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Longitudinal poverty measures

Social transfers in kind for education and health - imputation into EU - SILC data

Note by European Commission Eurostat Unit F/4*

Summary

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 of the conceptual and methodological aspects of the non-monetary income indicators to complement the existing measures.

Monetary income is most relevant factor that impacts the economic well-being. Monetary income could be consumed or saved. In turn social transfers in kind (STiK) which could be regarded as non-monetary income can be consumed when it is received, without possibility to save. More household consume, higher the wellbeing is assumed.

In this paper the analysis of distribution of non- monetary income is limited to the two social in kind benefits (received from public spending): education and health care. Education could be attributable to the social expenditure by government with long term perspective. The governments that are providing equally accessible health and education services are assumed to reducing inequality. The year of analysis is 2015.

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Introduction

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In this paper the analysis of distribution of non- monetary income is limited to the two social in kind benefits (received from public spending): **education** and **health care**. Education could be attributable to the social expenditure by government with long term perspective. The governments that are providing equally accessible health and education services are assumed to reducing inequality. The year of analysis is 2015.

Valuation of STiK- 'insurance' or the 'actual consumption' approach

A value needs to be imputed from external sources for social transfers in kind 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 STiK 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, choosing the insurance approach over the actual use approach.

At a conceptual level, social protection can be considered 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. Experts considered that education and child care were not 'risks' per se, but more similar to investment. In all studies so far published, 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 discern which the more appropriate approach is:

- 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 approach could also be influenced by considering the plausibility of individual household- or person-level results from any consequent imputation. As Vaalavuo points out in *Towards an Improved Measure of Income Inequality*, it 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).

A further point was made that according to some studies, perhaps more than half of lifetime health care expenditure occurs in the last year or so of life: this suggests that an insurance approach might be the more meaningful. This means that the value of health care STiK 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 STiK (whereas with an actual consumption approach, only those individuals that use health care services would receive health care STiK).

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

Data sources

EU-SILC is a multi-purpose instrument that focuses mainly on income, collecting detailed income components at household and individual level, but also gathers information on social exclusion, material deprivation, housing conditions, labour market participation, education and health. Definitions and guidelines for this data source can be found in the EU-SILC regulations and in the Eurostat website.

Although precise questions on the value of the STiK received by individuals are not feasible to be included in the EU-SILC, the socio-demographic variables are used to allocate STiK. Recognising the policy needs for more detailed information on social transfers in kind, the 2016 EU-SILC survey included an ad hoc module on access to services. The variables from module are used in the calculations.

The education STiK values are imputed to the EU-SILC micro data, to only those who consume the services, in this case to pupils and to students. For **educational STiK** the **age variable** is used for those **under 16**, and for others **the EU-SILC variables** are used (if the persons are **in education** and in which **level of ISCED education** they are in).

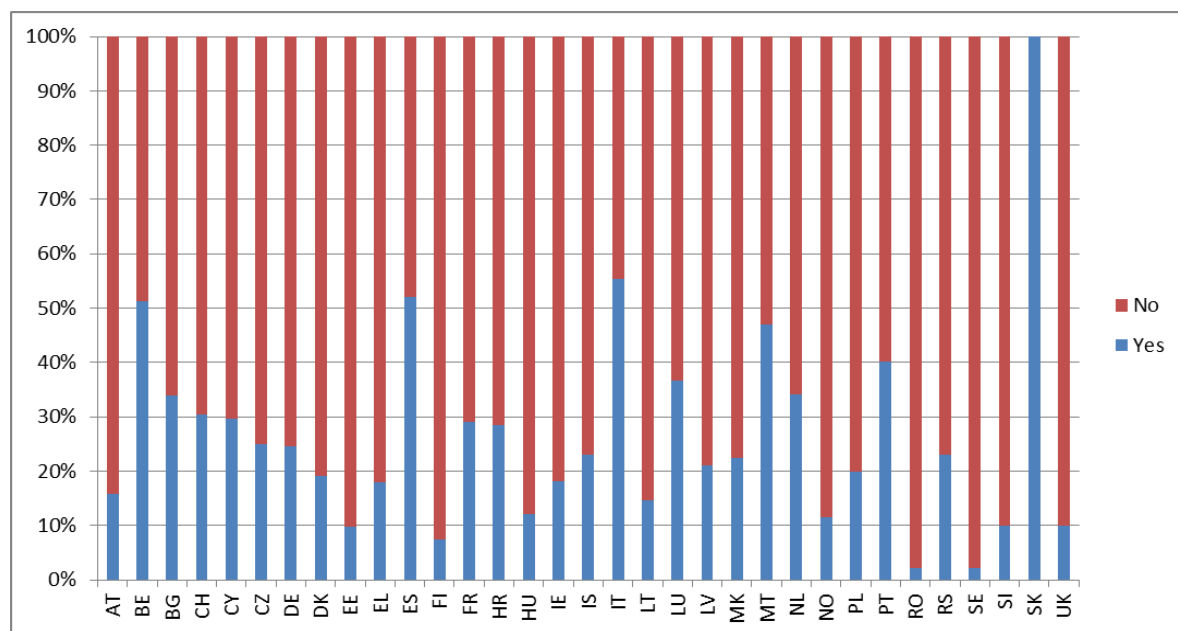
For health STiK values are imputed to the EU-SILC micro data to all people based on ECFIN data on health expenditure estimations (2012). The data from ECFIN are available by **age** and **sex**. Consequently, for **health STiK** the **age** and **sex** variables are chosen as determining variables in the **EU-SILC**. The health care cost curve for all the countries has the "J" shape, showing the largest health care expenditures (therefore benefit from public health expenditure to individuals) at the beginning and at the end of the human life cycle.

2016 EU-SILC ad hoc module on access to services

For educational STiK the variable RC070 – payment for tuition fees (answer categories are: yes/no; the question in the module is asked to whole population) is used as filtering variable to determine if the person is received education STiK or not, see Figure 1. If the answer category is "yes" then no estimated educational STiK value is attributed to this person, on other side if the answer is "no" or missing, educational STiK values are imputed. Other variables¹ from the module are not included in this preliminary analysis. According to ad hoc 2017 module assessment, the other variables related to tuition fees were not working very well. On average full price for tuition fees was paid by 65% respondents and reduced price by 34% respondents (with varying frequencies among countries). The most common answer modality was that government/ local authorities pays partly for tuition fees (on average 90% respondents). These variables will be more developed for use in relation to STiK allocation in 2024 when ad hoc module on Access to services is planned. This method allows us to take in account who receives the education STiK.

¹ RC080- Part of tuition fees paid (answer categories are: full price/reduced price/do not know); RC090 - Who/pays contributes to the tuition fees (answer categories: government/employer/other institutions/private persons who are not household members/ other/do not know)

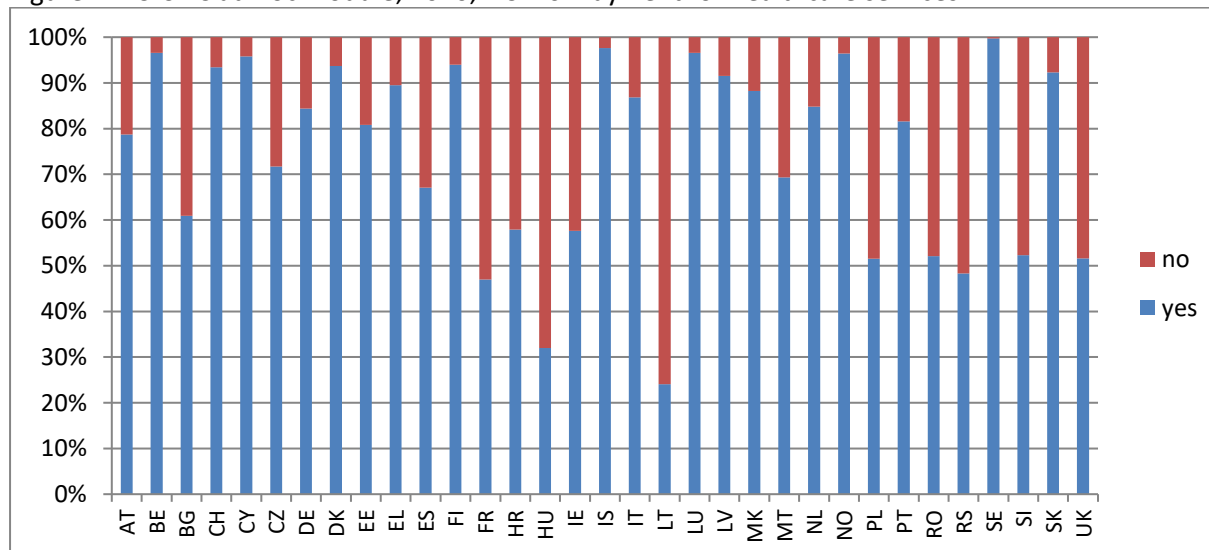
Figure1: EU-SILC ad hoc module; 2016; RC070: Payment for tuition fees



Source: 2016 EU-SILC module; assessment of implementation²

For STiK analysis for health uses the intention was to use the 2016 ad hoc module on access to services, in particular question whether household pays for health services. The question (HC170) asks if the household pays for healthcare services, with answer modalities – yes or no. This question has drawbacks as household might partly use public services, but this answer modality is not given and it is impossible to know. Majority of respondents answered that they pay for health care services, see Figure 2. The author considered that results of this variable were too ambiguous to use in the calculations.

Figure 2: EU-SILC ad hoc module; 2016; HC170: Payment for healthcare services



Source: 2016 EU-SILC module; assessment of implementation³

² <https://ec.europa.eu/eurostat/documents/1012329/8088300/LC+221-18+EN+Module+2016+assessment.pdf/82b23b36-9e04-4905-ab74-9a07f1223637>

³ <https://ec.europa.eu/eurostat/documents/1012329/8088300/LC+221-18+EN+Module+2016+assessment.pdf/82b23b36-9e04-4905-ab74-9a07f1223637>

Educational STiK

For educational STiK, author uses Eurostat estimates of expenditure by ISCED level, taken from the joint (UNESCO Institute of Statistics)/OECD/Eurostat (UOE) questionnaires on education statistics⁴. The standards on international statistics on education and training systems are set by the three international organisations jointly administering the UOE data collection. The education statistics provide comparable statistics on education systems and resources dedicated for education across the EU member states. In addition, details for education system for each country are provided in Annex 1.

The education costs (STiK to individuals) for those aged 16 and over who are in education were imputed according the average education expenditure per head for each ISCED level and distributed according to the level of ISCED reported in EU-SILC. For those aged under 16, the level of ISCED has been estimated based on age of the child using pan-EU criteria.

Then the micro data totals for education STiK have been forced to aggregated expenditure on education as reported in the National Accounts (COFOG). Taking the national accounts data as a reference, the difference ratio between the two sources is obtained for each member state for (see Annex 2). Further the ratio is used to adjust the education benefits attributed to each individual. The aggregated education care costs from the population covered by EU-SILC are forced equal to education expenditure aggregates coming from National Accounts. Following the education social transfers in kind imputed to micro data are coherent to the National Accounts information.

This method has several limitations. It takes no account of whether the quality of services differs across countries (and possibly inside countries, e.g. regions, cities, suburbs etc.).

This method reflects average consumption patterns according to the numbers, age and level of those receiving education, whereas the delivery of education services may vary according to other factors, such as the ability of individual pupils and students.

Health STiK

Detailed information on health care costs by age and gender for each country is used to impute the social transfers in kind for health. The health expenditure age-gender specific profiles come from national data sources. They were provided directly by the Member States through the Ageing Working Group channel (source: European Commission's Directorate General for Economic and Financial Affairs (ECFIN))⁵.

The average national health care cost for the all age groups for both genders is known and attributed to each individual. In order to insure that the health care totals calculated from micro data are consistent with published National Accounts (COFOG) data, the micro data totals have been forced to aggregated expenditure on health as reported in the National Accounts (COFOG). Thus the health care social transfers in kind imputed to micro data are coherent to the National Accounts information. To do so, the health care costs at country level are calculated aggregated based on ECFIN data and compared to the aggregated health care expenditure from the National Accounts (COFOG).

⁴ <https://ec.europa.eu/eurostat/web/education-and-training/data/database>

⁵ Missing health cost age-gender specific profiles were replaced by average profiles. Average profiles are calculated as simple averages (expressed as % of GDP per capita) of all available data provided by the Member States, either for EU12 or EU15. This simple average approach was chosen in order to better reflect wide variety of health care systems. Concerning the sources of total spending, more detailed information is available in the 2012 Ageing Report "Underlying Assumptions and Projections Methodologies" (http://ec.europa.eu/economy_finance/publications/european_economy/2011/ee4_en.htm)

The chosen method has limitations that should be taken into account in the interpretation of the results. It takes no account:

- the fact that in many countries, individuals are required to make private co-payments towards public sector health care services (for items such as prescription medicines, but not only). Any bias is compounded if the level of these co-payments is means-tested;
- of any differences in the extent to which different households have access to public health care services.

Equivalised income including STiK

The main purpose of the exercise of allocating the STiK services to the population members is to see how the STiK is distributed in the population and carry out the distribution and poverty analysis. Social transfers in kind (STiK) can be thought of 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 STiK to the monetary income would decrease total income inequality, as these services are assumed to be equally accessible for all members of society irrespective to their monetary income situation.

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 (for ex., means tested) family in society, that is not explored in this analysis.

2) The elasticity of the need for public health care, education services and child 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 repeat the examples from earlier in this note). Following, it is not likely that the needs of those who receive public services, including health care, education, and child care are distributed in a similar way to cash needs.

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 augmented by the value of STiK. 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 total income (monetary and STiK) to the household members to be able to carry out more detailed poverty analysis, however there is no consensus so far which method to choose.

Strand of the NET-SILC2 collaboration presented a further proposal at the December 2012 NET-SILC2 conference held in Vienna.

- Modified OECD equivalence scale

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

According to the view 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 STiK

The NET-SILC2 proposal (SNA scale)

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 predicated on 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, they limit their analysis to 21 EU countries). Their method for establishing an appropriate needs-adjusted equivalence scale involves three steps, is described in their presentation and paper to the Vienna conference: “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.”

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 STiK received by individual households (which are estimated by the NET-SILC2 in a similar way as the ‘main’ methods used in the present paper);
- 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 gender. (As an aside, this results in there being a huge number of different types of household);
- 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);
- 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 gender 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.

This leads to the set of parameters for calculating the proposed NET-SILC2 needs-adjusted equivalence scale, as reproduced in Table 1.

Table 1: NET-SILC2 equivalence scale (SNA scale) parameters for the combination of cash income and health care and education and child care STiK, 2009

Constant	0.46
0-3 years	0.41
4 years	0.57
5-13 years	0.69
14-16 years	0.95
17 – 54 years	0.54
55-64 years	0.6
65-74 years	0.67
75 years and above	0.75

In order to calculate the non-cash equivalence scale, what is required is to determine household composition in terms of the above age bands, and 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 education age and for those in the higher age bands, exactly the kinds of people for who 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 has agreed that this method is simple and easy, and it is more appropriate solution to accounting for non-cash needs than using modified OECD equivalence scale.

Results

Relevance of STiK in adjusted gross disposable income

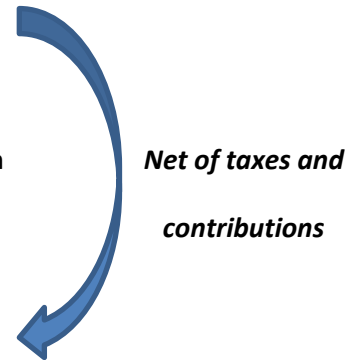
In general, STiK is considerable part of adjusted disposable income across the Europe. In 2015, STiK on average was 19% of gross adjusted disposable income for the countries where data were available (Figure 3). However, there are notable differences among countries; the smallest shares for STiK were in Cyprus (12%), Romania (12%) and Bulgaria (13%), whereas the largest shares were reported in Nordic countries- Denmark (29%), Sweden (29%) and Norway (28%).

Box 2: Gross disposable income and adjusted disposable income

Household disposable income is net of total household income after payment of taxes and social security contributions that households can use to cover their consumption and/or savings.

More specifically the components of household disposable income are:

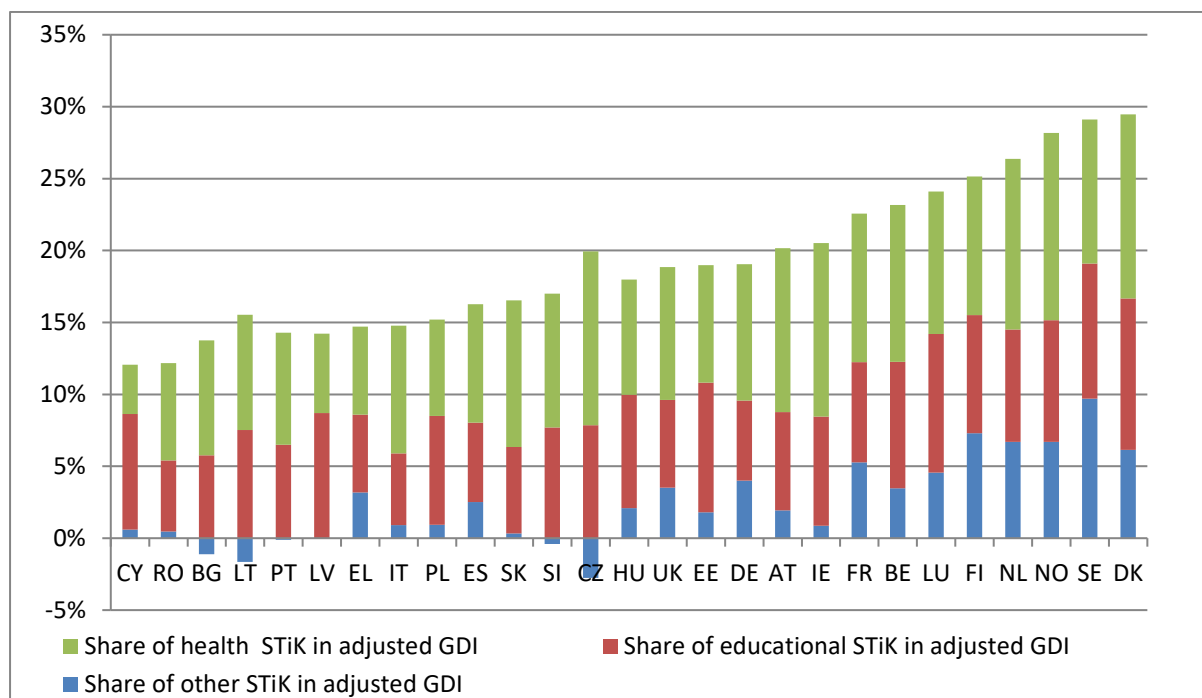
- Income from employment;
- Property income
- Income from household production of services for own consumption
- Current transfers received
- Current transfers paid
- Social benefits



Adjusted gross disposable income includes the flows corresponding to the use of individual services (social transfers in kind) which households receive free of charge from the government. While social transfers in kind increases household income, this part of income could for the intended purpose only and cannot be used for other purposes. For example, if the government provides health care free of charge for all the population, the person can benefit from it or use private health services.

For distribution of STiK into purpose expenditure, the author used COFOG data, assuming that majority of health and educational government expenditure are received in kind, however it might be that some benefits to population are transferred in cash. This assumption could cause some imprecision in the results. Taking into account this assumption, educational and health STiK for countries varied. On average the share for educational STiK was 7%, the smallest shares being for Greece (5%), Italy (5%), and Romania (5%), while largest shares were in Denmark (11%), and Luxembourg (10%). In turn health STiK on average was 9% of adjusted disposable income, the smallest shares were for Cyprus (3%), Latvia (6%) and Greece (6%). The largest shares were in Norway (13%), Denmark (13%), the Netherlands (12%), Czechia (12%) and Ireland (12%).

Figure 3: Share of total and educational STiK in gross disposable income, National accounts, 2015



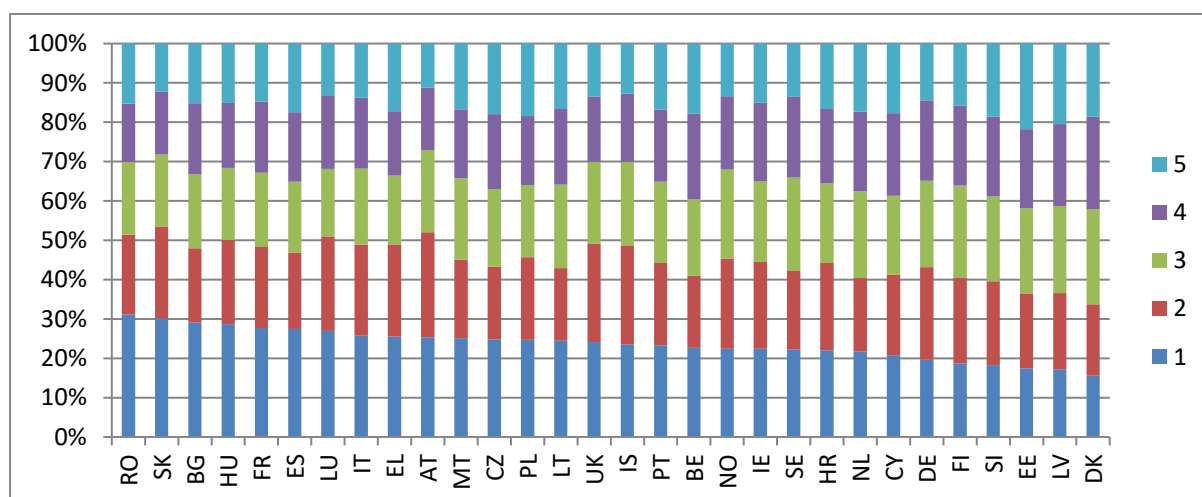
Source: Eurostat data base(gov_10a_exp; nasa_10_nf_tr)

Educational STiK

Distribution of children

When analysing educational STiK, it is relevant to look where the children are located in the income distribution. When population of children is located in the lowest income quintiles the educational STiK would mostly contribute to first income quintiles, however if the population of children is mainly placed in the highest income quintiles also the educational STiK benefits would largely go to the highest income quintiles. Figure 4 shows that there are notable differences across countries. The largest shares of children located in the first income quintile are in Romania, Slovakia and Bulgaria – around 30% of all children. On other side, the highest percentages of children that are located in the fifth income quintile across the countries are in Estonia (22%) and Latvia (20%).

Figure 4: Distribution of children (age 18 and less) along equivalised income quintiles



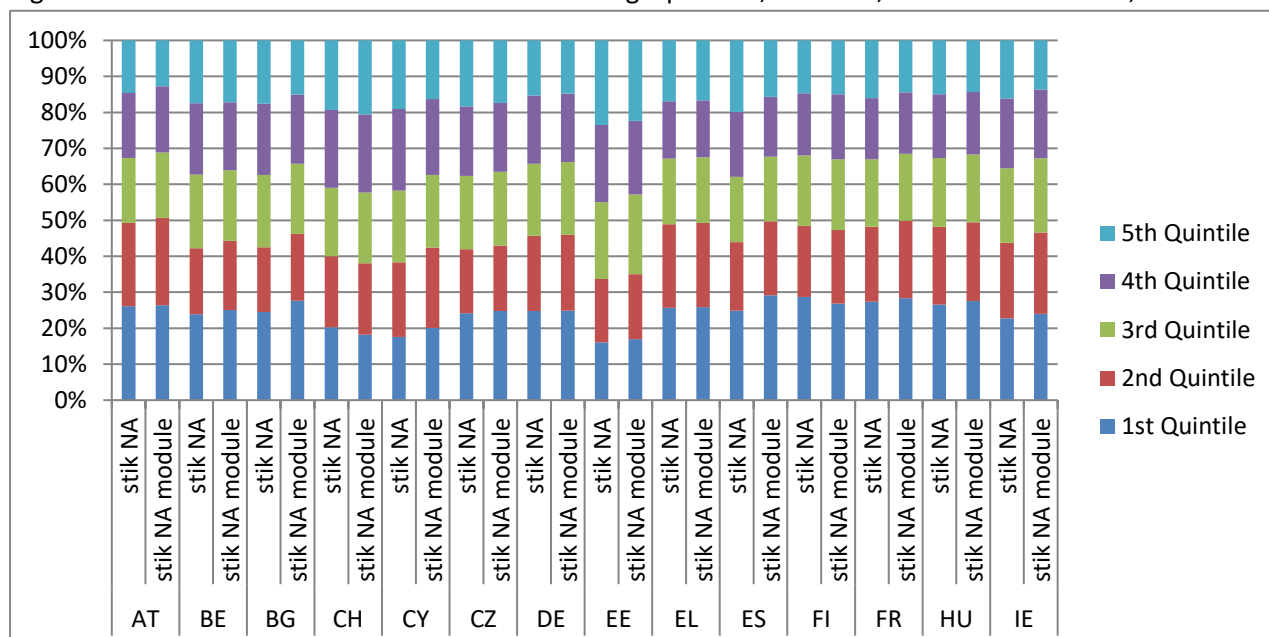
Source: EU-SILC (own calculations)

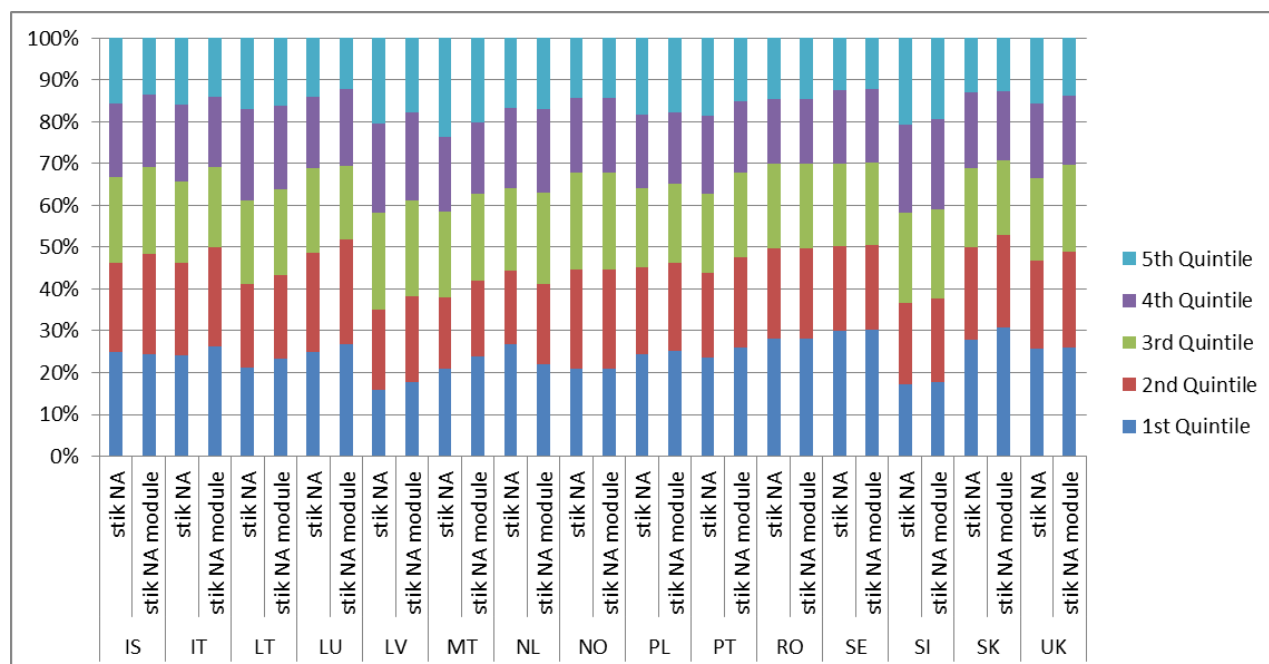
Income distribution and educational STiK

Distribution of education STiK is illustrated in Figure 5. It shows how education STiK (without and with taking into account information on paying for tuition fees from 2016 EU-SILC ad hoc module) is distributed along the quintiles. The both scenarios are adjusted to national accounts information on the expenses of public education. Distribution of STiK in quintiles is determined by distribution of pupils and students who receive the educational STiK.

As shown in Figure 5, in general the distribution varies across the European countries based on equivalised income quintiles. For most of the countries the largest share of education STiK is allocated in the first income quintile, for example in Sweden and Slovakia up to 30% of education STiK is in the first income quintile. However, less than 20% is received in Estonia, Latvia, Slovenia and Cyprus.

Figure 5: Distribution of educational STiK along quintiles, EU-SILC, National accounts, 2015



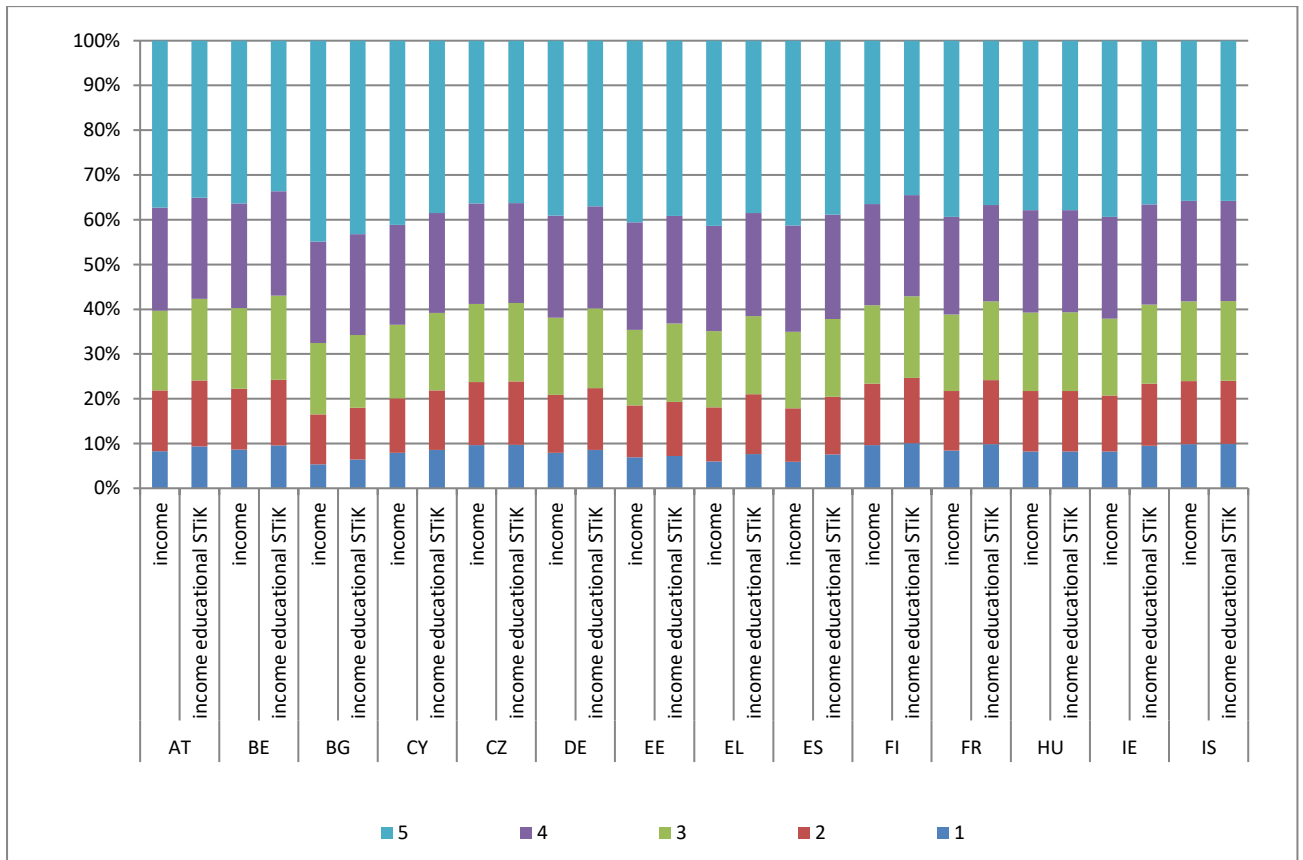


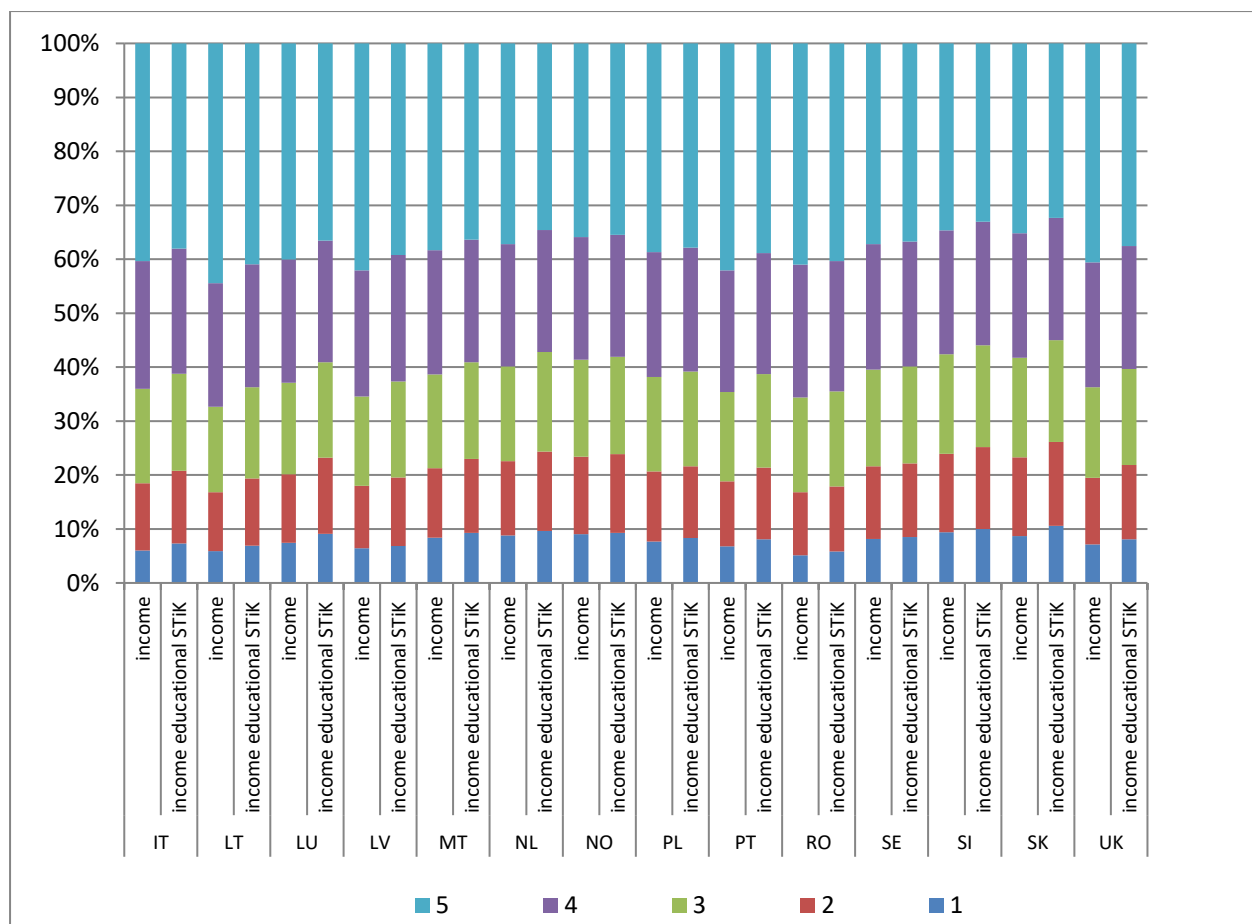
Source: Eurostat data base (gov_10a_exp); EU-SILC; own calculations

Distribution of educational STiK that takes into account 2016 AD hoc module question on the actual use of public educational services (stik NA module) differs from educational STiK (stik NA) without this information. The additional information coming from EU-SILC 2016 module allows identifying those students and pupils who actually benefit from public education. The largest differences between distribution of educational STiK with and without EU-SILC 2016 ad hoc module information is observed in the first and fifth quintiles. The countries most benefiting from this additional information (where the differences are more significant) are Bulgaria, Spain, and Malta. For example, it is shown that in Spain the first income quintile receives 25% and the fifth income quintile receives 20% of education STiK without information from module, whereas with module information the first income quintile receives 29%, and the fifth income quintile – only 16%.

Figure 6 shows the income distribution and how the income distribution changes when adding educational STiK to it. For comparison reasons the income is equalised using SNA scale. The observed changes are not large (taking account that on average educational STiK is 7% of adjusted disposable income). For the first income quintile, share of income with educational STiK as compared with just monetary income, increases for almost all countries 0-2 ppt. As expected, for the fifth income quintile share of income decreases for almost all countries by 1-4 ppt. It could be concluded that, adding educational STiK to monetary income, inequality decreases for almost all countries.

Figure 6: Income (SNA scale) distribution with and without educational STiK (taking into account the actual recipients: EU-SILC ad hoc module 2016)

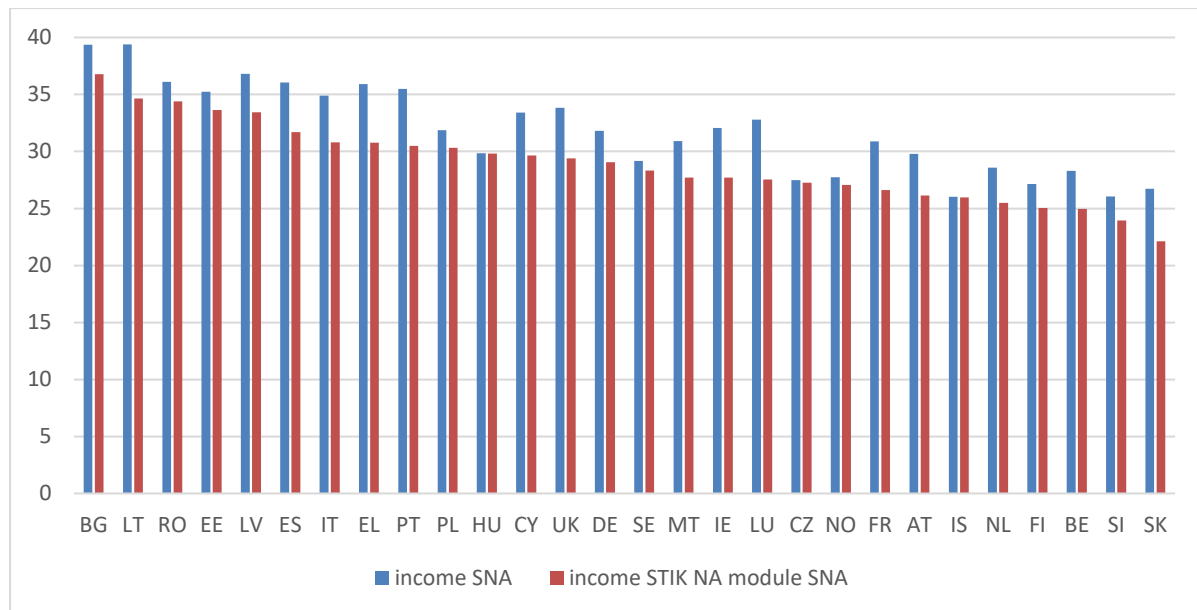




Source: EU-SILC, own calculations

To show this, Figure 7 includes GINI coefficients for monetary income (using SNA scale for comparison) and for monetary income with educational STiK. For almost all countries the GINI coefficient decreased, except for Hungary. In the Czech Republic, there are almost no changes for GINI coefficient. Largest decreases for GINI coefficient are in Luxembourg (5.3), Greece (5.2), and Slovakia (4.6).

Figure 7: GINI coefficients for income (SNA scale) with and without educational STiK (taking into account the actual recipients: EU-SILC ad hoc module 2016)

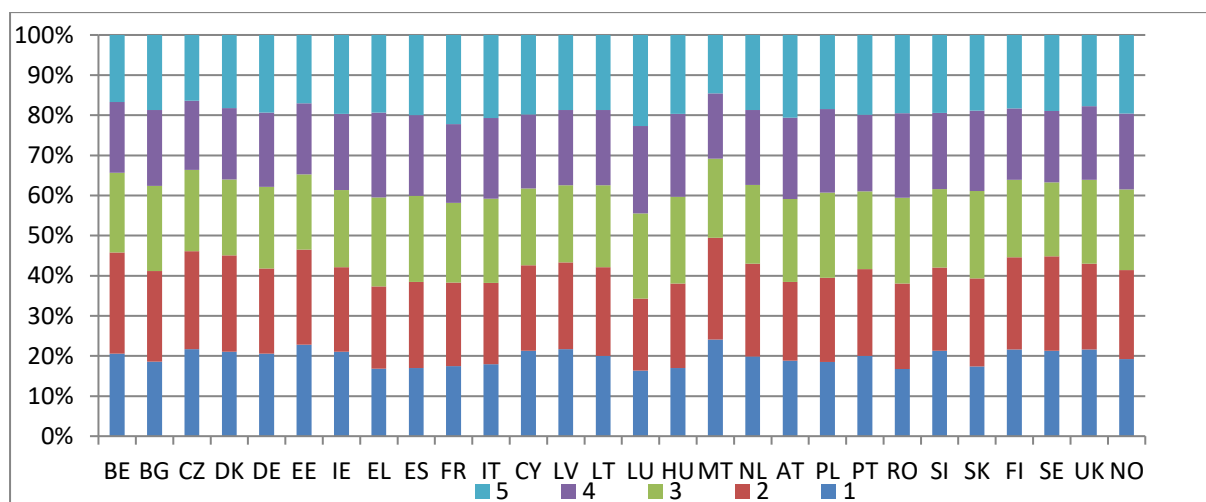


Source: EU-SILC, own calculations

Health STiK

On average, health STiK is equally distributed across income quintiles, slightly more receiving those people that are in the second income quintile and slightly less those in third and fourth income quintiles (see Figure 8).

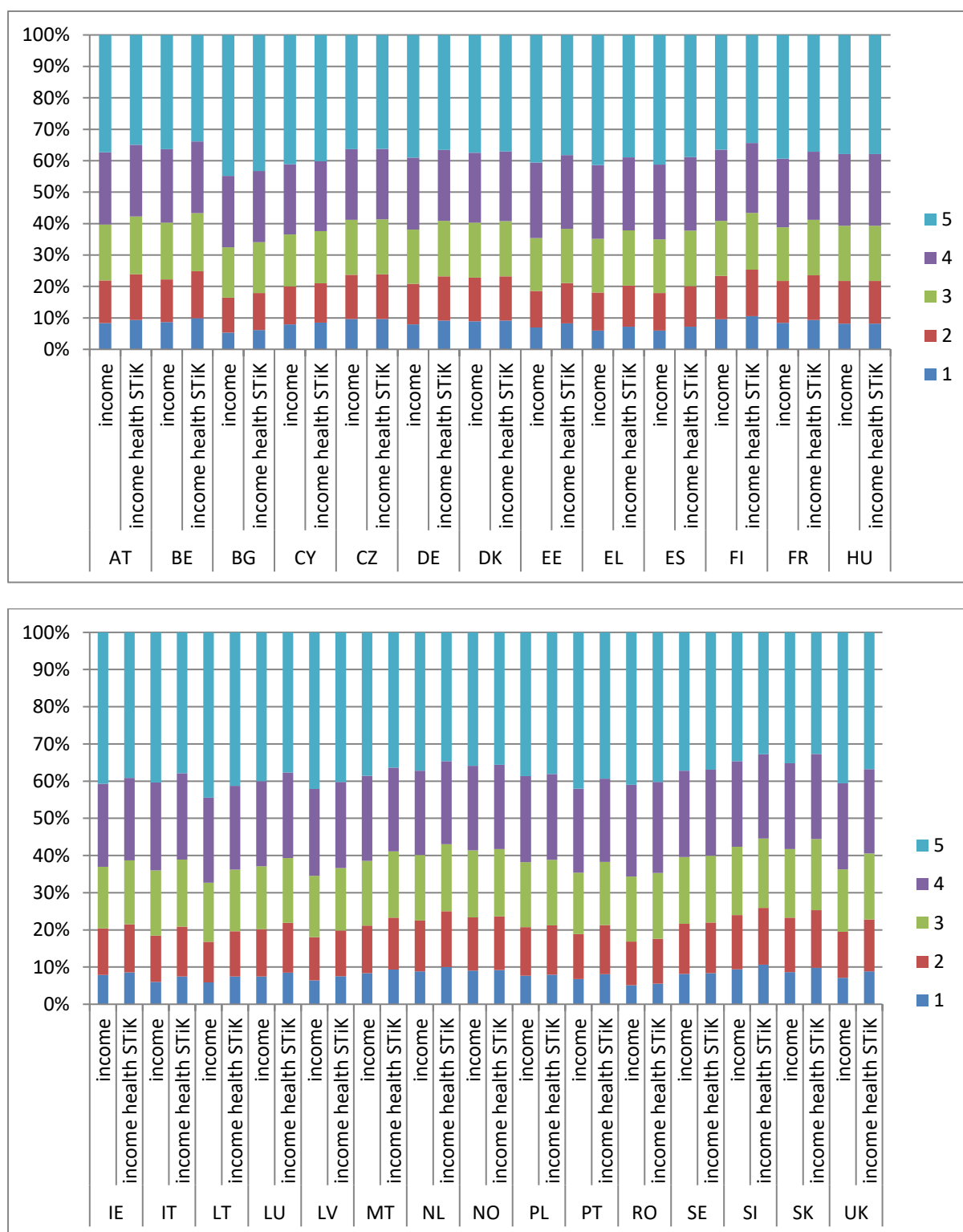
Figure 8: Distribution of health STiK along quintiles, EU-SILC, National accounts, 2015



Source: EU-SILC, NA; own calculations

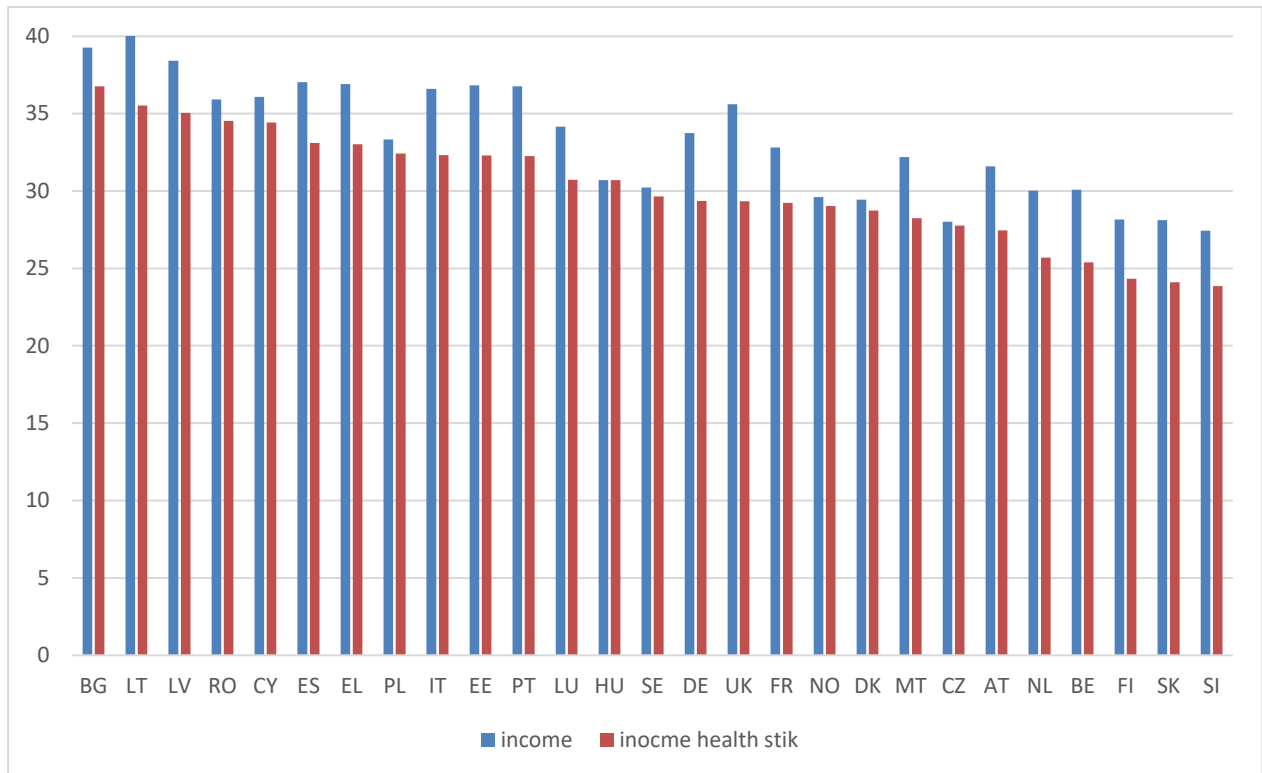
Figure 9 shows the distribution of income (SNA scale) and income and health STiK. On average, the distribution of income and health STiK shows slightly larger share as compared with income - in the first two quintiles (both by 0-2pp) and smaller share (by 0-4pp) in the fifth income quintile. The results imply that income and health STiK shows smaller inequality than that for income only.

Figure 9: Income (SNA scale) distribution with and without health STiK



It is confirmed by results of GINI coefficients, see Figure 10. The inequality in terms of GINI coefficient is smaller for almost all countries for STiK and income as compared to income only (except for Hungary and minor changes for the Czech Republic). The largest differences are for the United Kingdom (6.3 pp), Lithuania (5.4 pp) and Belgium (4.8 pp).

Figure 10: GINI coefficients for income (SNA scale) with and without health STiK



Education and health STiK

Figure 11 shows the distribution of income (SNA scale) and income and educational and health STiK. In general, it displays the larger income and STiK shares as compared with income in the first income quintiles and smaller shares in particularly in the last income quintile. As expected, adding STiK to income, it decreases inequality.

Figure 11: Figure 10: Income (SNA scale) distribution with and without health and educational STiK

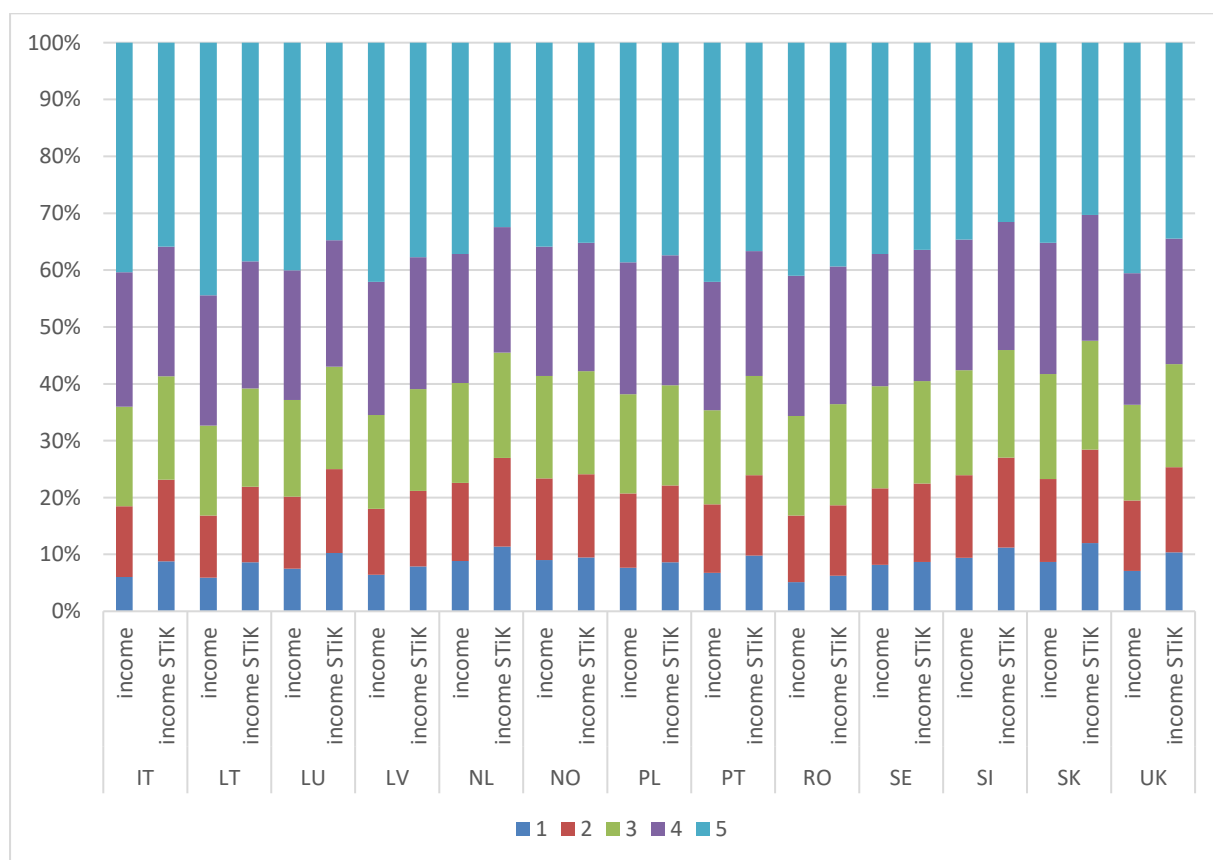
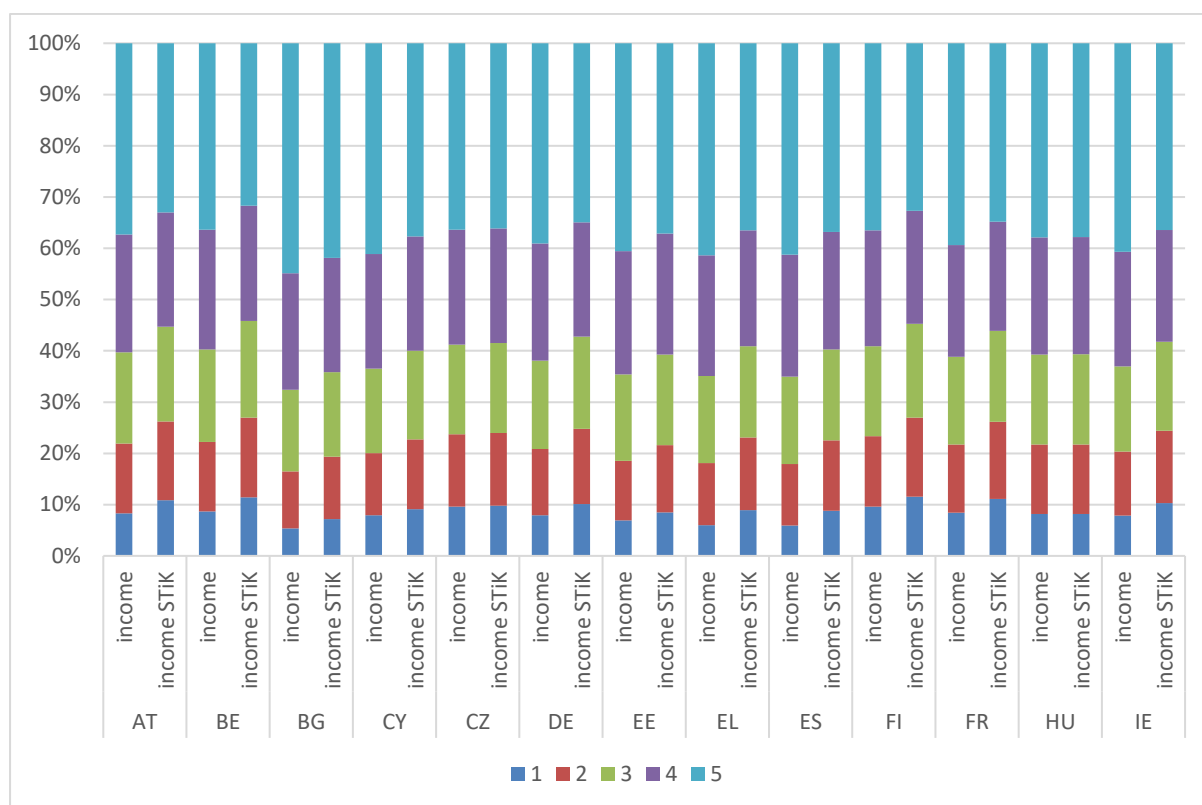
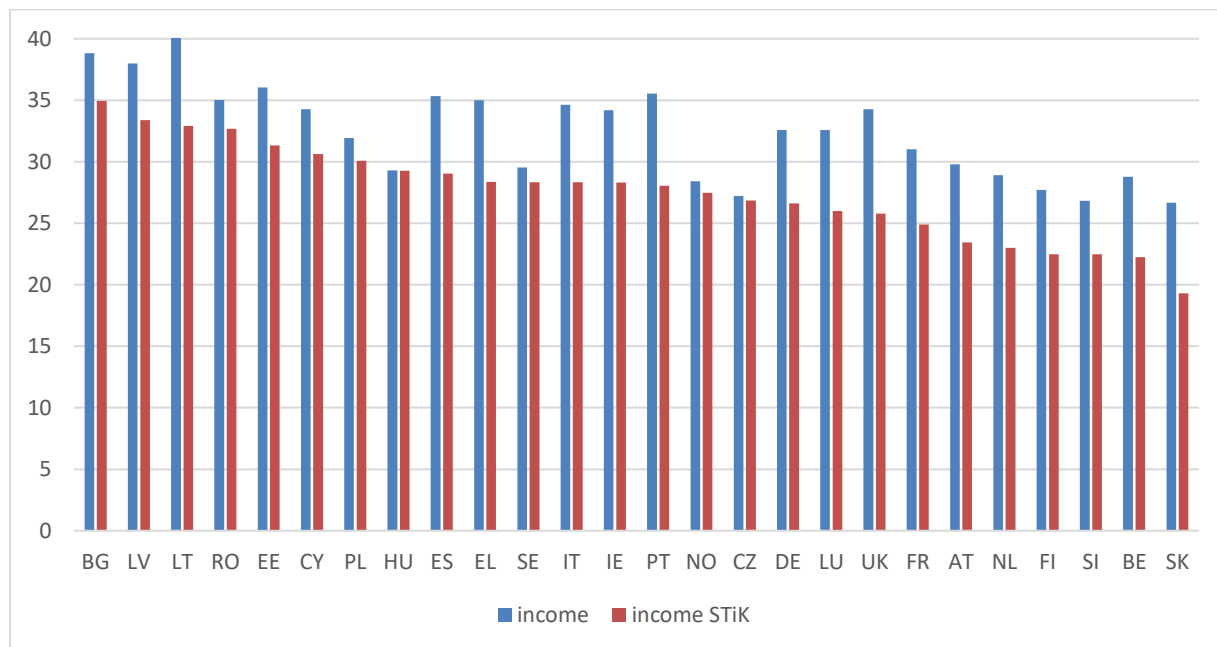


Figure 12 shows that for almost all countries, the GINI coefficient for income and STiK is smaller than those for just income (except for Hungary, and minor changes for the Czech Republic). Larger differences are for the United Kingdom (8.5 pp), Portugal (7.5 pp), Lithuania (7.4 pp), and Slovakia (7.4 pp).

Figure 12: GINI coefficients for income (SNA scale) with and without educational and health STiK



Conclusions

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

The education STiK values are imputed to the EU-SILC micro data, to only those who consume the services, in this case to pupils and to students. For educational STiK the age variable is used for those under 16, and for others the EU-SILC variables are used (if the persons are in education and in which level of ISCED education they are in).

In 2015, on average (for the countries where the data are available) the share for education STiK in adjusted gross disposable income was 7%, the smallest shares being for Greece (5%), Italy (5%), and Romania (5%), while largest shares were in Denmark (11%), and Luxembourg (10%). In turn health STiK on average was 9% of adjusted disposable income, the smallest shares were for Cyprus (3%), Latvia (6%) and Greece (6%). The largest shares were in Norway (13%), Denmark (13%), the Netherlands (12%), Czechia (12%) and Ireland (12%).

The largest differences between distribution of educational STiK with and without EU-SILC 2016 ad hoc module information is observed in the first and fifth quintiles. The countries most benefiting from this additional information (where the differences are more significant) are Bulgaria, Spain, and Malta.

The observed changes to the income distribution when adding educational STiK to it are not large (taking account that on average educational STiK is 7% of adjusted disposable income). For the first income quintile, share of income with educational STiK as compared with just monetary income, increases for almost all countries by 0-2 ppt. As expected, for the fifth income quintile share of income decreases for almost all countries by 1-4 ppt. It could be concluded that adding educational STiK to monetary income inequality decreases for almost all countries. For all almost countries the GINI coefficient decreased, except for Hungary. In the Czech Republic, there are almost no changes for GINI coefficient.

Similarly, the observed changes to income distribution when adding health STiK to it are not large either. On average, the distribution of income and health STiK shows slightly larger share as compared with income - in the first two quintiles (0-2 pp) and smaller share (by 0-4pp) in the fifth income quintile. The inequality in terms of GINI coefficient is smaller for almost all countries for STiK and income as compared to income only (except for Hungary and minor changes for the Czech Republic).

Similar results are obtained for GINI coefficients as compared between income including and excluding health and educational STiK. Results show that for almost all countries GINI coefficient for income and educational and health STiK is smaller than those for just income (except for Hungary, and minor changes for the Czech Republic). Larger differences are for the United Kingdom (8.5 pp), Portugal (7.5 pp), Lithuania (7.4 pp), and Slovakia (7.4 pp).

Annex 1: ISCED mapping

ISCED level in EU-SILC needs to be determined based on age. Table below shows the age- ISCED mapping (ages). <https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp>

Country	Pre -primary education	Primary education	Lower secondary education	Upper secondary education	Post-secondary non-tertiary education	Tertiary education (levels 5-8)
BE	3-5	6-11	12-13	14-15		
BG	3-6	7-10	11-14	15		
CZ	4-6 not confirmed	7-10	11-14	15		
DK	4-5 not confirmed	6	7-12	13-15		
DE	5-6	6-9	10-15			
EE	4-6 not confirmed	7-12	13-15			
IE	4-5	6-11	12-14	15		
EL	4-5 not confirmed	6-11	12-14	15		
ES	3-5	6-11	12-15			
FR	3-5	6-10	11-14	15		
IT	4-5 not confirmed	6-10	11-13	14-15		
CY	5	6-11	12-14	15		
LV	6	7-12	13-15			
RO	3-5	6-9	10-13	14-15		
SI	3-5	6-11	12-14	14-15		
SK	3-5	6-9	10-14	15		
FI	6	7-12	13-15			
SE	3-6	7-12	13-15			
UK	5-6 not confirmed	7-10 not confirmed	11-13 not confirmed	14-15 not confirmed		
LT	3-6	7-11	12-15			
LU	4-5	6-11	12-14	15		
HU	3-5	6-9	10-13	14-15		
MT	3-4	5-10	11-13	14-15		
NL	3-5	6-11	12-14	15		
AT	5	6-9	10-13	14-15		
PL	3-6	7-12	13-15			
PT	3-5	6-11	12-14	15		
CH	4-5	6-11	12-14	15-17		
NO	3-5	6-12	13-15	16-17		
IS	3-5	6-12	13-16	17		
HR	3-6	7-10	11-15			

Annex 2: Calibration factors to force educational STiK to be consistent with National Accounts expenditure on education, 2015

country	calibration factors	calibration factors module
AT	1.2	1.0
BE	1.0	0.7
BG	1.1	0.9
CY	1.1	0.9
CZ	0.8	0.7
DE	1.1	0.9
EE	0.7	0.7
EL	0.8	0.8
ES	1.1	0.7
FI	1.1	1.0
FR	0.9	0.8
HU	0.9	0.8
IE	1.3	1.1
IS	1.0	0.7
IT	0.9	0.7
LT	0.7	0.6
LU	1.2	0.8
LV	0.8	0.7
MT	1.1	0.9
NL	1.1	0.6
NO	0.6	0.6
PL	0.8	0.7
PT	1.0	0.7
RO	1.1	1.1
SE	1.2	1.2
SI	1.2	1.1
SK	1.2	0.6
UK	1.1	0.9