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Impact of social transfers in kind on income distribution in the EU countries:

Methodological note

Volume I: Social transfers in kind for health care services

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1. Background

Income distribution measures and poverty indicators are policy instruments to monitor the situation of the most vulnerable part of the society.

While monetary income indicators are widely used and recognised in the analysis of poverty and inequality, there is an ongoing discussion on the conceptual and methodological aspects of the non-monetary income indicators to complement the existing measures.

Monetary income is the most relevant factor that impacts the economic well-being. Monetary disposable income could be consumed or saved. In turn social transfers in kind which could be regarded as non-monetary income can be consumed when they are received, without any possibility to save. The more household consume, the higher the wellbeing is assumed.

According to the glossary of the 1993 System of National Accounts (SNA), social benefits in kind are “expenditures by government or NPISHs on goods or services produced by market producers that are provided directly to households, individually or collectively, without any further processing constitute final consumption expenditures by government or NPISHs and not intermediate consumption. The goods and services in question are treated as social transfers in kind and enter into the actual consumption of households.” (UN-DESA, 2010).

There are several ways to include social transfers in kind in inequality measures. One method is to estimate them in monetary terms and to add them to the income. It is however possible to approach the issue from the other side, i.e. to see whether the persons or households would be able to afford the public services (education, health, child care) in case they would need to pay for them from their current income.

With the objective of analysing complementary choices to monetary income indicators, Eurostat presents findings of analysing the impact of social transfers in kind on income distribution and inequality measures such as the Gini index.

Social transfers in kind can have different aims. Eurostat work will be focused on education and health care functions. The work will be divided into two different volumes, being the first volume focused on social transfers in kind for health care and second volume dedicated to education social transfers in kind.

2. Methodology

2.1 Overview

Households can receive social transfers in kind from government or non-profit organisations serving households (like churches). In this analysis the focus is on the health social transfers in kind (STiKs) received by households from government. These benefits are assumed to be uniform at country level.

Income distribution is computed from survey micro data and social transfers in kind are imputed to the micro data for further distributional income analysis.

Although the STiK field of research is still limited, some work has already been carried out and corresponding final reports have been published. This Eurostat's project on STiKs has drawn heavily on some existing literature (Verbist *et al.*, 2012; Vaalavuo, 2011; Paulus *et al.* 2009; Langorgen, 2010) not least by examining the content of the final publications but also discussing options and potential solutions. Health care and education are the functions of government that consume the most resources across the EU, and as such all studies include both of these functions.

Several conceptual considerations are addressed in this part of the methodological note based on prior research and consultations with experts in the field:

- valuation of STiKs, 'insurance' or 'actual consumption' approach;
- socio - demographic variables to be taken into account for STiK distribution;
- STiK value imputed at household and individual level (equivalence scales);
- income distribution and poverty indicators (based on disposable income and/or STiKs).

2.2. Valuation of STiKs - 'insurance' or the 'actual consumption' approach

With the aim of estimating the value of social transfers in kind, a value needs to be imputed from external sources for each household and individual. Much of the existing literature on the valuation of social transfers in kind in household surveys recognises that there are a number of choices to be made regarding the methodology for valuation of STiKs across the population. One of these choices is typically presented as a binary choice between the 'insurance' approach and the 'actual consumption' approach (see box 1).

Box 1: Insurance approach and actual consumption approach

The insurance approach is one where the amount of income imputed to a person is based on an estimate of what the equivalent (notional) insurance premium might be, such that the sum of those equivalent insurance premiums across the entire population equals the total costs of the service;

The actual consumption approach is one where the amount of income imputed to a person is based on that person's use of the service.

An actual consumption approach is very data - demanding and typically the relevant data are not available at an international level, although it is available in some countries, for example

the Nordic countries. This is the major reason for published studies, as well as in this paper, to choose the insurance approach over the actual use approach.

At a conceptual level, social protection can be considered as a type of insurance against a given risk, in which the state is ensuring that individuals have a minimum standard of living in terms of health care, education, housing and so on. This might constitute a strong argument for using an insurance approach for some types of social protection. In all published studies accessed during the development of this work, the insurance approach has been used for health care and for long-term elderly care. For all other functions, the actual use approach has been used.

The existence of equivalent private markets, or not as the case may be, could be a factor in helping to decide on the most appropriate approach:

- for health care and for long term care for the elderly, private sector markets exist for health care insurance and for 'pay-as-you-go' health care, suggesting that **either approach** could be appropriate.
- for education, housing, and child care, private sector markets exist only for 'pay-as-you-go' services, suggesting that only **the actual consumption approach** is appropriate for these functions.

The choice of the approach could also be influenced by the decision to have household- or person-level results from any consequent imputation. As Vaalavuo (2011) points out that might not make sense to '...impute a value of 80,000 Euros of surgery to a patient's economic resources...'. From an income-accounting perspective, such an imputation could make sense, but from a welfare perspective, in which income is used as an indicator of welfare, this makes rather less sense (unless the patient's extra needs are also taken into account). Healthcare costs are known to be skewed, with about 5% of the population accounting for about 50% of healthcare expenditures (Cohen and Yu 2012). The latter observation explains the high level of cost sharing from public healthcare payers (redistributive insurance approach) and further underlines the rationale for preferring an insurance approach over an actual consumption approach in the health care domain.

A further point was made that according to some studies, more than half of lifetime health care expenditure occurs in the last years of life: this suggests that an insurance approach might be the most meaningful. This means that the value of health care STiKs that is allocated to an individual is taken as the equivalent of what might be the insurance premium that that individual would pay if a fully functioning market existed. In an insurance approach, all individuals receive health care STiKs (whereas with an actual consumption approach, only those individuals that use health care services would receive health care STiKs).

Based on experts opinion and previous publications in this field, as well as on practical implementation, the insurance approach is chosen for health STiKs in this paper.

2.3. STiK value at household and individual level (including equivalence scales)

The methodology to analyse the distribution of disposable income is robust and internationally agreed. This part of the paper explains the current practices in the field of disposable income and further builds up possible scenarios to analyse STiKs. The European Union Statistics on Income and Living Conditions (EU-SILC) is the reference source for

statistics and indicators on income and living conditions in the EU. It will be described in more details in Section 2.1.

Disposable income

Household yearly monetary disposable income is collected through the EU-SILC survey. The information available in the survey on household disposable income can be used directly, meaning that the household is treated as the smallest unit of the society and household income is analysed without taking into account the information on the number and characteristics of the household members but this approach would not give very rich information on the distribution of income of the population in general. To overcome these drawbacks, the household disposable income information should be adjusted to the number of the household members and their characteristics.

Distribution of total household income to its members is based on three main principles:

- 1) there is an economy of scale using the household income (for example, for heating costs, the house would be heated during the winter whether there are two or three household members currently living in it, in other words by adding one more member to the household the heating cost does not change given they stay in the same house);
- 2) that the household income is distributed taking into account the needs of each household member (for example, two years old child would consume less food than adult aged 30).
- 3) the household income is equivalised so that each household member is attributed the same amount of income, thus assuring that all household members are equally well off.

When a one-person household is used as a reference household, its equivalised income is equal to actual income recorded. For household composed of more than one person, equivalised income is an indicator of the household income that would be needed by a one-person household to enjoy the same level of economic well-being as the household in question.

With perfect information on the household compositional factors that have an impact on the amount of expenditure needed to have a given standard of living and on expenditure patterns, it would be possible to calculate exactly what income levels are required to acquire a particular standard of living for all types of households given their relative needs for all consumption items.

In practice, such detailed information is not available. Instead, a consensual approach to the problem of comparing income for households with differing compositions has been reached. This consensual approach involves the use of a relatively simple 'equivalence scale' which can be thought as average ratios that take into account the needs of households across all different possible consumption items (including the two examples given above – heating and food) - as well as all other household consumption items.

The equivalence scale adopted for use in practice by Eurostat is the modified OECD equivalence scale. In particular, it specifies that there is a main household member (first adult) and other household members are attributed a weight based on the age:

- The first household member aged 14 years or more counts as 1 person;
- Each other household member aged 14 years or more counts as 0.5 person;
- Each household member aged 13 years or less counts as 0.3 person.

An example of this is shown in Box 2.

Box 2: Calculation of equivalised income using modified OECD equivalence scale

Total disposable income in household is 50 000 euros. Household consists of two adults aged 45 and two children, aged 15 and 12. The calculation of the equivalised income is as follows:

First adult has the weight 1;

Second adult has the weight 0.5;

15 years old child has the weight 0.5;

12 years old child has the weight 0.3

Total sum of weights for the household members is 2.3 (1+0.5+0.5+0.3), following the equivalised income for all household members would be $50\,000/2.3 = 21\,739.1$ euros

It is important to note that the modified OECD equivalence scale (and other similar simple equivalence scales, for that matter) is not the product of an exact science and therefore based on direct empirical evidence. The modified OECD equivalence scale has been chosen subjectively, but is nevertheless consistent with the quantitative research that has been undertaken (Anyaeibu, 2010).

Disposable income and STiKs

STiK allocation

The main purpose of the exercise is to see how the STiKs are distributed in the population and to carry out the income distribution and poverty analysis. Social transfers in kind (STiKs) can be thought as an imputed income to a household with an exactly-matching imputed expenditure (or need to incur 'expenditure'). It is expected that adding the value of STiKs to the disposable income would decrease household income inequality, as these services are

assumed to be equally¹ accessible for all members of society irrespective of their monetary income situation.

STiK distribution at household level

One of the simplest ways is to look at the distribution of STiKs at household level taking as a base the equivalised disposable income at household level. It could be done in two steps, first, by distributing the households according to their equivalised disposable income, secondly by looking at how much of STiK services are allocated to each of the equivalised income quintile. The individual disposable equivalised income information is used to allocate STiKs to disposable income quintiles. The expected result is that irrespective of the disposable income distribution, each quintile would receive an additional income in kind of 20% on average, as public services are assumed to be equally accessible by all population members irrespective of their monetary situation. The deviations from 20% are indicating either the concentration or a relative lack of STiK target population in a particular quintile.

STiK distribution at individual level

Even if monetary disposable income has been equivalised at household level, the STiK value for each household member is different (see an example in Table 1). Simply adding together the disposable equivalised income and STiKs at individual level, would result in the fact that each household member has different level of adjusted disposable income (disposable equivalised income and STiKs), that is against the concept that all family members are equally well off.

¹ Nevertheless the unique access to the health, education and child care provided though public financing to all members of society might not hold for each member states, as it does not take into account the possible individual contributions.

Table 1: Example of a possible distribution of STiKs based on monetary disposable income

	Income quintile	Equivalised monetary disposable income at household level	STiKs
HH1	1	1000	600
HH1	1	1000	700
HH1	1	1000	400
HH1	1	1000	100
HH2	1	1010	300
HH2	1	1010	400
...	...		
HHt	5	7000	100
HHt	5	7000	300

The STiK income differs in several aspects from monetary income:

- 1) There is no or very limited economy of scale. However, there could be some services in kind provided by government that imply economy of scale at household level, for example, provision of social housing for most deprived (e.g. means tested) families in society, that is not explored in this analysis;
- 2) The elasticity of the need for public health care relative to household size is probably close to unity. For most public services, the need for services is most likely to grow in direct proportion with the number of individuals (more similar to food than to heating, to use the examples referred to earlier in this note). Therefore, it is not likely that the needs of those who receive public services, including health care, are distributed in a similar way to needs for cash transfers. For example, it is unlikely that the relative need for public health services or for many other public services of the four-member family mentioned above is 2.3 times of the one-member family (see Box 2).

There has been a long-standing recognition in the literature of the need to re-consider what should be an appropriate equivalence scale to be used when estimates of household disposable income are increased by the value of STiKs. For example, Radner mentions this requirement in his paper published in 1997.

There are many attempts from researchers to find the way how to equalise the adjusted disposable income (disposable equivalised income and STiKs) to the household members to be able to carry out more detailed poverty analysis. There is however no consensus so far which method to choose.

Two proposals result from a collaboration with Eurostat, the proposal from Euromod for a more appropriate equivalence scale in 2010 (Paulus *et al.*, 2010), and the NET-SILC2 proposal (Aaberge *et al.*, 2013).

Please find below several options proposed in the literature and discussed with experts during the project.

- Modified OECD equivalence scale

An easy solution would be to use the same modified OECD equivalence scale for disposable income and STiKs. However, it does not take into account the fundamental differences between the two incomes types described above.

According to the views of experts, although there is a general agreement that this is far from the best solution, the estimates that result from this approach should be presented as they will provide a reference against which other approaches can be compared.

- Re-modelled modified OECD equivalence scale that takes into account STiKs

The NET-SILC2 proposal

The weights used in calculating the modified OECD equivalence scale could be amended to take into account the needs associated with non-cash as well as cash income. This is the approach taken by the [NET-SILC2 group](#).

The NET-SILC2 method is using country-specific information from EU-SILC and sources of information on government expenditure on public services in a way that produces a single European-level needs-adjusted equivalence scale (rather than a scale for each country. For reasons based on the availability of data, the NET-SILC2 limited their analysis to 21 EU countries). Their method for establishing an appropriate needs-adjusted equivalence scale involves three steps: “The first step ... consists of estimating needs-adjusted scales for each of the European countries ... Next, the country-specific needs-adjusted scales are assigned to all households in the total population of the countries in the study. Finally, the common scale is determined by the average of the country-specific needs-adjusted equivalence scales for every household in all countries” (Aaberge *et al.*, 2013).

Their first step involves the estimation of the non-cash equivalence scale as well the combination of it with the cash income scale. The estimation of the non-cash equivalence scale involves the following:

- assuming that the value of the needs for public services by individual households equate to the value of the STiKs received by individual households (which are estimated by the NET-SILC2 in a similar way as the ‘main’ methods used in the present paper). It should be noted that this assumption is equally applied to all member states; however it is also true that EU countries differ in the extent to which the needs of public services are covered by government spending;
- whereas the modified OECD scale distinguishes between types of household according to the number of occupants and the distinction between adult and child, the NET_SILC2 proposal also distinguishes by detailed age band (7 of them) and by sex²;
- For each type of household, summing the value of the need for public services for each person living in households of that type;
- calculating the ratio of this sum for each type of household to the sum for the reference household (defined as a household with a single adult male aged 35-44);

² As an aside, this results in a huge number of different types of household.

- to reduce the (computing and presentational) complexity, a regression model is fitted to the data, whereby the number of age bands is reduced to 7 and no differentiation by sex is made (the model fit is extremely high).

This non-cash scale is combined with the cash scale according to their relative expenditure weights, and then a European average scale is determined by taking a population-weighted average of the country-specific scales. As a consequence of calculating the equivalence scale parameters combining cash income and STiKs, the equivalised income tend to be underestimated for countries with generous public spending and overestimated for countries with smaller public spending.

This leads to the set of parameters for calculating the proposed NET-SILC2 needs-adjusted equivalence scale, as reproduced in Table 2.

Table 2: NET-SILC2 equivalence scale parameters for the combination of cash income and health care and education and child care STiKs, 2009

Constant	0.46
0-3	0.41
3 years to education age	0.57
Education age below 14	0.69
Education age above 13	0.95
Above education age – 54	0.54
55-64	0.6
65-74	0.67
75 and above	0.75

In order to calculate the non-cash equivalence scale, what is required is to determine the household composition in terms of the above age bands, and to sum as appropriate (the constant term is added once per household). So for the reference household as described above (single adult male aged 35-44), the scale is, of course, 1 ($0.54 + 0.46$).

The increase in the number of parameters makes the model less simple than the modified OECD scale, but the incorporation of a differentiation by age is logical given the key role age has in explaining differences in average expenditure on (and thus need for) education and health, and child care services.

The parameters make intuitive sense: they are higher for those of the education age and for those in the higher age bands, for whom public expenditure on health care and education are (and therefore whose need is) highest.

As with any single scale that is designed for use across a set of heterogeneous countries, this model takes no account of differences across countries in the economies of scale of different household types.

Experts have agreed that this method is simple and easy, and it is a more appropriate solution to account for non-cash needs than with the use of the modified OECD equivalence scale.

- Use of both additive and multiplicative equivalence adjustments

While cash needs would be dealt with using the multiplicative modified OECD equivalence scale, the needs for public services associated with STiK would be accounted for using both additive and multiplicative models. As the need for health care, education and child care services is relatively elastic to the size of the household (as well as to other measurable factors such as age and perhaps also sex), the equivalence adjustment could be additive.

In recognition of the fact that the need for consumption of public services is different from the consumption of other household goods and services, chiefly that there are no economies of scale for public services, the Euromod proposal differs from the NET-SILC2 one in the way in which the value of the need for public services is included alongside the need for cash income. Whereas the NET-SILC2 proposal introduces non-cash income multiplicatively (by calculating a ratio of the need of a type of household to the need of a reference household), the Euromod proposal introduces non-cash income additively. This is done by multiplying the cash income equivalence scale by a ratio with cash plus non-cash income as the numerator and cash income only as the denominator.

Experts have agreed that this method is a more appropriate solution to accounting for non-cash needs than using modified OECD equivalence scale; however it is not simple.

Both, NET-SILC2 and Euromod proposals are recognised as better solutions than modified OECD equivalence scale. Even though both methods can be considered, for simplicity reasons, NET-SILC2 is chosen as a main method to allocate STiKs in the paper.

2.4 Income distribution and inequality measures (based on monetary disposable income and/or STiKs).

For the analysis, equivalised disposable income is used. According to the equivalised income definition, it is the income that is available for spending and saving, divided by the number of household members converted into equivalised adults (see part on equivalised income).

Equivalised income quintiles

The distributional analysis is based on the distribution of income quintiles for adjusted disposable income (disposable equivalised income and social transfers in kind).

Gini

The GINI coefficient is one of most commonly used summary inequality measures. The GINI coefficient as an income inequality measure is not only concentrated on the lowest part of income groups but analyse the income inequality for the population as a whole.

GINI coefficient equals 0 when all people have the same level of income and equals 1 when only one person receives all the income. The calculation of GINI coefficient is based on the Lorenz curve, and it is calculated as the area between the Lorenz curve stemming from income data and the diagonal and area under Lorenz curve.

3. Data sources and database construction

The aim of this work is to build the database for further analysis from harmonised sources at EU level. Although national sources could better serve the needs for STiK analysis and would potentially provide more precise and tailor made indicators, the choice of this paper is to develop harmonised methods that would allow country comparisons.

This work is based on the analysis of the impact of social transfers in kind for health care services.

3.1. EU-SILC

The European Union Statistics on Income and Living Conditions (EU-SILC)³ is the reference source for statistics and indicators on income and living conditions in the EU. It is a multi-purpose instrument that focuses mainly on income, collecting detailed income components at household and individual level, but also gathering information on social exclusion, material deprivation, housing conditions, labour market participation, education and health. In addition to income distribution, some socio-demographic variables (i.e.: age and sex) are used in this paper to allocate STiKs.

3.2. The National Accounts

National Accounts statistics cover a broad range of information on economic transactions⁴. For the purposes of imputing social transfers in kind to micro-data (EU-SILC), the aggregated data at country level for STiKs are needed for health. For health services, the government expenditure statistics broken down by the Classification of Function of Government (COFOG)⁵ are used. However, the population coverage is not the same in EU-SILC and National Accounts data⁶.

³ An exhaustive presentation of the EU-SILC methodology and main information is available respectively at these links:

[https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_\(EU-SILC\)_methodology](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology)
<https://ec.europa.eu/eurostat/web/income-and-living-conditions/data>

⁴ National Accounts estimates are required to be provided by all Member States under Council Regulation (EC) No 1392/2007. The concepts and definitions for these statistics are internally consistent and are specified in detail in Council Regulation (EC) No 2223/96 (ESA95). The European System of National and Regional Accounts (ESA 2010) is the newest internationally compatible EU accounting framework for a systematic and detailed description of an economy. The ESA 2010 was published in the Official Journal on 26 June 2013. It will be implemented as from September 2014; from that date onwards the data transmission from Member States to Eurostat will follow ESA 2010 rules.

For further information please refer to <https://ec.europa.eu/eurostat/documents/3859598/5925693/KS-02-13-269-EN.PDF/44cd9d01-bc64-40e5-bd40-d17df0c69334>
<https://ec.europa.eu/eurostat/web/national-accounts>

⁵Information on COFOG classification:

[https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Classification_of_the_functions_of_government_\(COFOG\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Classification_of_the_functions_of_government_(COFOG))

⁶ EU-SILC data covers the members of all private households residing in the territory of Member State at the time of data collection, being people living in collective households and in institutions generally excluded.

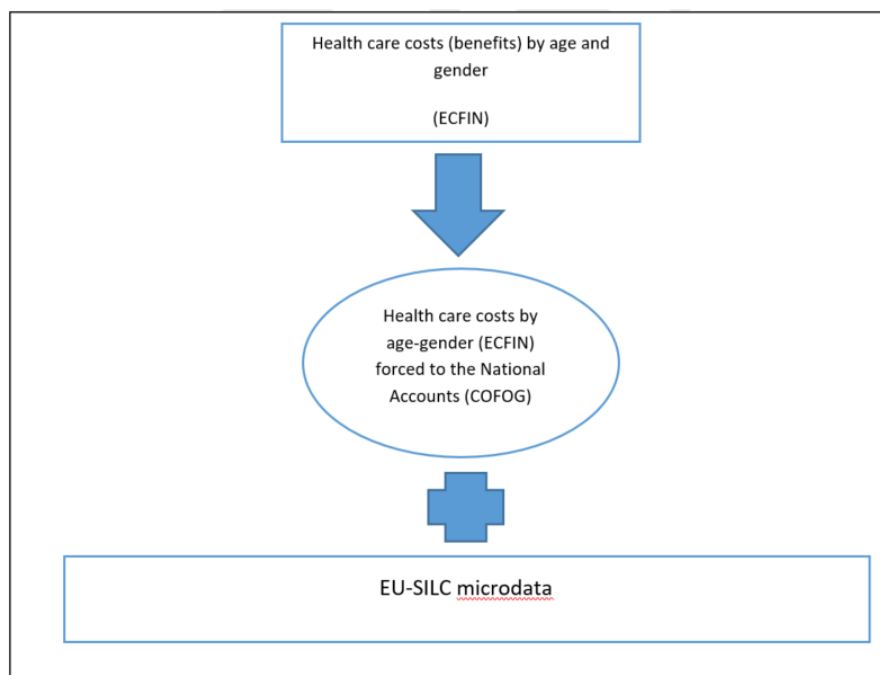
3.3. Health care statistics used for allocation of STiKs

Detailed information on health care costs by age and gender for each country is used to impute the social transfers for health. The health expenditure age-gender specific profiles come from national data sources. They were provided directly by Member States through the *Ageing Working Group channel* (source: European Commission’s Directorate General for Economic and Financial Affairs (ECFIN)).

3.4. Data imputation (database construction)

The average national health care cost for all age groups for both genders is known and attributed to each individual from the EU-SILC sample. To ensure that the health care totals calculated from the micro-data are consistent with published National Accounts (COFOG) data, the micro-data totals have been forced to be equal to aggregated expenditure on health as reported in the National Accounts (COFOG). To do so, the aggregated health care costs at country level based on ECFIN data are calculated and compared to the aggregated health care expenditure from the National Accounts (COFOG). Taking the national accounts data as a reference, the ratio of the figures from the two sources is obtained for each Member State. Further, the ratio is used to adjust the individual health care benefits attributed to each individual in the sample. The aggregated health care benefits from the population covered by EU-SILC are equal to Health expenditure coming from National Accounts. Thus, the health care social transfers in kind imputed to micro-data are coherent to the National Accounts information. The health social transfers in kind are imputed to micro-data taking into account the average health care cost by gender and age in each Member State from ECFIN database (Figure 1).

Figure 1: Workflow of the database for the health STiK analysis.



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