universal flat-rate benefit with a tax proportional to income. Now imagine that this country were to change the financing of that benefit by proceeding to base it solely on a tax on products, proportional to consumption. In such a case, the tax would weigh more heavily on the bottom end of the income scale, where people have very little or often even nothing at all in the way of savings: this change would therefore increase inequality. However, if we were to only take account of the benefits and direct taxes, as is usually the case in redistribution statistics, therefore excluding taxes on products, the second system would appear to be more redistributive than the first. It is therefore only possible to perform an unbiased comparison of the two situations by including both expenditure and income and direct and indirect taxes.

In practice, if two countries finance the same benefits, one by means of VAT and the other by means of income tax, the failure to integrate taxes on consumption would provide a distorted picture of the redistribution of public transfers, but with an identical public expenditure profile. The example given here is stylised, but it reflects a reality that skews the usual international comparisons: the fact that taxes on products are high in Europe, whereas they are almost non-existent in the United States.

Recommendation 13: The assessment of the redistributive impact of a transfer system should, in so far as is possible, focus on zero-sum transfer packages (i.e. those where there is a balance between income and expenditure), particularly where comparisons are being made internationally or over time and within the context of distributional accounting. Failing that, discuss the potential consequences of an unbalanced analysis and, where possible, show the accounting balance of the package in question.

I.4.c. Comparison of Inequality Indicators

What is true for Gini is generally also true for other positive or descriptive inequality indicators: they underpin an implicit collective preference, which is often explicit at the outset, and which can sometimes be forgotten over time. Therefore, the Palma ratio, which establishes a ratio between the richest 10% and the bottom 40% of the distribution, is based on an analysis that combines statistics, sociology and political economy. Palma observes that the two income groups are of the same order of magnitude in many countries. Redistribution would take place between the wealthy households represented in the first group (the richest 10%) and the working classes, the majority of whom fall within the second group (the bottom 40%). According to his vision, redistribution increases when the middle classes are combined with the working classes and decreases when they are not.

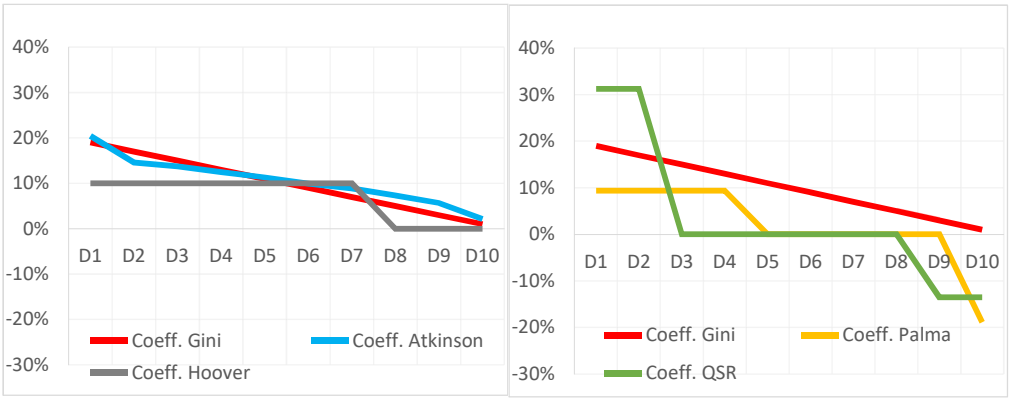
This underlying collective preference can be clarified with a view to clarifying the choice of indicators and facilitating the interpretation of the results and the comparison of the various studies. This reconstitution makes it possible, by means of linearisation, to assign implicit weightings, which the various indicators in fact attribute to the various distribution quantiles as soon as they are used to measure redistribution. In order to simplify the above, we will consider here six of the indicators most commonly used by practitioners:

- three indicators that we will refer to as the *dispersion index*: the Gini index and the Atkinson index, together with the Hoover index, which measures the billions that need to be moved in order to achieve an egalitarian distribution;
- three *gap indices* between the top and bottom ends of the distribution: the Palma ratio (T10/B40), the 20-20 ratio (T20/B20) and the T10/B50 ratio.

The graphs in Figure 12 below represent, first of all, the weightings per tenth of income for the implicit monetary welfare associated with the various indicators, as evaluated by André and Germain (2021). A higher value for a given tenth is interpreted as a higher implicit preference given to that tenth by each indicator.

It is possible to demonstrate that marginal monetary welfare is not dependent on the underlying income distribution for the Gini index. It shows a linear decrease in two-point steps, falling from 19% for the first tenth to 1% for the final tenth. For the other indices, the weightings are dependent on the income distribution[21]. The Atkinson index corresponds to an implicit monetary welfare that weights the first groups more heavily; the marginal utility then decreases more rapidly than is the case with Gini. Finally, the deviation indices show constant marginal implicit welfare across the first tenths (the first two for T20/B20, the first four for Palma and the first five for T20/B50), which are slightly positive for middle incomes and negative at the top end of the distribution (the last two for B20/T20 and the last one for the Palma and T10/B50 indices).

Figure 12: Weighting of implicit welfare by tenth



Sources: authors' calculations.
Reading note: the implicit welfare assigned by the Palma coefficient amounts to 9% for the first standard of living tenth compared with 19% for the Gini coefficient.

21 Figure 12 and **Erreur ! Source du renvoi introuvable.** (annexed hereto) are based on numerical estimates associated with French distribution after transfers.

These simple developments make it possible to specify and quantify the characteristics of the various inequality indices used to measure redistribution, which are well-known to practitioners. The Hoover indicator is interpreted in billions of euros moved between the groups. However, it is the furthest from the concept of welfare, since it is neutral throughout the distribution. As a result, it tends to underestimate the contribution made by redistribution as it fails to take account of the fact that €100 received by the poorest households provides them with greater welfare than €100 received by median or average households (due to the concave nature of the utility of income).

The Gini coefficient is more consistent with the principle of the decreasing marginal utility of income. However, its robustness, which is so appreciated by statisticians, is also its downfall, since it leads to an underestimation of the welfare impact of redistributions among those with the very highest and very lowest incomes. Indeed, it offers little sensitivity when it comes to changes at the extreme ends of the income distribution scale.

The Atkinson index comes closest to the concept of welfare, on which it is directly based. It places great value on redistribution targeted at the poorest people. Therefore, a transfer of €100 from tenth number 10 to tenth number 1 would have a greater impact if it is measured using the Atkinson index than it would if measured using the Gini index. Potentially sticking to the curvature of the utility function underlying the income distribution, it is dependent on a parameter that can be provided with an empirical basis in order to best match the elasticity of income-based welfare[22]. In the following, we will use the value estimated for this parameter on the basis of French data from the life satisfaction surveys conducted by Germain (2020), namely 2. Therefore, the Atkinson index seems to be the most appropriate to use for cases where the redistribution performed by means of transfers is to be interpreted in terms of welfare. Nevertheless, as is the case with the Gini index, it is not especially sensitive at the very top end of the distribution, which does not present any limitations when studying balanced transfers, but may do where this is not the case.

The gap indicators are the most readable and are more sensitive to variations at the very top end of the redistribution. The Palma index and the B50/T10 index are based on a breakdown of the population into groups, which, unlike the groups used for the other indices, are close to the social reality in the sense that they can be interpreted: the working classes, the middle classes, the upper classes, etc. They also present an accounting reality, since redistribution effectively takes place primarily between the wealthy households, which are net contributors, and the working classes, which are net beneficiaries, pivoting around the middle classes.

By transforming these indicators into a ratio, one euro taken from the top end and given to the bottom end counts for double that of a euro taken from the middle and given to the bottom end, or taken from the top end and given to the middle. They therefore

22 $1 - [1/n \sum_{i=1}^{n} [r_i/\overline{r}]^{1-\tau}]^{1/(1-\tau)}$ or r_i represents the income of an individual i, $\overline{r}$ the average income, n the number of individuals and τ a parameter (set at 2 for the purposes of this report).

place more value on redistribution operations from the top to the bottom than they do for those involving the middle class. They present the disadvantage of being less sensitive to redistributions aimed at the very poorest households. However, they offer the advantage of being robust at the extreme ends of the distribution scale in the event that the statistical sources used are less reliable for the poorest or richest households; this is particularly true of the Palma and T50/B50 indices.

Other studies, which focus on localised measurements of income redistribution, consist of comparing the income distributions with one another (Chauvel, 1995). Amoureux, Guillaud and Zemmour (2019) suggest, for example, that the reduction of inequality should be measured according to three criteria. The first criterion identifies the target area for redistribution, within which income densification takes place. This area of income gap reduction is fairly limited around the median. The second criterion captures the intensity of redistribution, the measure of which is the share of households affected. The third criterion measures the polarisation of the redistribution according to whether it is performed "from the bottom up" (by reducing the poverty rate) or "from the top down" (by reducing the share of high incomes). This analytical framework highlights the fact that one of the more notable effects of redistribution policies is to increase the share of the population whose standard of living lies around the median.

Figure 13: Characterisation of the practical use of the main inequality indicators to measure distribution

	Indicator	Characteristic	Cautionary note
Dispersion	Hoover	Simple interpretation in billions of euros moved during the transfer operations	The furthest from the concept of welfare (marginal utility virtually constant)
	Gini	Closer than the Hoover index to the concept of welfare, but difficult to interpret	Underestimates the impact of targeted redistributions on the poorest households (marginal utility decreasing in a linear manner)
	Atkinson	The closest to the concept of monetary welfare	Like the Gini and Hoover indices, less sensitive at the top end of the distribution
Ratio	Palma (B40/T10)	Very simple to read and interpret within social groups: inequality and redistribution play out between the working classes and wealthy households	Underestimates the impact of targeted redistribution on the welfare of the poorest households and the negative impact of the deductions on the middle classes
	T10/B50	Same benefit as the Palma index, with working classes making up half the population	Underestimates the impact of targeted redistribution on the welfare of the poorest households. B10/B50 allows for a focus on median households
	20-20 or QSR ratio (T20/B20)	Easy to read, places greater emphasis on redistributions targeted at the poorest households than the Palma and B50/T10 indices	No interpretation within social classes, and no account taken of redistribution operations benefiting the upper working classes
	Interdecile ratio (D9/D1)	Easy and logical to read, similar to the 20-20 ratio, the decile threshold can be interpreted as a particular individual	Does not take account of the extreme ends of distributions and provides an especially poor measurement of the concentration of high incomes

In light of the above, none of these indicators, when used in isolation, can correctly shed light on the impact of the redistributive effects of transfers. Any choice of indicator

corresponds to specific weightings and therefore implies an underlying normative convention if interpreted in terms of welfare. This observation leads to a fairly obvious recommendation, but one which the observation of practices compels us to reiterate: in order to correctly measure the impact of redistribution on inequality, it is preferable to shed light on the issue from several angles and therefore to make use of several indicators to ensure the robustness of the results.

The median or intermediate population could be studied by defining it as being neither poor nor wealthy. In order to achieve this, it may be useful to define a wealth threshold as a proportion of the median standard of living, in the same way as the poverty threshold has been set at 60%. In the introduction to the insights detailed in *France, Social Portrait*, dedicated to median households (*Insee Références*, 2017 issue), wealthy persons are defined as those whose standard of living exceeds 180% of the median standard of living. This threshold therefore defines a wealth rate, measured at 10.9% in this publication, while the poverty rate is estimated at 14.1%. This means that 75% of people are neither poor nor wealthy. This indicator measures the concentration of the distribution of standards of living around the median and can be used as a tool for performing international comparisons. Similarly, the OECD report (2019) on the middle classes defines middle-income households as those situated between 75% and 200% of median income. This category represented 64% of the population in OECD countries in the 1980s, compared with 61% in the 2010s. These incomes grew a third less quickly than the highest 10% and even stagnated in some countries.

Recommendation 14: In order to reach robust conclusions, describe the entirety of the distribution (by tenths, hundredths, etc.) of income and wealth; make use of at least one dispersion indicator and one ratio indicator, rather than concentrating on a single indicator.

I.4.d. Comparison of the Redistribution Systems

The comparison of redistribution systems appears to be a simple question with an answer that can be difficult to obtain. The difficulties raised in the previous sections must be addressed and the choices made in order to achieve this need to be clarified. The question itself is worth looking into further, since we are interested in making international comparisons. So far, by comparing the income before and after transfers at the individual level or by category, we have measured the observed impact of redistribution on standards of living, aggregated where appropriate by applying a greater or lesser weighting to the bottom end of the distribution in order to more closely approximate the concept of an impact on collective welfare.

Another related, yet different question revolves around the evaluation of the effect of the socio-fiscal system itself on standards of living in the form of calculation rules, i.e. answering the question “are the tax and social laws of country A more redistributive than those of country B?”. It is no longer sufficient in this case to compare the inequality indices before and after transfers in the same way as before; ideally, the entire set of rules governing the socio-fiscal system of country A should be simulated in advance in

country B and vice versa in order to construct comparable counterfactual situations. This being the case, if a part of system A applied to income in country A reduces inequality to a greater degree than when system B is applied to country A, and if the other part of system A applied to country B reduces inequality to a greater degree than when system B is applied in country B, it is reasonable to conclude that one system is more redistributive than the other. If this is not the case, the redistributability of the two systems cannot be clearly classified.

Such an exercise goes far beyond the scope of distributional income accounting, but it allows for a close approximation of this by estimating, through the calculation of appropriate ratios, a "reduced version" of the rules of the transfer system. As an initial approach, two specifications are possible to achieve this. The first approach involves calculating the net transfer amount for each tenth as a fraction of the income of that tenth. This is based on the assumption that the apparent rates of transfers paid and received are proportional to the primary incomes within each tenth. The second approach involves calculating a net transfer amount for each tenth as a fraction of national income, and comparing that profile with other countries. This implicitly assumes that the transfers within each tenth take place as a lump sum.

In practice, the socio-fiscal systems obey both logics simultaneously (benefits are closer to the flat-rate model, while deductions more closely match the proportional model), which makes the results difficult to interpret. This suggests that a third approach is needed, which consists of calculating an average apparent tax rate, as a proportion of primary income, and an average amount of transfers received, expressed as a level, with this combination of apparent rate and apparent flat-rate allocation acting as a *proxy* for the fiscal-social system and therefore providing the basis for international comparisons (see André-Germain (2021)).

Recommendation 15: The comparison of the redistributive effect of two socio-fiscal systems with "all else being equal" ideally requires the application of transfer rules to the same primary income distribution. In practice, several complementary approaches can be taken on the basis of the same distributional accounting in order to address this theoretical case. *A fortiori*, it is necessary to explain the approach followed and to discuss its implications.

I.5. Possible Limits and Extensions

This final section collates the points for discussion regarding the framework generally adopted for the study of inequality. It highlights in particular the fact that the measurement of redistribution from an accounting point of view inevitably remains partial, as is the case with any analytical accounting exercise, since it is situated upstream of the consideration of any possible looping effect or the behaviour of economic agents. The final paragraph deals with issues related to the data sources on which the analyses are based.

I.5.a. Inequality, Life Cycle and Mobility

The usual approach to measuring redistribution, which is based on the classification of households by standard of living, then on the basis of the distribution of all of the public transfers paid and received, known as distributional accounting, provides a cross-sectional view of the distribution of income, transfers and wealth for a given year. This "snapshot" provides a necessary basis for understanding the issue of inequality, but is not the be-all and end-all. The working group identified five main limitations presented by the annual nature of distributional accounting.

Firstly, the observation of inequality at a given point in time does not correct for life-cycle effects. A share of the individuals at the bottom end of the income distribution scale could be made up of young households – students or those just starting their careers – whose current income is low, but whose future income prospects are higher. Albis et Badji (2017) found that the incomes of individuals within each cohort follow an inverted U-shaped curve throughout their life cycle, which peaks at around 55-59 years of age. The difference in income between the youngest (25-29 year olds) and the top end of the life cycle (55-59 year olds) is around 30-40% for each cohort. However, this difference, although significant, is small when compared with the differences in income between the top tenth and the bottom tenth, which can exceed a factor of 10. According to Garnero *et al.* (2019), the majority of labour income inequality at a given point in time is permanent in OECD countries. Indeed, almost 80% of inequality between individuals measured at a given point in time persists throughout their life cycles. Furthermore, the distributional accounting exercise is not fundamentally incompatible with a breakdown by age, provided the underlying data are suitable for this. As part of the DINA project, Garbinti, Goupille and Piketty (2018) found that labour income rises from around 70% of average income for 25-29 year olds to 120% for 55-59 year olds.

Secondly, cross-sectional inequality includes any short-term variations in income that individuals may experience. These variations do not properly reflect changes in their standards of living. Those same individuals are able to smooth out their consumption during times when they do not have any liquidity constraints. When income inequality is looked at over a period of several years, it is therefore lower than the annual inequality. Such a measure of income mobility is particularly demanding in terms of data quality, since it requires individuals to be followed over time. In the United States, and based on Social Security data, Kopczuk, Saez, and Song (2010) found that the Gini coefficient falls by around 2pp when looking at income over a period of five years as opposed to annual income. This change is quite small compared to the value of the Gini coefficient for annual data, which is around 0.44 for the early 2000s (most recent available data). Moreover, the difference remains stable over time and does not significantly change the trends. In France, Accardo (2016) highlights that, when averaged over a period of five years, inequality in the distribution of standards of living is only very slightly lower than the inequality currently observed in standards of living. Recent studies (Roux & Magnac, 2020) have been breaking down the variations in life cycle salaries and have found that short-term wage inequality is 20-80% higher than long-term inequality. Permanent individual heterogeneity would account for between 60 and 90% of the variance in salaries.

Thirdly, income inequality also fails to take account of intergenerational mobility. However, this mobility appears to be limited. In the United States, Chetty *et al.* (2014)

show a linear relationship between the ranking of parents within the income distribution and the ranking of children: a 10 per cent increase in one corresponds to a 3.4 per cent increase in the other. According to the OECD (2018), intergenerational mobility is no higher in France, where it takes six generations for a family in the poorest 10% to reach the average (compared to five in the United States). Although it is conceptually distinct from cross-sectional income inequality, this intergenerational mobility appears to be linked to the latter by the *Great Gatsby curve* (Corak, 2013): across countries, there is a negative correlation between intergenerational mobility and inequality.

Fourthly, transfers of capital between households – in the form of gifts or inheritance – together with maintenance payments or informal transfers – between parents and children, the payment of rent or pre-committed expenses – are an important form of transfer that are not taken into account in current income. Nevertheless, these transfers play an important role in the creation of wealth and the transfer of inequality between generations. Piketty and Zucman (2015) find that the share of the French national wealth that is inherited has increased in recent decades to around 65% as at 2010, with similar trends being seen in other developed countries. Arrondel, Garbinti and Masson (2014) show that gifts and inheritances increase the probability of a person buying their own home and that gifts in particular increase the probability of an individual starting or taking over a business. These transfers are not taken into account in national accounting. Only inheritance taxes are included in capital transfers (D9). In so far as these data exist, it is still possible to measure these transfers within a sub-account.

Fifthly, income inequality also fails to take account of inequality in health and life expectancy. According to INSEE (2016), between 2009 and 2013, the life expectancy of a 35-year-old executive male was a further 49 years, compared with 42.6 years for male blue-collar workers. This inequality is notable in itself, but it also has repercussions for income distribution and redistribution throughout the life cycle: blue-collar workers have less time to accumulate wealth and, on average, benefit less from the pensions system, etc. Health inequality can therefore have an amplifying effect on income inequality.

To summarise, the distributional data presented in this report provide a snapshot of the impact of social, fiscal and in-kind transfers on inequality, which cannot claim to cover the whole issue. However, they are no less essential than the financial evaluations of the measures set out in finance laws, for example.

I.5.b. Elasticity of Factors and Fiscal Impact

Distributional income accounting is still an accounting exercise. In other words, it is a case of describing the way in which income is paid out and distributed within the economy at a given moment using a common language and in accordance with established conventions. The exercise is carried out with *all else being equal*, so to speak, and therefore without taking account of behavioural, dynamic or general equilibrium effects.

It is generally accepted in economics that the question of "who ultimately pays the tax?" is separate from the question as to who is legally obliged to pay the amount to

the administration: this is the issue of fiscal impact. National accounting already recognises this principle, in a sense. For example, social security contributions are always included in the remuneration received by employees (D1), regardless of whether they are employee or employer contributions. Although employers' contributions are technically paid by companies, they are considered to be a deduction from labour income that is paid by employees, unlike corporate income tax. All this has consequences for the calculation of the division of value added between capital and labour, for example. However, this represents the agreed approach.

These choices can be justified by means of the fiscal impact. In a standard partial equilibrium model, if the labour and capital supply elasticities are low compared to the elasticity of the substitution of labour and capital for one another, then the levies on labour are paid by the workers and the levies on capital are paid by the holder of that capital. However, while it is useful, the use of the principles of tax impact does present certain problems.

Indeed, in standard neoclassical models, deductions from capital are partly – or even entirely – paid by workers. Following this principle, it would appear that there is justification for allocating those deductions to employees, which would have major consequences for pre-tax inequality and the redistributive nature of the system. This raises at least two problems. Firstly, this result is controversial and relies on specific assumptions: there is a vast array of literature that demonstrates how such estimates will vary depending on the assumptions made (Saez and Stantcheva, 2018). Secondly, even if we take this result at face value, it should be noted that the chain of reasoning that leads to it is complex: taxing capital reduces its after-tax return, which discourages investment, thereby reducing the capital stock and, in turn, making workers less productive, resulting in downward effects on their wages or upward effects on their risk of unemployment. Taking account of such a chain of reasoning goes far beyond the objectives of distributional accounting.

These are issues that have arisen during the *Distributional international accounts* (DINA) project, particularly with regard to the impact of corporate income tax. The initial approach consisted of following the principles of fiscal impact as put forward by Harberger (1962). According to these principles, corporate income tax is paid by all holders of capital, regardless of whether that holding is in the form of shares or bonds. This can lead to a number of inconsistencies: corporate income is attributed to shareholders (since they are the ones who control the company and who benefit from the capital gains derived from this income), but corporate tax, although paid on this income, is attributed to a wider group of individuals. The new DINA practices now tend to make the owners of companies, i.e. their shareholders, pay the corporate tax. This orientation is based on a distinction between the analysis of the distribution of taxes on the one hand and the analysis of the effects of a tax reform on the other hand (Saez and Zucman, 2019). The first concept is primarily descriptive, while the second aims to establish a counterfactual.

In our view, distributional income accounting falls under the first type of exercise. The second type – more speculative in nature – is useful, but needs to be carried out within a different framework. Although descriptive, the analysis of the tax distribution is not limited to observing the nominal incidence. The following is a general principle: *the factor that pays a tax is the one on which the amount of the tax depends*. Although

employers' contributions are nominally paid by employers, the amount depends on the company's payroll. They are therefore allocated to the employees. Conversely, corporate tax depends on the profit of companies and is therefore paid on that profit. A simple economic logic underlies this approach: if the aim is to model the decision of an agent with regard to the use of a resource (for the purposes of production or consumption), the only taxes that directly influence that decision are those that depend on the resource in question. Therefore, the analysis of the distribution of taxes provides data of relevance for the modelling of certain behaviours by agents, but does not comment on the behaviours themselves. There is no consensus on how to model such behaviour, which is also likely to vary over time and between countries. The inclusion of these behaviours in inequality statistics would pose significant problems in terms of robustness and comparability.

By concentrating on the distribution of deductions (taxes and levies), we also ensure the consistency of the distributional accounting exercise with itself. By design, the assumptions made with regard to their distribution therefore leave the total national income or the share of value added unchanged. However, these values will generally change if we consider the impact of a socio-fiscal reform incorporating the reactions of agents, which is problematic for an accounting exercise.

The redistribution or tax progressivity measures emerging as a result of distributional income accounting should therefore not be interpreted as a counterfactual in the strict sense of the word. More specifically, these analyses of socio-fiscal arrangements are based on an assumed counterfactual with no behavioural effects. They are intended to describe which groups pay which taxes, but only represent what the distribution of income would look like without a particular tax with a certain margin of error. However, they should make it possible to inform the debate on the modelling of behavioural responses to taxation.

In addition, the distributional accounting framework assumes that the generation of primary income happens independently of socio-fiscal policies. In reality, the distribution of primary income can be directly modified by the legal or regulatory framework, without going through monetary transfers between agents. This is the case, for example, for the introduction of a minimum wage or low rates of taxation for very high incomes. Benefits for the poorest employees are likely to be higher in a country where there is no such minimum wage or where it is low. In addition, a fiscal system that is more heavily concentrated on high incomes, since high primary incomes are mobile, can potentially lead to an increase in such incomes in order to preserve net incomes. In other words, the distribution of "market" income is linked to the "before/after" profile of transfers.

I.5.c. Differences Between Statistical Sources

When studying redistribution, particular attention should be paid to the data being used. Various sources exist: the LIS (*Luxembourg Income Study*) database mentioned above, INSEE's ERFS survey and FIDELI register, and Eurostat's EU-SILC system. Contrary to what you may think, the production processes for sources may be relatively similar; however, the poverty and inequality indicators calculated on the basis of those various sources can vary significantly and can sometimes present divergent temporal

dynamics. A comparison between ERFS and FILOSOFI showed, for example, that the assumptions regarding the evolution of financial income alone could have a significant influence on the level and development of inequality indicators.

Recommendation 16: For the purposes of comparability and replicability, clearly specify the simulation and imputation methods used, drawing a distinction in particular between income observed within the central source (including by means of matching) and those simulated on the scale, or even imputed and adjusted.

Recommendation 17: In the interests of readability, indicate the methodological breaks in the series. In the event of a change to the calculation method (simulations, imputations, new sources, etc.), present long back series of data wherever possible.

In practice, there is no single source that allows all transfers covered by national accounting to be taken into account. It is therefore necessary to combine several sources. Two situations may arise. In the first, household or individual identifiers allow for the direct matching of sources. This is the case, for example, for certain comprehensive administrative bases. In the second situation, those identifiers are not available. This is the case in particular when comparing administrative data with survey data. Statistical matching must therefore be performed.

In general, the validity of statistical matching methods relies on the assumption of conditional independence: comparing a source A with a source B assumes that the variables associated with A are independent of the variables associated with B and conditional on the variables shared by the two bases. This assumption is restrictive if the aim, for example, is to run a regression between the variables of A and B. It is less restrictive in the context of the studies included in this report. Indeed, let us assume that we observe an income concept X, which is shared by both A and B. Two different transfers, Y and Z, are observed in A and B respectively. Although there is no way of knowing with certainty the joint distribution of Y and Z, it is easy to estimate the expectation of X + Y + Z conditional on X. Provided the reclassification effects between X and X + Y + Z are small, a reasonable measure of the total income X + Y + Z is also obtained. More problems arise where the data are to be broken down by family structure, for example, where this is not observed in both A and B, where it is weakly correlated with X and where Y and Z are heavily dependent on it. These problems remain relatively limited, provided the sources used are reasonably comprehensive. It is this type of imputation that is commonly used in practice: for example, the INES model, which serves as a basis for this report, imputes consumption data on the basis of the family budget survey, or household wealth on the basis of the Wealth survey.

In other words, the distribution of the various transfers along the standard of living scale is correlated in the sense that the core redistribution for a household is based on a set of demographic, social and fiscal characteristics that can only be determined if they are observed simultaneously. *A fortiori*, "superimposing" the distributions of different bases by imputing the transfers, group by group, on the basis of a ranking for each

transfer, can only provide an approximation of the actual situation: the first tenth of a pension is not necessarily paid to the first tenth on the standard of living scale. Likewise, the distribution of capital income does not perfectly match that of labour income[23].

> **Recommendation 18:** Start from a central source with a broad coverage of income when studying redistribution through a set of transfers. In general, you should prioritise sources that include a large number of income components simultaneously.

A further point to be aware of is linked to breaks in the availability of administrative data over time, particularly where transfers are removed or reconfigured. The examples of the abolition of housing tax and the change from the ISF [solidarity tax on wealth] to the IFI [tax on real estate assets] highlights the importance of having autonomous statistical registers in order to measure redistribution and inequality, in particular for wealth and savings, and for defining the central units used to analyse inequality: households.

However, administrative data present the advantage of containing information with the same structure as that used in the socio-fiscal systems with which they are associated. In other words, for each socio-fiscal system that we wish to simulate, the management database used for that system contains all of the information required for its precise calculation, which is not necessarily the case for survey data. For example, the resources used for some social security benefits are provided on a quarterly basis. The CNAF's administrative data contain this infra-annual information. The incomes contained within the survey data are often annual, which can result in prediction discrepancies in the case of monthly or quarterly variations in household income. This therefore necessitates the use of quarterly modelling. However, the administrative bases may not cover the entire population, for example where the scope is limited to the beneficiaries of the benefits in question, which implies that an extrapolation exercise is required.

> **Recommendation 19:** Guarantee the consistency of statistics on redistribution and inequality over time by developing and disseminating statistical registers, bringing together data that are additional to those provided by the management databases alone, in particular for the study of wealth.

I.5.d. The Broader the Scope, the More Necessary Imputations Become

The usual scope of monetary redistribution, which extends as far as household disposable income, is a pivot point common to both microeconomic analysis and the accounting approach, with a few different conventions. As we have already pointed out,

23 See box 2 "43% of the 1% of households with very high income are also in the top 1% of wealthiest households" in (Cazenave-Lacrouts, 2018).

as the concept that comes closest to the households' perception of "arbitrable" income, it forms the basis for the usual calculation of inequality in standards of living.

If we wish to broaden this scope, the public transfers that are to be added to the analysis are not, strictly speaking, monetary payments with a redistributive purpose. They correspond to services provided by the public sector, qualified by national accounting as transfers in kind, such as expenditure on education or the allocation of reimbursements from the health branch of Social Security. They do actually perform transfers between different categories of the population, such as by standard of living band, as well as by age bracket or social and professional categories.

The information required in order to place a monetary value on these transfers to households is not always available. As a result, statistical imputations should be carried out in order to finely distribute these transfers. Generally speaking, the further the expenditure deviates from the usual scope of monetary redistribution, the less informative the existing data. In order to achieve full comprehensiveness, additional assumptions are required when compared with the usual work carried out, which makes all of these studies all the more complementary. As a result, the distribution of taxes on products requires data to be gathered on consumer expenditure, distributed, for example, by pseudo-matching with the family budget survey. Similarly, health expenditure benefits in kind are allocated to households by requesting health insurance reimbursement data.

A second category of estimates relies on microeconomic information from tax and social security databases in order to distribute income and transfers. These are, on the one hand, education expenditure, which is based on the family composition of households and, on the other hand, business-related income and taxes, which are based on the professional income of households. They are, by their very structure, less precise than if they had been directly present within the databases or matched, but the micro-founded estimate provides the best possible accuracy with regard to existing work and data.

Finally, a third type of transfer requires more direct imputations, such as non-individualizable collective expenditure or taxes on production. To ensure the proper interpretation of the results, it is important that the conventions used are clearly described, that the sensitivity of the results is documented and that intermediate data are produced to allow the user to test their own assumptions.