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INCOME OF THE POOREST DECILES OF SERBIA'S POPULATION, FOCUS ON AGRICULTURAL ACTIVITIES

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INCOME OF THE POOREST DECILES OF SERBIA'S POPULATION, FOCUS ON AGRICULTURAL ACTIVITIES

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

AH	Agricultural households
AP	Agricultural products
CEVES	Center for Advanced Economic Studies
COP	Consumption of own production
FAO	Food and Agriculture Organization of the United Nations
EU	European Union
Eurostat	European Statistical Office
FSS	Farm Structure Survey
HBS	Household Budget Survey
HH	Households
HY170	Value of goods produced for own consumption
MIA	Monetary income from sale of agricultural products
NACE	The Statistical classification of economic activities in the European Community (for the French term "nomenclature statistique des activités économiques dans la Communauté européenne")
OECD	Organisation for Economic Co-operation and Development
RSD	Serbian Dinar
SILC	Survey on Income and Living Conditions
SO	Standard output
SORS	Statistical Office of the Republic of Serbia
THDI	Total household disposable income
TEDI	Total equivalised disposable income
UNDP	United Nations Development Programme

List of Country Abbreviations

BG	Bulgaria
CY	Cyprus
CZ	Czechia
DE	Germany
EE	Estonia
EL	Greece
ES	Spain
UK	United Kingdom
FR	France
HR	Croatia
HU	Hungary
IE	Irelands
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
NL	The Netherlands
PL	Poland
PT	Portugal
RS	Serbia
SI	Slovenia
SK	Slovakia

Executive Summary

This report aims to derive recommendations for the improvement of SILC – as an internationally comparable tool for the assessment of poverty, inequality and social exclusion – based on comparisons of two methodological issues with Household Budget Survey (HBS), EU-SILC practices and info that can be obtained from the Farm Structure Survey (FSS). Unlike some of EU countries, Serbia is almost fully in alignment with EU-SILC framework. However, analyses of SILC data (up to SILC 2017) indicate that there might be some issues in measuring income level in Serbia. Building on the existing body of knowledge, we shed light on how the two methodological issues (differences in the treatment of zero and negative income and income from agriculture) contribute to the observed high discrepancy in income level between households in the 1st decile in SILC and HBS. Since the two instruments have different philosophies and goals, certain level of discrepancy is not unusual. However, the unusually large discrepancy in households' income indicates the importance to conducts a systematic comparison of SILC and HBS methodologies and results to identify possibilities for improvement of SILC estimates. Namely, an average household in 1st decile in SILC have 3,5 times lower total equivalized disposable income (2.668 RSD) compared to HBS (9.224 RSD). This issue is particularly important for targeting individuals in need of Government financial social assistance. If SILC adequately captured reality, then Serbian social assistance net would be grossly inadequate and required urgent review. This analysis finds that 39% of observed discrepancy is related to the mentioned differences in methodological approach (23p.p. to zero and negative income, 16p.p. to income from agriculture) in 2016. This is a cumulative effect of several factors, including significantly differences in the share of households with zero income, different segmentation of households' characteristics, different coverage of in-kind income etc. While the extent of the difference found does not give us a sense of the level of SILC deviation (particularly in the first decile), there are insights which do indicate possible methodological improvements needed. For instance, the fact that as many as 27% of households in 1st decile in SILC is being found with exactly zero income (5% in HBS), and 83% of those with no consumption from own production – requires attention. Furthermore, results found suggest that not all can be related to different philosophies and that there might be substantial methodological problems with both instruments. For example, HBS strongly overestimates the share of agricultural HH in total number of HH (29%), while SILC underestimates it (19%, vs. 23% based on FSS). Focusing on the key improvements in SILC, we believe that further needs to be addressed: revising sampling methodology and segmentation of households; uncovering underlying factors for high share of households with zero and very small income; comparing the size and characteristics of the poorest population in SILC to receivers of social assistance based on official data; switching to use of registers where possible; improving questionnaire and instructions as to better capture income, and improving data collection capacity.

This report aims to derive recommendations for the improvement of SILC - as an internationally comparable tool for the assessment of poverty, inequality and social exclusion - based on comparisons of two methodological issues with Household Budget Survey (HBS), EU-SILC practices and info that can be obtained from the Farm Structure Survey (FSS). Based the most recent MetaSILC report, unlike some of EU countries, Serbia is almost fully in alignment with EU-SILC framework[1]. However, analyses of SILC data (up to SILC 2017) indicate that there might be some issues in measuring income level in Serbia. This report shed light on how two methodological aspects: (1) different treatment of negative and zero income, and (2) different assessment of income from agriculture, contribute to the high discrepancy in income of the 1st deciles as estimated by SILC and HBS. We also analyse EU-SILC practices and we Farm Structure Survey in order to gain additional insights into where the sources of possible improvements might be.

The study builds on the existing body of knowledge, that indicated the issue of large discrepancy in income level of the poorest deciles as measured by SILC and HBS. Based on data from 2016, HBS average total equivalised disposable income was 33.263 RSD, and based on SILC it was 29.751 RSD. While this difference of 12% might not be high, the difference in the lowest decile is extreme. ***The 1st decile in SILC has 3,5 times lower average equivalised disposable income compared to HBS (2.668 RSD and 9.224 RSD respectively).*** This high discrepancy remains high across 2013-2016 period. Interestingly, the discrepancy decreases in higher deciles, while in 10th decile it even reverses.

It needs to be stressed that some level of discrepancy is not unusual, since these two instruments are conceptually different methodologies and have rather different goals. One of important differences in "philosophy" is reflected in the fact that SILC covers only monetary income components, while HBS includes income in-kind as well. Namely, HBS primarily focuses on household consumption, while measuring household income is a secondary aspect of the survey. Apart from measuring standard of living, HBS results are used to generate weightings for some of key macroeconomic indicators, such as consumer price indices and national accounts (Eurostat). However, HBS is voluntary and no legal basis exists at EU level, so there is a low level of methodological comparability among European counties. On the other hand, SILC aims to be a comparable survey at EU level. Even though EU-SILC does not prescribe a fixed methodology, it provides a common harmonised framework. Moreover, unlike HBS, SILC primary focus is to assess income, poverty, social exclusion and living conditions of citizens.

However, the unusually large discrepancy in households' income indicates the importance to conducts a systematic comparison of SILC and HBS methodologies and results to identify possibilities for improvement of SILC estimates. While it is not correct to use HSB for income and poverty estimates since HBS and SILC are different tools and have different goals, we can use differences in the methods, questions and results related to income in order to learn how SILC can be improved.

We focus on the significance of SILC capacity to adequately capture income level since it is the key instrument for measuring poverty and social exclusion. This issue is particularly important for adequately covering all individuals in need of Government financial social assistance. In fact, SILC data indicate the urgent need to increase the coverage of individuals obtaining Government financial social assistance. Based on SILC, even 10,2% of households in 2016 had disposable income below the census level of financial social assistance as defined by the Law on Social Protection. If SILC adequately captured reality, then Serbian social assistance net would be grossly inadequate, would not cover all households in need, and it would require urgent review.

1. *Based on MetaSILC report, Serbia is not aligned only in part that refers to collecting data on income from using a company car. However, based on SORS experts, this is a marginal part of household income, so even if it was collected it would not make a great difference. On the other hand, some EU countries do not fully comply with Eurostat definitions in terms of pensions (France, Luxembourg, Malta, the Netherlands, United Kingdom), income from self-employment (Croatia and Bulgaria) etc.*

We conducted a decile analysis of equivalised disposable income in SILC and HBS, and focus on how the two observed aspects contribute to income discrepancy particularly in the 1st decile. We test how different treatment of existing primary data affects disposable household income. The analysis is conducted on SILC and HBS primary data for 2013-2016 period, with particular focus on 2016 data (SILC 2017 and HBS 2016). We also take a closer look on practices of EU counties. We focus on those that share common characteristics regarding agriculture to those in Serbia: high gross values added (GVA) created in agriculture per capita, high share of agricultural HH in total number of HH and high fragmentation of land per AH. In this regard, Serbia can be best compared to Romania, Bulgaria, Greece and Hungary, but also Poland, Slovenia, Croatia, and to some extent Portugal.

This analysis does not aim to obtain an improved income assessment by the comparison of two instruments; but because we do not have enough information on the probabilities and segmentations, we only use the comparison as a guidance for improving methodologies.

This analysis show that the two observed aspects amount up to 39% of income discrepancy between SILC and HBS in 1st decile in 2016 (23p.p. to zero and negative income, 16p.p. to income from agriculture). This is a cumulative effect of several factors that will be analysed further in text. However, it needs to be underlined that this represents only an order of magnitude analysis, where we aim to quantify what percentage of the income discrepancy between HBS and SILC might be related to mentioned two aspects in a given year. However, this percentage differs slightly across years; and since it is influenced by many factors, they are hard to be singled out one from another. Thus, we provide the estimate only as a solid illustration and order of magnitude.

While the extent of the difference found does not give us a sense of the level of SILC deviation (particularly in the first decile), there are insights which do indicate possible methodological improvements needed. For instance, the fact that as many as 27% of households in 1st decile in SILC is being found with exactly zero income (5% in HBS) requires attention. Furthermore, results found suggest that not all can be related to different philosophies and that there might be substantial methodological problems with both instruments. For example, HBS strongly overestimates the share of agricultural HH in total number of HH (29%), while SILC underestimates it (19%, vs. 23% based on FSS).

TREATMENT OF NEGATIVE AND ZERO INCOME

Households with zero and negative income are related to a significant portion of discrepancy between HBS and SILC, and understanding them is of crucial priority for adequate social policy targeting. **Different treatment of negative income values, and the more frequent occurrences of zero income values in SILC, amounts to 23% of THDI difference between SILC and HBS in 1st decile in 2016.** This percentage differs across years. Negative income used to affect the discrepancy to the higher extent in 2014-2015 period. Even though still high, this factor is relatively weaker in 2016, since the share of HH with negative income in SILC halved.

- **Negative income.** SILC and HBS have different approach to negative income. Income can be observed as a negative income on various categories of self-employment in both instruments. However, unlike SILC, negative income on self-employment in HBS is not deducted from total disposable income but set to zero. So, disposable income can never be negative in HBS, while it can be in SILC.

• **Zero income.** SILC reports significantly higher share of HH with zero income compared to HBS (27% of HH in the 1st decile in SILC vs. 5% in HBS). This might indicate that either SILC better capture "desperate" part of population, or it is less successful in obtaining adequate responses from households (less non-response issue).

Additional to these issues, there is a high share of HH with very small amount of THDI (up to 1.000 RSD monthly). In SILC, even with negative income set to zero, 30% of HH in 1st decile has zero income, while 8% reports small amount THDI (2016 data). In HBS, these shares are 5% and 0,3% respectively.

Both negative and zero income values in EU-SILC have long been disputed issues. Such cases sometimes can be correct (e.g. very deprived households, HH with family micro business facing loss etc.), other cases indicate possible issues such as non-response errors. The basic questions behind is how it is possible that a household can survive with zero or negative income and no consumption from own production during entire year (83% of HH with zero income in SILC). While a HH may rely on the borrowing, still the persistent trend of zero income within the same households does not seem valid.

EU does not set strict requirements regarding the treatment of negative and zero disposable income, but rather provides recommendation for reducing risk of making mistakes during data collection. Instead of excluding zero values, EU practice prescribes different techniques that would ensure higher efficiency in data collection, with particular focus on potential non-response error and HH refusing to provide information on their income level. Regarding negative income components, there is a different practice among EU counties. In fact, around a half of the countries allow for the incidence of negative values, while a half sets them to zero. This allows space for Serbia to reconsider the treatment of negative income, and possibly align it with the HBS practice.

ASSESSMENT OF INCOME FROM AGRICULTURE

In 1st decile, difference in measuring income from agriculture amounts to 16% of income discrepancy between HBS and SILC. The largest part of it refers to different assessment of in-kind income (non-monetary income from agriculture) (14,8 p.p.). Among other factors, this is due the fact that unlike SILC, HBS overestimates AH, includes in-kind income for all HH, includes it in market prices, and includes fuel wood. On the other hand, only 1,2 p.p. can be attributed to different assessment of monetary income from agriculture.

Income from agriculture is captured by two components in both surveys, one monetary and the other non-monetary income stream: (1) Agricultural production sold on market (Monetary Income from Agriculture - MIA), and (2) Agricultural production for own consumption (Consumption of Own Production - COP). While COP is relatively more important in lower deciles, MIA becomes more relevant in higher deciles. Expectedly, COP level is stable across deciles (households have similar level of agricultural production for own use), while income from sale (MIA) increases significantly in the higher ones. Interestingly, HBS reports higher average MIA in the highest deciles, which might indicate SILC inefficiency to sample or obtain responses from the richest agricultural households.

There are significant differences in how SILC and HBS assess income from agriculture. Assessment of mentioned two income components differ in the following aspects:

• **Coverage.** The monetary income from agriculture is included in THDI in both surveys the same way. On the other hand, there are numerous differences in covering COP in two surveys. HBS includes entire COP in THDI in gross terms. SILC includes

only the small fraction of COP that refers to withdrawals from production that was intended to sale, and this fraction is included in net terms. Agricultural production aimed solely for own consumption in SILC, captured by indicator HY170 (value of goods produced for own consumption), is not included in THDI. Additionally, SILC does not include fuel wood, while HBS does.

- **Estimation approach.** HBS uses more detailed approach in estimating both streams of income from agriculture, while SILC has high-level estimation approach. HBS has 28 questions related to revenues and costs from sales in past three months, which allows to calculate both gross and net values related to income. In terms of COP, HBS ask HH to keep detailed diary of their consumption (exact quantities for each product consumed) for 15 days. On the other hand, SILC has only one or two questions for each income component that refers to recalling the annual net income level (income or loss) both for sales and for withdrawals.

16% of discrepancy referring to different assessment of income from agriculture in 1st decile is a cumulative effect of the following aspects:

- **HBS overestimates and SILC underestimates both the share of agricultural HH in total number of HH, and the share of commercially oriented AH.** Based on FSS, there is 23% of agricultural households in Serbia. SILC on the other hand reports only 19% of AH, while HBS even 29%. On the other hand, while FSS reports there is 17,5% of commercially oriented agricultural households (in total number of HH), while SILC and HBS report 8,5% and 20% respectively.

- **HBS and SILC have different scope in terms of consumption of own production (while the scope is the same in terms of sale of agricultural products).** Differences refer to the following:

  - *Fuel wood*. Fuel wood that is included in HBS COP, and it is not in SILC, is not negligible. Based on HBS 2016, 12% of households use fuel food from own consumption. In the first decile 16% of HH use fuel food as COP, and that represents even 26% of their TEDI.

  - *Production only for own consumption*. Not included part of COP captured by HY170 in SILC is not negligible as well. In fact, 21% of HH in 1st decile report HY170, which would represent 59% of their TEDI if HY170 was included (in net terms).

  - *Gross vs. net values*. As mentioned, COP in HBS is included in THDI in gross values, while SILC includes withdrawals from production intended for sale in net values.

- **SILC seem to significantly overestimate the magnitude of consumption from own production in the lowest and the highest deciles.** We use HBS as a reference point, since it has a very detailed approach to measuring COP (each HH keeps a detailed diary of their consumption for 15 days). When we observe HH that reported having COP, SILC reports twice as high magnitude of gross value of COP compared to HBS in 1st decile, and 136% higher COP in 10th decile (fuel wood is excluded).

Among other issues regarding agriculture, inclusion of HY170 is highly disputed issue even on an EU level. EU-SILC methodology leaves a choice for a country to make – it can choose to collect, not to collect the data on HY170 at all, or to collect it form

another survey, like HBS. However, since it is a non-monetary part of income and represent rather a marginal part of THDI, all EU countries except Croatia do not include it in THDI. Still, after being flagged by Eurostat as a country that "does not seem to follow the Eurostat guidelines", will stop including it in THDI. Thus, inclusion of HY170 would negatively affect cross country comparability. **This is way we could not recommend HY170 to be included in THDI.** Moreover, its inclusion would negatively affect cross country comparability. Nevertheless, HY170 can still serve as some form of development indicator, especially in the case of developing countries of Southeast Europe with significant agricultural population.

Similarly, EU-SILC framework allows only for net income values and does not envisage fuel wood to be included in household disposable income in any amount. **Thus, we cannot propose neither switching to gross values in terms of COP, nor inclusion of fuel wood in THDI.**

RECOMMENDATIONS

Referring to the two observed aspects, SILC methodology in Serbia could be improved, but up to the limits defined by SILC harmonised framework. Thus, we propose several areas in need of further analysis and improvement:

1. Reviewing the statistical segmentation, sampling and weighting of households. Sampling and weighting processes, being crucial for good quality data collection, should be thoroughly analysed in SILC in order to assure that sampled population adequately represent the structural characteristics of households in Serbia. As previously mentioned, this report indicates strong deviations in terms of the size and structure of agricultural household sampled both in SILC and HBS. Even though we cannot conclude that other structural households' characteristics are also inadequately represented, the difference related to agriculture suggest the possibility of there being other deviations from actual structure. In Serbia there are strong regional differences, and different economic and demographic trends that should be carefully taken into account when defining sampling and weighting processes.

2. Uncovering underlying reasons for high share of households with zero and very small income. Since SILC focuses also on poverty and social exclusion, its capacity to adequately capture reality in this regard is of crucial interest for social policy targeting. This includes proper capturing of the share and characteristics of deprived HH/individuals in need of social assistance. Even if this share was adequately captured in SILC so far, the question of the structure would remain. For example, it should be analysed which of HH that reported zero disposable income do not belong to 1st decile, but rather refuse to provide information on income. Eurostat often draws attention to the fact that sometimes HH from upper deciles are those that avoid providing info on income.

3. Comparing the size and characteristics of the poorest population in SILC to recipients of social assistance based on official data. This is in alignment with the previous recommendation and it goes in both directions: the analysis should cover both the capacity of SILC to capture the population that (should) receive social assistance, and the capacity of social assistance instruments to capture targeted population. For this purpose, further analysis should uncover actual typology and characteristics of HH that are in need of social assistance, and compare it both to SILC and official data od social assistance receivers.

4. Switching to use of registers where possible. SILC framework encourages countries to rely on registers when they can. Using registers has many benefits in form of reduced errors, biases and lower response burden. Serbia might consider registers related to social assistance, income from employment, pensions, subsidies for agriculture etc. EU countries still dominantly rely on survey data (50% of countries), 38% use mixed approach (combining data from survey and registers), while 12% rely dominantly on data from registers. Still, there are issues regarding using register data, due to legal barriers, difference in definitions or timeliness of the data etc. Particular issue refers to personal data protection and obtaining personal identity number during data collection.

5. Improving data collection capacity. This includes Improved questionnaires, instructions and trainings for interviewers. Questionnaires should be adjusted so they cover clear and unequivocal questions in measuring income from agriculture (e.g. distinction of withdrawals and goods produced for own consumption). More importantly, since SILC uses high-level estimation approach, and asks only one question per income category, additional instructions to the interviewers are needed to explain many concepts that should be covered. For example, income from agriculture should also include subsidies received for agriculture. Since this is not noted in the questionnaire itself, such information should be provided in instructions, so that interviewers can explain what each income category includes. Once questionnaires and instructions are improved, it is up to interviewers to ensure good quality of data collection. Referring to the previous example, when interviewers ask about income from agriculture, they should remind HH that subsidies should be included. In particular, interviewers should be trained to overcome non-response risk, and to motivate HH to provide proper answers on income level.

Additional improvements in SILC might be accomplished by the following: Consider different treatment of negative income level from self-employment activities; Consider implementing cross-checking mechanism with other instruments such as FSS, Labour Force Survey etc.; Consider switching to gross values in SILC questionnaire (revenues and expenses) instead of net values such as income and loss; Consider alternative analysis of HY170 through additional development indicators; Thoroughly analyse other income components as a source of discrepancy between HBS and SILC in lower income deciles.

INTRODUCTION

Inequality and income of Serbia's population are measured through two conceptually different methodologies – SLIC (Survey on Income and Living Conditions) and HBS (Household Budget Survey). However, income level and inequality measured by these two instruments differs widely. In terms of inequality, SILC puts Serbia among countries with the highest inequality, while HBS survey puts it lower, closer to EU average. Difference partly lies in the fact that first measures income inequality, while the latter measures consumption inequality. According to SILC, Gini coefficient of income inequality in Serbia in 2018 was 35,6 (highest in Europe, after Turkey, Bulgaria and Lithuania). Bearing in mind that HBS is not comparable on EU level, measured by consumption distribution, Gini coefficient was 28,5 points, which put Serbia closer to EU average (SIPRU). Both two concepts give relatively stable results over time, as SILC inequality tends to gravitate around 38 since its introduction in 2013, while HBS measured inequality ranges from 25,5 to 28 from 2006 to 2018.

This report focuses on income level and the high discrepancy observed between HH in the 1st decile between HBS and SILC. Serbia's Human development paper (UNDP, 2018) sheds light on large discrepancy in equivalised disposable income, and notes that the largest difference lies in the 1st decile and 10th decile, with obvious differences in other bottom deciles as well. The report underlines several possible sources of this. Firstly, unlike SILC, HBS include in-kind income. Secondly, there is a different treatment of negative income values and outliers in two surveys. While HBS neutralize them, SILC does not. Finally, there is different data collection approach where HBS uses diaries and detailed questionnaires for collecting income referring to a shorter period of time, while SILC uses high-level approach for annual period.

It needs to be stressed that some level of discrepancy is not unusual (still lower in EU countries), since these two instruments are conceptually different methodologies and have rather different goals. Namely, HBS primarily focuses on household consumption, while measuring household income is a secondary aspect of the survey. Apart from measuring standard of living, HBS results are used to generate weightings for some of key macroeconomic indicators, such as consumer price indices and national accounts (Eurostat). However, HBS is voluntary and no legal basis exists at EU level, so there is a low level of methodological comparability among European counties. On the other hand, SILC aims to be a comparable survey at EU level. Even though EU-SILC does not prescribe a fixed methodology, it provides a common harmonised framework. Moreover, unlike HBS, SILC primary focus is to assess income, poverty, social exclusion and living conditions of citizens.

However, the unusually large discrepancy in households' income indicates the importance to conducts a systematic comparison of SILC and HBS methodologies and results to identify possibilities for improvement of SILC estimates. While it is not correct to use HSB for income and poverty estimates since HBS and SILC are different tools and have different goals, we can use differences in the methods, questions and results related to income in order to learn how SILC can be improved.

We focus on the significance of SILC capacity to adequately capture income level since it is the key instrument for measuring poverty and social exclusion. This issue is particularly important for adequately covering all individuals in need of Government financial social assistance. In fact, SILC data indicate the urgent need to increase the coverage of individuals obtaining Government financial social assistance. Based on SILC, even 10,2% of households in 2016 had disposable income below the census level of financial social assistance as defined by the Law on Social Protection. If SILC adequately captured reality, then Serbian social assistance net would be grossly inadequate, would not cover all households in need, and it would require urgent review

Among other methodological aspects, we draw attention on capturing agriculture at least for two reasons: (1) it represents a particular issue in Serbian statistics, (2) there is an unusually higher share of HH relaying on agriculture compared to other EU countries. Thus, we believe that inadequate capturing of agriculture might significantly affect the observed income discrepancy. Firstly, agriculture is among statistics that is the hardest to capture, and Eurostat keeps on improving its methodological frameworks as to provide better and more detailed assessments (Eurostat, 2020). At the same time, agriculture seem to be more often, and important source of income compared to other income countries. In Serbia there is even 23% of agricultural households in total number, while the EU average is 5%. The only country with the higher share is Romania (46%). In general, in EU countries there is a lower share of AH, agriculture is more concentrated, and AH are larger and more specialised. Finally, Serbia has above average standard output of agriculture[2] per HH, compared to EU average (27% higher).

This report aims to derive recommendations for the improvement of SILC, based on comparisons of two methodological issues with Household Budget Survey (HBS), EU-SILC practices and info that can be obtained from the Farm Structure Survey (FSS). It shed light on how two methodological aspects: (1) different treatment of negative and zero income, and (2) different assessment of income from agriculture, contribute to the high discrepancy in income of the 1st deciles as estimated by SILC and HBS. We also analyse EU-SILC practices and we Farm Structure Survey in order to gain additional insights into where the sources of possible improvements might be.

This report has six chapters. In the first chapter we briefly introduce the methodology of this report and shed light on important methodological caveats of the analysis. The second chapter provides a detailed analysis of methodological differences in data treatment and measuring income, with particular focus on income from agriculture. The third and fourth chapter provide quantitative results of the analysis, where we provide an order of magnitude analysis of how the two observed methodological aspects affect the discrepancy. In the fifth chapter we draw attention on EU-SILC practices in these two aspects and what lessons can be applied on SILC in Serbia. Finally, in the sixth chapter we propose recommendation on how SILC can be further improved as to better estimate income.

2. *Rough proxy of agricultural production. See page 47 for more on standard output.*

I. METHODOLOGY OF THIS REPORT

As mentioned, this report aims to derive recommendations for the improvement of SILC, based on comparisons of two methodological issues with Household Budget Survey (HBS), EU-SILC practices and info that can be obtained from the Farm Structure Survey (FSS).

There are two major analyses: a quantitative analysis based on SILC, HBS and FSS data; and a qualitative analysis of current methodological guidelines and employed practices within the EU-SILC countries. The focus of the quantitative part is to assess to which extent different assessment of zero and negative values, as well as different assessment of agriculture, affects the discrepancy in disposable income as assessed by SILC and HBS. This analysis is conducted on a decile level, since we pay particular attention on the poorest households where this discrepancy is the largest. We also analyse FSS data in order to uncover characteristics of agricultural HH in Serbia, and to which extent those are represented in SILC and HBS. Finally, the analysis of EU-SILC framework and practices in different EU countries serves to draw conclusions on where and how SILC might be improved and still satisfy Eurostat required guidelines.

More methodology details on concepts and terminology can be found in Appendix 1.

In this report, we provide a quantitative analysis of SILC and HBS total disposable household income and different income components. Moreover:

1. All data for the quantitative analysis of income components in SILC and HBS in Serbia were provided by Statistical Office of the Republic of Serbia (SORS). These data largely concur to methodological guidelines provided by Eurostat (Goedemé, Zardo 2020).

2. The analysis is based on primary data for the period 2013-2016, with particular focus on 2016 data (SILC 2017 and HBS 2016)

3. The analysis focuses on equivalised disposable income, based on OECD-modified equivalence scale that was applied both to SILC and HBS income data.

4. All results presented in this study are weighted averages, based on cross-sectional household weights in SILC and household weights in HBS.

There are **several methodological caveats** we need to underline:

- **We aim to provide an order of magnitude analysis.** Namely, we aim to quantify what percentage of the income discrepancy between HBS and SILC can be related to different assessment of income components in a given year. However, this percentage

differs slightly across years, and it is influences by many factors. Thus, since we did not conduct a rigorous statistical analysis, we focus primarily on one year and we provide assessment only as an illustration and order of magnitude.

- **In terms of agriculture, we focus our analysis on assessing the impact of different assessment of income from agriculture on the income discrepancy between HBS and SILC, rather than focusing on different assessment of agriculture in general.** The reason refers to the fact that assessing agriculture also influences non-agriculture related income. For example, different assessment of agriculture includes proper sampling of agricultural households. Clearly, that has an impact not only on income from agriculture, but also on other sources of agriculture. Such as, an overestimation in sampling agricultural HH with one member older than 65 years, might led to an overestimation of the number of pensioners, and therefore pensions as a source of income, and potentially underestimation of income from employment. Since we are not able to quantify impact on other income components, we focus entirely on income from agriculture.

- Finally, **when we zoom in and shed light on different aspects of assessing agriculture, we again provide only a rough estimation of impact for each aspect.** Namely, it is hard to single out separate effect of different aspects of assessing the agriculture, since each is influenced by a multiplied effect of many factors (including ones non-related to agriculture). For example, when we try to estimate how not including certain income components affect the discrepancy, that is also a multiplied effect of two observed aspects (structure and magnitude). In other words, we lack proper benchmark to derive more definite and exact conclusions.

There are two main and interconnected segments of this analysis: (1) data processing (negative and zero income); and (2) assessment of agriculture. In the first case we simply test to which extent the discrepancy would be reduced if negative and zero income values were treated the same way in two methodologies. In terms of assessment of agriculture, we shed light on three structural aspects (structure, scope, magnitude). Namely, we focus on the following:

• DATA PROCESSING

In terms of different data processing, in this report we primarily focus on the treatment of negative and zero values. Even though some other aspects like extreme values are also significant, they are out of the scope of this analysis.

• ASSESSMENT OF AGRICUTLTURE

As mentioned, this report aims to assess the impact of differently estimated income from agriculture on the income discrepancy between HBS and SILC. We particularly focus on three different aspects of assessing agriculture:

1. Structure. This aspect aims to uncover whether SILC and HBS representatively sample agricultural households in Serbia. This assumes both the share of agricultural households in total number of households, as well as the particular characteristics of different segments within agricultural households (commercial orientation, other sources of HHs' income etc.). Without proper sampling, it might happen that certain

types of households are overestimated or underestimated. For example, SILC 2017, when compared to FSS 2018, underestimates the share of agricultural households that are commercially oriented, and particularly in lowest income deciles. (see page 35).

2. Scope. The scope refers to the coverage of all income components coming from agriculture, and how that affects the discrepancy between SILC and HBS. As it was mentioned, SILC does not include consumption from own production (HY170), nor it includes fuel wood as part of withdrawals in PY050.

3. Magnitude. The magnitude aims to uncover the quality of questionnaire tool (and other supplementary material that influence the success of interviewer) and its ability to properly estimate actual income level. Among other issues, assessment approach and type of questions are crucial for this aspect. There are different practices among EU countries. While some relies either on data from other surveys or official registries (such as HBS) or have more detailed questions in this segment (such as diaries), there are some that have more high-level approach to estimating income (such as "recall income") (see page 19).

We use results of SORS' Farm Structure Survey and certain segments of HBS as a trustworthy benchmark. Both HBS and SILC methodological approach has its potential shortcomings. For the largest part of the analysis, we were only able to state that income based on HBS was higher or lower than the one based on SILC. In order to be able to state whether either HBS or SILC underestimate or overestimate certain income components, we need to provide a trustworthy benchmark. Namely:

- We use **Farm Structure Survey** (see next paragraph) a**s a benchmark for the structure of agricultural households**, since it is a detailed instrument which interviews almost a quarter of agricultural households in Serbia (22%). In particular, we use it to set a benchmark for the share of AH in total number of HH, as well as the share of commercially oriented AH in total number of HH.

- We use **HBS as a reference point for in-kind income from agriculture**, since it has a very detailed approach in its estimation (for more, see next chapter).

Farm Structure Survey (FSS) is a regular survey in EU countries, which is crucial for understanding the structure of agricultural households in a country. FSS is the Survey on the structure of agricultural holdings (another name for FSS). It serves as a methodological basis for census in EU countries, and provides detailed characteristics on AH (land size, type of agricultural production, standard output[3], number of HH members, commercial orientation of AH, age of manager and head of AH etc.) All EU member states conduct FSS regularly every 3 or 4 years, based on a common methodology (Eurostat). This makes FSS comparable statistics across countries and time, at regional levels (NUTS 3 level) (ibid.). In Serbia, SORS conducted FSS in 2018, which covered 120 thousand agricultural households (22% of their total number). This is the most detailed and recent data on agriculture in Serbia, after the agricultural Census in 2012. However, it is important to note that this survey does not cover data on AH income, so cannot be directly compared to HBS and SILC in this regard.

3. *FSS does not measure agricultural production, but does measure a category that is called standard output which can be used as a proxy of production. It is the average monetary value of agricultural output at farm-gate price, in euro per hectare or per head of livestock in observed year. It is used to classify agricultural holdings by type of farming and by economic size (Eurostat). It cannot be used to calculate income of a HH since it cannot be estimated the part of production that had been sold or consumed.*

II. THE TWO INSTRUMENTS METHODOLOGIES (SILC & HBS)

DIFFERENCE BETWEEN SILC AND HBS

As previously mentioned, **even though both surveys measure income and inequality of Serbia's population, SILC and HBS are two conceptually different methodologies.** While the former relies on assessing households' income, the latter primarily relies on households' consumption. Nevertheless, both HBS and SILC surveys measure household disposable income on a detailed level. Both surveys capture a number of income components both on personal and household level. However, their methodologies differ, which in case of Serbia led to discrepancies in results particularly in the lower deciles. In this section we focus on methodological differences among these two tools regarding total disposable household income, with focus on income from agriculture.

The European Union Statistics on Income and Living Conditions (EU-SILC) is an instrument which aims to assess income, poverty, social exclusion and living conditions within the EU, EFTA and Candidate countries. It does so by collecting timely and comparable cross-sectional (inter- and intra-country comparable) and longitudinal (comparable over time) multidimensional microdata (person/household data). This instrument is deeply anchored in the European Statistical System (ESS). As of 2019, SILC framework is implemented in all 28 EU member states, three non-EU EFTA states (Switzerland, Iceland and Norway) and in four out of six EU Candidate countries. Moreover, apart from Italy, SILC already has a 15-year tradition among the EU member states.

It needs to be stressed that EU-SILC does not prescribe a fixed methodology; and rather than providing common survey it provides common framework (Eurostat). Given the scope that it aims to cover with a high level of inter-country comparability, the mechanism itself had to be flexible enough to grasp countries' specifics and at the same time set within harmonized frame to ensure sufficient level of comparability. Harmonized frame implies providing common concepts, procedures and guidelines and setting the target variables – such as *total household disposable income, dwelling type or unemployment benefits*. It is then up to national statistical offices to determine exact methodology and design questionnaires, which are later justified through national quality reports. Namely, flexibility is largely

portrayed in methods on data collection (personal or over the phone interviews; use of registers for data compiling and cross-checking), choice of a sample design and frame (as long as it is four-year rotational[4])[5], weight calculation (calculated weights represent probability of selection for specific individual or household), data processing (some data manipulations that include correction for negative, extreme, and missing data, mainly due to mistakes and non-response). Along these lines, SILC can be defined as decentralized, yet ex-ante output harmonized framework.

On the other hand, **the European Union Statistics on Household Budget Survey (HBS), primarily focuses on household consumption.** Apart of measuring standard of living, its results are used to generate weightings for some of key macroeconomic indicators, such as consumer price indices and national accounts (Eurostat). **However, unlike SILC, HBS has low level of comparability among European counties.** As Eurostat underlines: "HBS is voluntary and no legal basis exists at EU level, the survey structure and implementation arrangements are diverse; this has evident implications for comparability. However, since the first HBS round (1988), all the participating countries and Eurostat have made great efforts to harmonize their HBS and to improve data comparability. Even so, there is still some room for improvement." (Eurostat). Methodologies on a country level vary in terms of frequency, timing, content or structure, but the biggest methodological difference refers to the owner-occupier imputed rent (Eurostat). Since there is no legal basis, each country has its own targets, methodology and survey programming (ibid.). The HBS is one of the most demanding surveys that National Statistical Institutes (NSIs) carry out, particularly because of diary keeping phase, which for some countries may be a whole month (ibid.).

Taking all this into account, in the following segment, we focus on methodological differences in SILC and HBS in Serbia, with particular focus on assessing agriculture. Details on HBS methodology will refer only to Serbia, while in terms of SILC it will be noted which methodological aspects are common for all EU countries, and which are Serbia specific.

4. *Every household is interviewed for four consecutive years and after that it is being excluded from the sample, while a new household is included. The design is such that every year 25% of the households leaves the sample while 25% new ones enter.*

5.*https://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_%E2%80%93_sampling#Sampling_frame*

DIFFERENCES IN MEASURING DISPOSABLE INCOME

Both SILC and HBS aim to estimate total household disposable income, by capturing components of income coming from employment, pensions, social benefits and other income sources. While both aim to capture all monetary income components, they differ in their structure (Table 1). In SILC, main target income variables are Total household gross income (HY010) and Total household disposable income (THDI - HY020). THDI in SILC is obtained when taxes on wealth, social contributions, taxes on income and regular inter-household cash transfer paid are deducted from the HY010. In HBS, the main indicator is also total disposable household income, while all key income components are calculated only in net terms which are summarised and constitute THDI. In Table 1, THDI is disaggregated on its main income components in HBS and SILC.

Even though SILC and HBS chose to distinguish different number and structure of main income components, **for estimating the quality of each survey, we need to shed light on each income component and underlining survey tools and methodologies.** For example, HBS reports pensions and other social security benefits, while SILC reports even 7 income components: pensions received from individual private plans, unemployment, old-age, survivor', sickness and disability benefits, and education-related allowances. This does not necessarily mean that HBS has only one question for other social security benefits. In this particular case, HBS has 8 questions within survey tool that are summarized in one (see notes below Table 1). Nevertheless, there are opposite cases, where SILC or HBS have more detailed approach in estimating certain component and instead of one question, have several.

It is important to note that **SILC income components presented in Table 1 are target variables defined by harmonised EU-SILC framework, while HBS income components are only relevant for Serbia and cannot be directly compared to those in other EU counties.** In SILC, countries need to obtain these target variables, but they have flexibility to define suitable national concepts and measurement procedures, as long as they meet output requirements set by guidelines and common framework (Eurostat). For example, some counties have very detailed questionnaires or use official registers to estimate some income components, while other only have one or two questions related to the same income components. In fact, Ireland, a country where agriculture has marginal influence on AH own consumption, has more than 90 questions for estimating COP; while Bulgaria is an opposite case with only 2 questions.

Table 1. SICL and HBS: Total disposable household income and its main components

HBS	SILC
Total household disposable income =	**Total household disposable income (HY020) =**
The sum of all net income components:	**The sum for all household members of gross personal income components:**
Income from regular employment	Gross employee cash or near cash income (PY010G)
Income outside regular employment[1]	Company car (PY021G)
Pensions (old-age, family, disability and other)	Gross cash benefits or losses from self-employment (including royalties) (PY050G),
Other social security benefits[2]	Pensions received from individual private plans (PY080G)
Income from agriculture, hunting and fishing	Unemployment benefits (PY090G)
Income from abroad	Old-age benefits (PY100G)
Property income	Survivor' benefits (PY110G)
Gifts and gains	Sickness benefits (PY120G)
Consumer and investment loans	Disability benefits (PY130G)
Other income[3]	Education-related allowances (PY140G)
Income in kind on earnings	**Plus gross income components at household level:**
Consumption of own production	Income from rental of a property or land (HY040G)
	Family/children related allowances (HY050G)
	Social exclusion not elsewhere classified (HY060G)
	Housing allowances (HY070G)
	Regular inter-household cash transfers received (HY080G)
	Interests, dividends, profit from capital investments in unincorporated business (HY090G)
	Income received by people aged under 16 (HY110G)
	Minus:
	Regular taxes on wealth (HY120G)
	Regular inter-household cash transfer paid (HY130G)
	Tax on income and social insurance contributions (HY140G)

Notes: 1. Includes two sub-components: Cash benefits from overtime, rewards, savings from business trips, transport allowance, recourse, a hot meal as a payroll supplement, etc.; and Cash benefits from temporary and temporary work, on the basis of a work contract, copyright contract, work in a freelance profession, etc.

2. Other social security benefits include separate questions for: Health insurance benefits (sickness benefit, etc.); Maternity and maternity leave benefit; Social assistance, allowances and other benefits based on social protection (family financial support, care and assistance of another person, parental allowance, etc.); Receipts for the financial security of unemployed and temporary unemployed persons; Personal, family disability benefits and disability benefits, civilian war invalids and war participants; Alimony, alimony benefits; Child's allowance; Student scholarships, student allowances for skilled workers, awards, etc.

3. Other income (among other sub-components) includes household income from engaging in unregistered, income-generating independent activity.

DIFFERENCES IN MEASURING INCOME FROM AGRICULTURE

Income from agriculture is captured from two different streams in these two surveys, one monetary and the other non-monetary income stream:

1. Agricultural production sold on market (Monetary Income from Agriculture - MIA)

2. Agricultural production for own consumption (Consumption of Own Production - COP)

However, these two streams are not equally included in THDI in HBS and in SILC. Monetary income from agriculture, referring to sale on the market, is included in THDI in both surveys. Only, HBS includes it as a separate income component, while SILC reports it as a part of income from self-employment (PY050) (Table 1). However, while HBS includes entire consumption from own production in THDI, SILC does so only partially (Table 2). In SILC, agricultural production aimed only for own consumption is measured by indicator HY170 (value of goods produced for own consumption), but it is not included in THDI. Only agricultural production that is partly consumed instead of sold is included in THDI since it is considered as withdrawals from a business by a self-employed person.

Table 2. SILC and HBS: basic differences in assessing income from agriculture

Income component	HBS	SILC
Monetary income from agriculture (MIA)	**Included.** It is included in THDI as a separate income component (Income from agriculture, hunting and fishing).	**Included.** It is included in THDI as a sub-component of PY050G - Gross cash benefits or losses from self-employment.
Consumption of own production (COP)	**Included.** Entire consumption from own production is included THDI as a separate income component (Consumption of own production).	**Included.** Agricultural production that is aimed at selling, but partly is consumed within the same HH is considered as withdrawals from a business by a self-employed person, and it is included in THDI as a sub-component of PY050G - Gross cash benefits or losses from self-employment.
		Not included. Agricultural production that is aimed solely for own consumption is not included in THDI. However, it is included in survey and calculated within target indicator HY170 - Value of goods produced for own consumption.

This specific treatment of consumption of own production in SILC deserves particular attention. **In SILC, COP has two segments that are only differentiated through HH's market orientation** – part that was intended to be sold is captured through PY050 as withdrawals, while part that was intended only for HH own consumption is captured through HY170. Namely:

- Value of goods produced for own consumption (HY170) refers to the **value of food and beverages produced and also consumed within the same household**[6]. The value itself should be calculated at net market prices – i.e. all expenses incurred in the production process should be deducted from the assessed market value of the products consumed. Definition also states that HY170 is limited to food and beverages, while other products and potential sources of income such as wood or goods acquired through hobbies or household services are excluded.

- HY170 should not be confused with **withdrawals from a business by a self-employed person or household**, as the latter should be considered as revenues in calculating self-employment income (PY050)[7]. Rationale behind separating these two in the first place can be found in the fact that the SILC relies on disposable income as a measure of (monetary) poverty and inequality rather than on consumption. Therefore, withdrawals of commercially oriented HHs can be interpreted as opportunity cost of selling (as revenue forgone).

It should be noted that calculations of income distribution, monetary poverty and inequality (Gini and S80/S20) do not take into account the data on HY170, as **HY170 is not an integral part of main income variables, neither directly nor indirectly, while withdrawals are included.**

However, the definition of HY170 might be confusing at times. The demarcation line between HY170 and withdrawal(s) is far from easy to draw[8]. One paragraph of the definition in the Methodological guidelines exemplifies the problem:

> *"Although for some households in some countries, the ability to produce and consume their own garden produce may appear to make a real contribution to their economic well-being, even then it is debatable whether the level of profit is significant once the cost of all inputs has been deducted. Note that if the household is in fact running a farm or small-holding then* ***the value of any of their own produce which they consume themselves*** *will already have been taken into account in the measurement of their (monetary) income from self-employment." (ibid.).*

Particularly the bolded part of it, and particularly the word "***any***" can be confusing - as it may seem that the whole ("***any***") COP (both withdrawals and HY170) is included into PY050 if the HH is commercially oriented. However, this paragraph tries to underline that withdrawals are recorded separately from HY170. This information is recorded with usually **two different sets of questions**, where the information about withdrawals is recorded in the part covering self-employment, while the question(s) about HY170 is(are) usually given separately. The definition of HY170 also states that it *"excludes any production for sale and*

6. *Methodological Guidelines and Description of EU-SILC Target Variables, Operation 2018*

7. *Methodological Guidelines and Description of EU-SILC Target Variables, Operation 2018*

8. *Croatia used to misclassify HY170 as withdrawal, potentially because of misunderstood definition. More on that in the Chapter V.*

any withdrawals from a business by a self-employed person" (Eurostat 2019). Knowing this, we conclude that main message of this passage is that HY170 and withdrawals should not be confused. The former is result of non-commercial activity and captured as such, while the *value* of the latter is a result of commercial activity and is *already* included in PY050.

Translating the definition into practice is also a challenge. The name of the variable **HY170** is "Value of production for own consumption", **stressing the intention that the goods *are produced to be consumed within the household*.** But, for example, some households may have commercially oriented agricultural production (of, say, apples) and a green garden that they cultivate solely for their own needs. By following the methodological guidelines strictly, if apples were consumed by that household, these should be included in PY050 as withdrawals, while production from the green garden should be included into HY170 (meaning that production from green garden is not part of the THDI). Nevertheless, in this simplified example, this distinction could be made relatively easily, while in reality, that task could be much more challenging. For example, what happens if HH has a production *intended* for own consumption, but only occasionally sells some surpluses? Conceptually, there is little reason not to include that income into total household's disposable income[9], yet on the other hand, there is also little reason to consider value of remaining own consumption as a withdrawal and to actually include it into PY050. Similarly, as it will be elaborated further in the report, there is a potential risk of double counting. Namely, households could report having COP both as part of withdrawals as well as part of HY170.

Apart from different treatment of consumption of own production, there are other important methodological differences in assessing agriculture in SILC and HBS presented in the following table. Additional difference in terms of two streams of agricultural production is specified in Table 3.

9.*Yet the value might be only small, and therefore the gains from addressing this issue by adding additional question(s) would be proportionately small.*

Table 3. SILC and HBS: key methodological differences in assessing agriculture in Serbia

		HBS	SILC
Reference period	Agricultural production for sale	Past three months	Previous financial year
	Consumption of own production	Current two weeks1	Previous financial year
Data collection method	Agricultural production for sale	Recall	Recall
	Consumption of own production	Diary	Recall
Assessment approach	Agricultural production for sale	More detailed: Set of questions aimed at estimating revenues and costs from this activity.	High-level approach: Three questions referring to profit or loss; and on withdrawals.
	Consumption of own production	Detailed: diary of all products	High-level approach: Two questions referring to market and producers' prices.
Gross/Net values	Agricultural production for sale	Net values (Calculated based on gross values)	Net values (For income from sale: income or loss; for withdrawals: net value)
	Consumption of own production	Gross values (market prices)	Net values. (Calculated based on gross values)
Scope of agriculture		Agriculture includes fuel wood.	Agriculture does not include fuel wood.
Treatment of negative values		Negative values are set to zero.	Negative values are not treated.

Notes: 1. Apart from fuel wood, which refers to the past 12 months.

SILC survey in Serbia relies on high-level estimation approach in estimating agriculture, and asks a responded to recall the level of income occurred in the previous year (up to 8 months after the reference period). In terms of agricultural production for sale, there are only three relevant questions: (1) did you have income or loss from selling agricultural products; (2) what was the amount of income or loss; (3) if you consumed part of production intended to sale, what was the amount of it. This way, only rough estimation of net income values can be obtained, while gross values (revenues and costs) cannot be extracted. In estimating HY170, high-level approach is also used from 2014 onward. There are only two questions: (1) what was the market value of goods produced solely for own consumption; and (2) what was the producers price of goods produced solely for own consumption. This is different to SILC 2013, when questionnaire had more detailed questions regarding HY170 and asked for quantities of agricultural products consumed within a year (25 product types of fruits and vegetables, and 7 animal product types such as milk, eggs, honey, pork meat etc.).

HBS in Serbia has much more detailed approach in assessing agriculture. Regarding agricultural production for sale, even though respondents are asked to recall, questions are much more detailed and refer to the past three months. HBS survey has 14 detailed questions on the type of products as a source of revenues (such as cereals, eggs, milk and milk products, fruits etc.) and 14 detailed questions on costs (such as animal feed, seeds, production tools, costs of sales etc.). This way both gross and net values can be calculated. When it comes to agricultural production for own consumption, respondents are asked to keep a detailed diary of their consumption for two weeks. HH record in detail quantity of each good consumed and note if that was bought, produced for own consumption, received as gift, etc. This includes not only agricultural products (which are focus of this studies), but also home appliances, furniture, apparel, hygiene and personal care products etc.

Scope of agriculture. Unlike HBS, SILC does not include fuel wood as part of households' own consumption. SILC survey only asks for own consumption of agricultural products, while fuel wood is not envisaged (European Commission, 2019). HBS on the other hand, has separate question that refers to annual value of fuel wood consumption coming from COP, which is included in total COP of HH. Fuel wood is not included in the sale of agricultural products in HBS.

It is worth mentioning that neither HBS nor SILC include value of agricultural products as gifts in THDI. Even though this is in alignment with EU practice in general, this reports also analyses the effect of agricultural products as gifts on THDI. We particularly test it on HBS THDI, since HBS diary does include questions on gifts. SILC questionnaire does not have specific question for gifts from agriculture.

Data treatment. Neither HBS nor SILC exclude zero or extreme values. On the other hand, while HBS sets to zero those income components that have negative values, SILC in Serbia do not. However, unlike treatment of zero values, treatment of negative values differs across EU counties. Some countries choose to leave negative values, and the other set them to zero (see pages 24 and 57).

OUR TERMINOLOGY

Taking all these differences into account, there can easily be certain confusion in terms of terminology and coverage. Thus, the terminology used in this report[10] is the following (for more, see Appendix 1):

Income from agriculture – will refer to the total sum of monetary and non-monetary income from agriculture. In particular, it will refer to the sum of the following two sub-components:

1. **(Monetary) income from sale of the agricultural products (MIA)**. This will refer to the net income from agricultural products sold on market.

2. **Consumption of Own Production (COP):** This will refer to agricultural products that are consumed by the same household that produced them (OECD definition). In term of HBS, we will refer to consumption from own production including fuel wood, unless otherwise stated. In terms of SILC, we will refer to the sum of withdrawals and HY170 (see Table 2). When some these two components are separately observed, it is clearly noted.

10. *There is no official common terminology neither for income from sale of agricultural products, nor for consumption for own production. For sub-components where exact terminology exists, we use them as such.*

III. FACTORS OF DIFFERENCE BETWEEN SILC AND HBS INCOME ESTIMATES

HBS and SILC report different level of total equivalised disposable income, which is particularly evident in the lowest deciles. Based on HBS, average total household equivalised disposable income in 2016 was 33.263 RSD, while based on SILC it was 29.751 RSD. While a difference of 12% might not be high, the difference on the decile level is extreme. Particularly lower value of TEDI in SILC is observed in lower deciles. HBS reports much higher average disposable income in 1st decile (3,5 times higher) compared to SILC, while the difference decreases in upper deciles (Table 4). This high discrepancy remains high across 2013-2016 period. Interestingly, the discrepancy decreases in higher deciles, while in 10th decile it even reverses. This is partly due to higher number of HH with relatively much higher TEDI.

Table 4. SILC and HBS decile analysis: average monthly total equivalised disposable income (RSD, 2016)

Deciles	HBS			SILC		
	Cut off	Mean	Median	Cut off	Mean	Median
Min	0			-41,667		
1	13,667	9,224	10,000	7,700	2,668	2,778
2	18,000	16,018	16,000	13,000	10,641	10,633
3	21,536	19,885	20,000	17,419	15,224	15,000
4	25,260	23,397	23,333	21,517	19,544	19,733
5	29,300	27,218	27,186	25,714	23,542	23,444
6	33,333	31,167	31,016	30,000	27,920	28,000
7	38,889	35,891	35,789	35,333	32,880	33,000
8	45,174	41,884	41,722	42,000	38,674	38,870
9	55,810	50,022	50,000	54,000	47,737	47,635
10	339,000	77,781	68,878	374,595	79,307	66,880

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016).All data are equivalized based on OECD modified equivalence scale. All data are weighted averages

There are many potential sources of these differences. They can originate in different weighting schemes, inadequate sampling, non-response errors and their treatment, different coverage of income components, inadequate estimation of magnitude of each income component, different data processing etc.

In the following two sections, we provide basic overview of two segments:

1) data processing (zero and negative income), and

2) assessment of agriculture

and assess to which extent they can affect discrepancies between SILC and HBS. In chapter IV, we go further inside the question of agriculture, and analyse each of three aspects (structure, scope and magnitude) separately.

It is important to note that, **once we determine the significance of different treatment of negative and zero values, entire analysis of agriculture is based on data where negative values were set to zero.** Namely, in order to single out the effect of agriculture, we needed to set negative values to zero in SILC as it is in HBS.

FOCUS ON: ZERO AND NEGATIVE INCOME

Proper capturing of the share and characteristics of deprived HH/individuals is essential for social assistance targeting within a country. High share of HH with zero and negative income in SILC calls for attention. In fact, 23% of HH in 1st decile has no income and no consumption from own production during entire 2016. If SILC adequately captured reality, then Serbian social protection net would be grossly inadequate and required urgent review.

Different treatment of negative values, together with more frequent occurrences of zero income values in SILC, amounts to 23% of THDI difference between SILC and HBS in 1st decile. Expectedly, zero and negative values affect (primarily) average THDI of 1st decile. Negative income values might affect other deciles as well, but have only marginal overall influence on THDI level. While EU-SILC also allows treatment of negative values, zero income values are not excluded in any of survey on the EU level. Rather, EU practice prescribes different techniques that would ensure higher efficiency in data collection, with particular focus on potential non-response error[11]. That way they tackle the issue related to HH who refuse to provide information on level of any source of income.

Treatment of negative and zero income in EU-SILC has long been disputed particularly since it can have a strong influence on disposable income of poorest households. Such cases sometimes can be correct (e.g. very deprived households, HH with family micro business facing loss etc.), other cases indicate possible issues such as non-response errors. The basic questions behind is how it is possible that a household can survive with zero or negative income and no consumption from own production during entire year (83% of HH with zero income in SILC). While a HH may rely on the borrowing, still the persistent trend of zero income within the same households does not seem valid.

11. *As Eurostat underlines: "There are two main types of non-response errors: unit non-response error and item non-response one. Unit non-response refers to absence of information of the whole units (households and/or persons) selected into the sample while item non-response refers to the situation where a sample unit has been successfully enumerated, but not all required information for this unit has been obtained" (Eurostat). Thus, there is an issue of understated level of income, since some HH refuse to provide an answer related to the actual income level.*

Occurrences of HH with negative income are possible in self-employment income components both in HBS and SILC. Since self-employment activities can result with profit or loss, both surveys allow for these income components to be positive or negative in data collection[12]. The difference refers to data treatment in calculating disposable income. In cases of negative income components, HBS sets them to zero, while SILC in Serbia leaves them as negative. This is not necessarily a common practice in EU. EU SILC framework allows countries to decide if negative values are to be treated or not. As it will be seen in Chapter V, around a half of countries allow the incidence of negative values of income from self-employment (PY050G) and total household gross income (HY010).

Another issue refers to much higher share of HH with zero and small income in SILC in Serbia, which less often occurs in HBS. In 2016, as much as 27% of HH in 1st decile in SILC had zero total disposable income, while 8% had very small TEDI (up to 1.000 RSD). The share of HH with zero income was stable during SILC 2014-2017, but significantly higher compared 2012 and 2013 (15% and 14% respectively) (Table 5). HBS on the other hand reports 5% of HH in 1st decile with zero income and 0,3% with TEDI up to 1.000 RSD. This can further be seen on income distribution on Figure 1, which shows much higher share of HH with zero and marginal income in SILC, compared to HBS.

HBS reports higher share of HH with negative income, but much lower share of those with zero income, compared to SILC. While 7% of HH in 1st decile in HBS 2016 would have negative income if there were not set to zero, 5% of HH has zero income (Table 5). Opposite is reported in SILC 2017: 3% of HH with negative and 27% with zero income in 1st decile. As it will be elaborated further in report, we believe that this originate in different questionnaires and the type of questions. While HBS ask for particular categories of revenues and costs, SILC ask only to recall if there was a profit or loss. In reality, very few HH do have exactly zero income from some self-employment activity. But when asked if they had a profit or loss, HH with marginal/small profit or loss seem to report "neither profit nor loss" (zero income).

Table 5. SILC and HBS: Share of HH with negative, zero or very small total equivalised disposable income

	% of HH with:	2013	2014	2015	2016
SILC					
	Negative income	0.6	0.6	0.7	0.3
	Zero income	2.0	2.3	2.6	2.7
	Very small income in sample (up to 1000 RSD)	0.6	1.1	0.8	0.8
HBS*					
	Negative income	1.3	0.8	0.8	0.7
	Zero income	0.1	0.5	0.4	0.5
	Very small income in sample (up to 1000 RSD)	0.1	0.1	0.03	0.03

*Source: CEVES' calculation based on primary data of SILC and HBS. All data are weighted averages.Note: year refers to the reference year, not the publishing one. That way, 2016 refers to HBS 2016 and SILC 2017.*Share of HH with zero and negative income in HBS is calculated for the scenario when negative income components were not set to zero, so they can be comparable to SILC.*

12. *HBS questionnaire captures negative income values for agriculture and unregistered self-employment activities, while SILC in Serbia captures negative income for each of 8 self-employment income components.*

However, HH that have negative income in self-employment in HBS, do have other positive income sources. So, once their negative income is set to zero, they in total have positive rather than zero total disposable income. This slightly indicates why HBS "does not suffer" from issue of zero income values. Unlike HBS, HH with negative income in SILC most often do not have other sources of income, so once set to zero, they increase total share of HH with zero income to 30% in 1st decile in 2016.

Still, it is important to note that none of EU counties excludes HH with zero income, but rather sets procedures that would disable such occurrences during data collection. In order to at least roughly assess the significance of zero income occurrences, we exclude HH with zero income in both surveys. This for sure have significant methodological shortcomings. However, we are interested only to estimate an order of magnitude impact, rather than to have a rigorous assessment. Once HH with zero income are excluded, we have lower number of HH in 1st decile, and the same number of HH in other deciles.

Negative and zero disposable income might amount to 23% of income discrepancy between HBS and SILC in 1st decile in 2016. This differs across years. Negative income used to affect the discrepancy to the higher extent in 2014-2015 period. But this factor is relatively weaker in 2016, since the share of HH with negative income in SILC halved. On the other hand, high share of HH with zero income remains significant and amounts to 13% of discrepancy in 2016 (Table 6).

Table 6. SILC and HBS. Average monthly total equivalised disposable income - treatment of negative and zero values (2016, RSD)

	HBS			SILC			Difference affected (%)	
Deciles	**As reported**	**Negative set to zero[1]**	**Zero excluded[2]**	**As reported**	**Negative set to zero[1]**	**Zero excluded[2]**	**Negative set to zero[1]**	**Zero excluded[2]**
1	9,224	9,224	9,722	2,668	3,330	4,693	10	13
2	16,018	16,018	16,018	10,641	10,719	10,719	1	0
3	19,885	19,885	19,885	15,224	15,252	15,252	1	0
4	23,397	23,397	23,397	19,544	19,547	19,547	0	0
5	27,218	27,218	27,218	23,542	23,584	23,584	1	0
6	31,167	31,167	31,167	27,920	27,920	27,920	0	0
7	35,891	35,891	35,891	32,880	32,880	32,880	0	0
8	41,884	41,884	41,884	38,674	38,676	38,676	0	0
9	50,022	50,022	50,022	47,737	47,744	47,744	0	0
10	77,781	77,781	77,781	79,307	79,322	79,322	-1	0

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016). All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.

Notes: 1. TEDI when HH whose negative income components are set to zero. Setting to zero was conducted in the same manner as in HBS. Meaning, each self-employment income components was treated separately (e.g. income from agriculture, income from sole proprietorship etc.), and in cases of negative income, they were set to zero. Thus, for example, if a HH had equalised income from agriculture -10.000 RSD, and equivalised income from sole-proprietorship 15.000 RSD, this would mean that total target variable PY050G (income from self-employment) would equal 15.000 RSD and not 5.000 RSD.

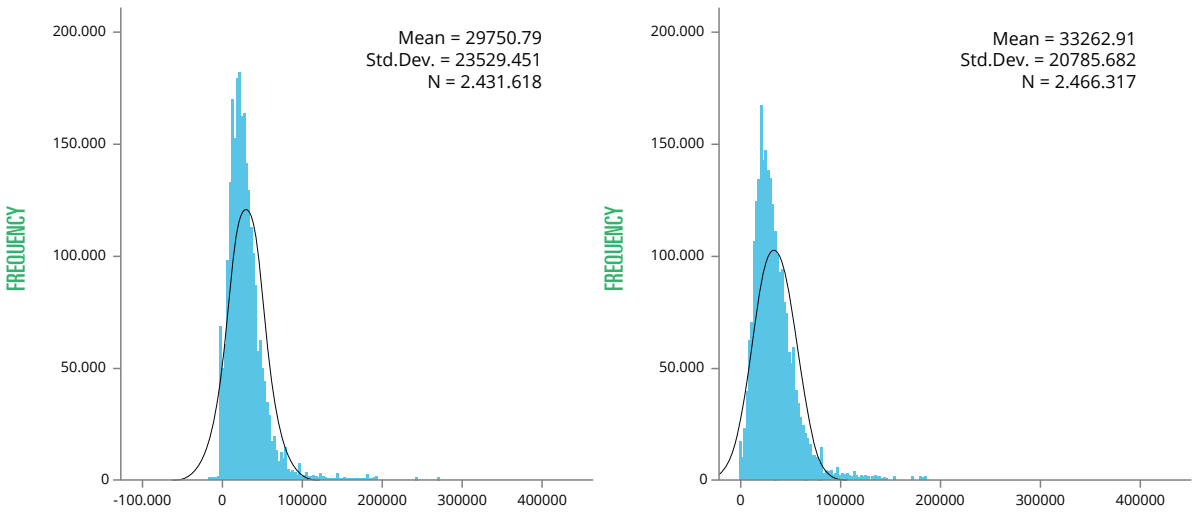
2. TEDI when zero are excluded (including HH who with zero income after negative income is previously set to zero)

3. Share of discrepancy between reported TEDI of HBS and SILC affected by different treatment of zero and negative values.

When we observe the structure of those households with zero and negative income in SILC, we can see that majority refers to HH in densely populated area, and to those without dependent children. 20% of HH with zero income in SILC refers to agricultural households, while even 46% refers to densely populated area. Furthermore, 68% of HH with zero income refers to those without dependent children -- 38 p.p. HH with one person, 17 p.p. two adults, both younger than 65 years, 10 p.p. other and 3 p.p. HH with two adults, at least one 65+ years. In terms of negative income in SILC, they are dominantly reported in the lowest deciles, particularly in income from agriculture (74% of total HH number that had some negative income) and sole proprietorship (38%). Other income categories have marginal number of HH reporting negative income.

Even though HH with zero income are not to be excluded, it is crucial to understand how even 30% of HH in the 1st decile in SILC has either negative or zero income, as well as high share of HH with marginal THDI in SILC compared to HBS. The reason behind might refer both to poor sampling process and inadequate coverage of some income components (e.g. social contributions, agriculture subsidies etc.). There is also a potential issue of "non-response error" that needs to be treated adequately. There are two types of non-response cases: 'unit non-response' and 'item non-response' (Eurostat). While the former refers to inability to obtain any income-related response from a HH, the latter means that a HH refused to provide data on specific income component. This is to be solved either during data collection, or by imputation values.

Figure 1. HBS and SILC: Distribution of total equivalized disposable income (SILC left figure, HBS right figure) (monthly, RSD, 2016)

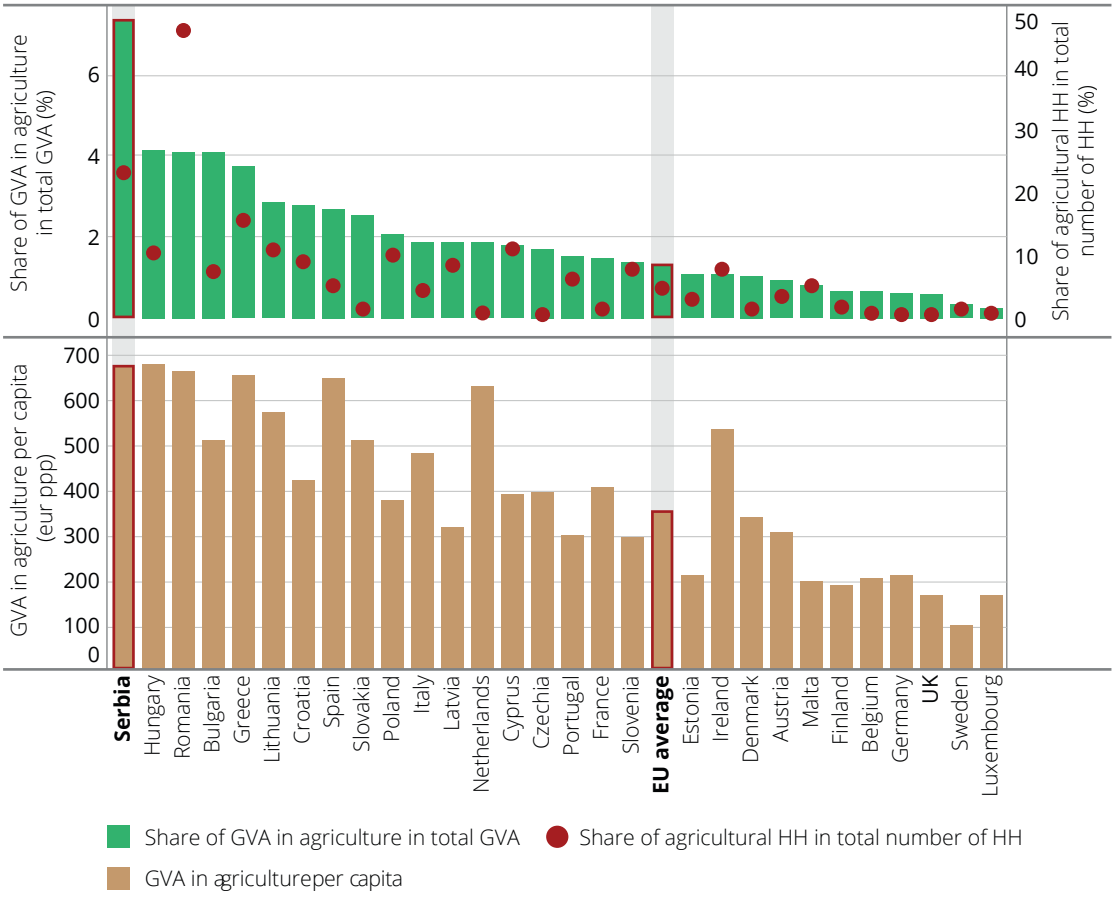


Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016). All data are equivalized based on OECD modified equivalence scal.All data are weighted averages. Vertical axis: Frequency; Horizontal axis: monthly equivalised TEDI

FOCUS ON: AGRICULTURE

Our assumption is that the different assessment of agriculture might be a source of a significant fraction of discrepancy between SILC and HBS in the lowest deciles. In particular, agriculture deserves a closer look since it is more important source of income for an average HH in Serbia than it is usual in other EU countries. Serbia is among countries with the highest gross value added in agriculture per capita, and relies on it to much higher extent compared to EU countries. GVA in agriculture pc is 1,9 times higher than in EU, and it accounts for even 7,4% of total GVA created in Serbia (SORS data) (1,4% EU average, Eurostat data). More importantly, an average HH in Serbia relies on agriculture more often than a HH in EU. **In Serbia there is relatively high share of agricultural households** (even 23% in total number[13]), **while for many EU countries there is a lower share of AH, agriculture is more concentrated, and AH are larger and more specialised.** Among countries with high GVA pc in agriculture, only Romania and Greece have high share of agricultural HH. On the other hand, an average HH in Hungary, Bulgaria and other countries with high GVA pc, seem not to rely on agriculture as often as in Serbia (Figure 2).

Figure 2. Serbia and EU: significance of agriculture for an economy and average household

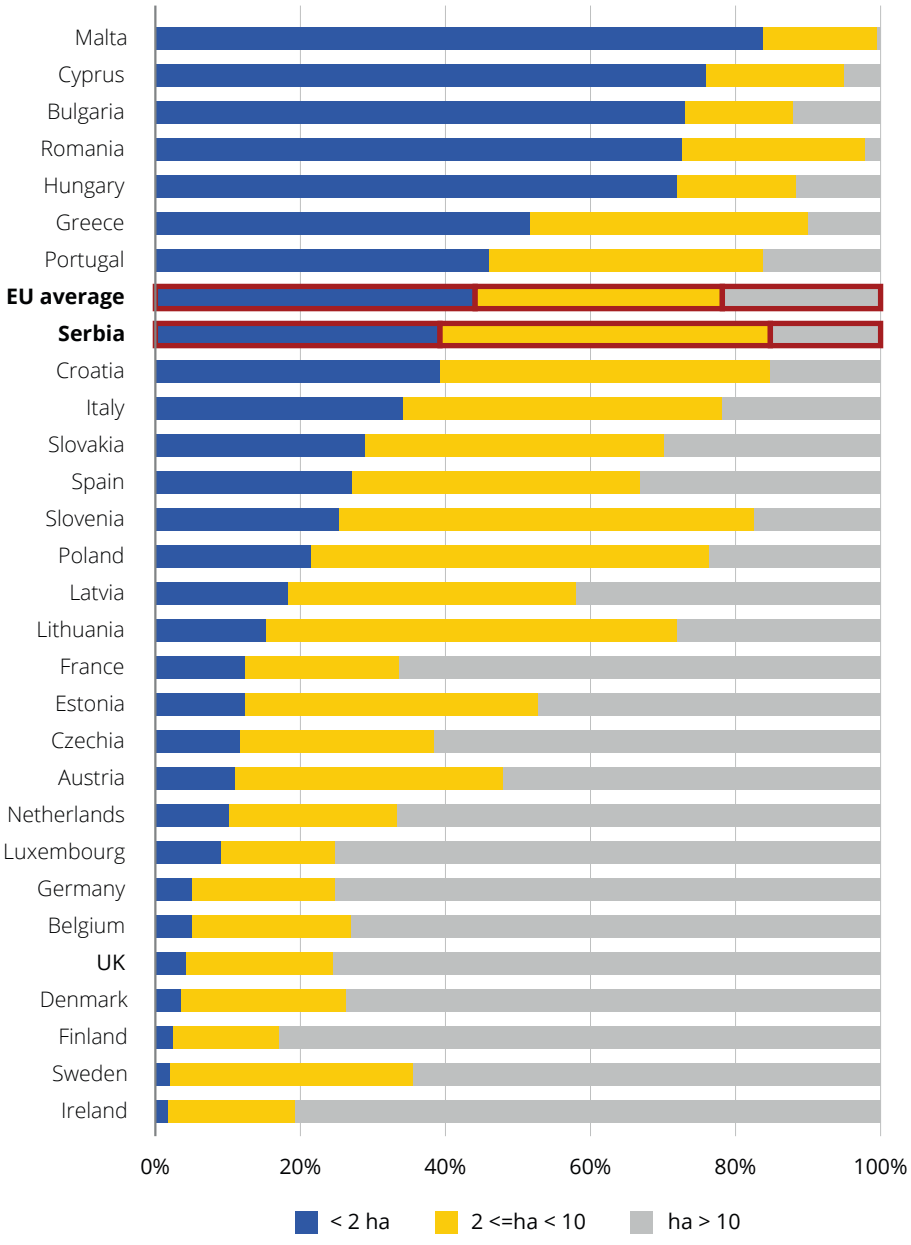


Source: CEVES' calculation based on SORS and Eurostat secondary data of FSS and national accounts (Serbia data for 2018, EU data for 2016)

13. *This number does not cover each HH that had any level of agricultural production. Since FSS 2018 does not have data on households that did not fulfilled criteria for agricultural HH, we estimate share of these HH based on Census 2012 data. Census 2012 noted additional 109 thousand HH that did have agricultural production, but insufficiently large to fulfil the criteria of agricultural HH. We assume that 109 thousand HH were reduced by the same rate of 10,6% as agricultural HH were reduced from 2012 to 2018. Once HH that have marginal agricultural production are included,* **all HH that had agricultural production can be extended to 27% of total HH number.**

Even though not the most fragmented one, Serbia is among the most fragmented countries in EU. The average utilised agricultural land in Serbia is only 6 ha per agricultural households, compared to EU average of 17 ha. Majority of agricultural households in Serbia has utilised agricultural land up to 5 ha (72%), while only 11% has land larger than 10ha. In EU, it seems that counties that rely more on agriculture (Figure 2) have relatively more fragmented structure of agricultural HH. Among the most fragmented are Bulgaria, Romania, Hungary, Greece and Portugal. These counties are even more fragmented compared to Serbia, having more than 70% of agricultural households that cultivate less than 2ha (except for Greece -- 52%). In Serbia, there is 39% of such households, while even 49% of agricultural households cultivate between 2 and 10ha. Other extreme are the least fragmented counties in EU: Ireland, Sweden, Finland, Denmark, United Kingdom, Belgium, Germany, Luxembourg, and Netherlands. These counties have on average more than 73% of agricultural households that cultivate more than 10ha of arable land each.

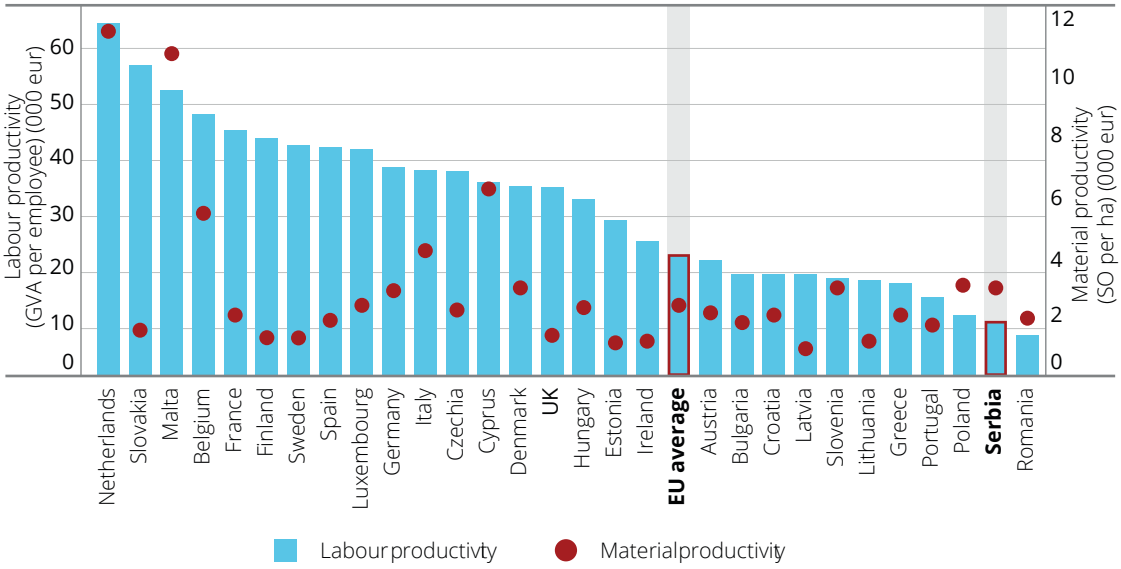
*Figure 3. Serbia and EU: Structure of agricultural households based on land size**



Source: CEVES' calculation based on SORS and Eurostat secondary data of FSS (Serbia data for 2018, EU data for 2016)

Additionally, Serbia has very low labour productivity, but still relatively high material productivity compared to other EU counties. This means that we do not have efficient production in terms of labour, but that we ultimately produce relatively more output is produces on average on singe ha. By material productivity, we observe the level of standard output per ha of utilized agricultural land. Higher level of material productivity might partly be related to the different structure of agricultural production per 1ha of utilized land. In Serbia, there is a higher share of crops, vegetable and fruit production in total utilised land, compared to some EU countries (such as Ireland) that have high share of meadows and pastures.

Figure 4. Serbia and EU: Labour and material productivity in agriculture (000 EUR in PPP)



Source: CEVES' calculation based on SORS and Eurostat secondary data of FSS and GVA (Serbia data for 2018, EU data for 2016)

Thus, based on the structural characteristics of agricultural households, and the significance of agriculture in general, **Serbia can be best compared to Romania, Bulgaria, Greece and Hungary, but also Poland, Slovenia, Croatia, and to some extent Portugal.** Romania seem to be an extreme case to other benchmark countries. It is more fragmented, has even higher share of agricultural HH and is among the least productive counties. An average HH in Bulgaria, Hungary, Poland and Greece on the other hand, relies relatively less on agriculture, but the existing structure is still highly fragmented. Among countries with high agriculture activity that cannot be used as a benchmark – Spain, Italy, Slovakia, Lithuania are moderately fragmented, while Ireland and Netherlands are highly concentrated and efficient agricultural production, with very low share of agricultural HH.

In the following segment, we focus on key figures related to how agriculture is assessed by SILC and HBS.

AGRICULTURE ASSESSED BY SILC AND HBS

HBS and SILC different methodological approach to assessment of agriculture is observed in different level of HH income from agriculture. Based on SILC, agriculture contributes to a lesser extent to households' disposable income compared to HBS. Observing entire population and the structure of disposable income, income from agriculture accounts for 3% of TEDI in SILC and 8% in HBS[14]. As previously mentioned, this difference is based on three aspects: different structure of agricultural HH (sampling), scope of income components, and estimation approach through questionnaires. For example, judging by the FSS, HBS seem to overestimate and SILC underestimate the share agricultural HH in total number of HH. While FSS reports 23% of AH, HBS reports even 29% and SILC 19% (Table 7). Similarly, SILC includes less income sub-components from agriculture compared to HBS (fuel wood and COP only for own use are not included). Each of these aspects will be carefully elaborated in the following chapter, while here we provide only high-level conclusions.

Table 7. SILC and HBS: Key agriculture indicators (2016)

	HBS				SILC				Difference affected (%)[4]
Decile	% AH	% commercially oriented AH[1]	Average MIA (RSD)	Average COP (RSD)	% AH	% commercially oriented AH	Average MIA[2] (RSD)	Average withdrawals[3] (RSD)	Income from agriculture (MIA+W[5])
Total	29.1	20.0	1.269	1,275	19.5	8.5	610	227	48.6
1	32.4	20.5	188	1,179	24.4	9.2	109	206	16.0
2	35.5	26.0	460	1,389	24.8	9.0	320	139	25.9
3	35.7	22.6	342	1,356	24.7	11.7	539	266	19.1
4	31.7	20.4	332	1,308	22.5	8.7	597	167	22.8
5	31.1	20.3	579	1,362	21.4	10.1	418	279	33.8
6	31.3	23.4	993	1,438	19.8	7.6	519	138	54.7
7	23.9	16.2	884	1,028	18.2	7.2	536	165	40.3
8	24.8	16.4	983	1,173	14.3	7.5	527	196	44.7
9	21.6	16.1	1,746	1,183	14.7	7.9	651	204	90.7
10	22.8	18.3	6,163	1,256	10.4	6.3	1.895	521	-

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016)

All data are equivalized based on OECD modified equivalence scale. All data are weighted averages

Notes: 1. Share of commercially oriented agricultural HH in total number of households.

2. Negative values of self-employment income sub-components in SILC were set to zero.

3. Includes only part of COP that refers to withdrawals from a business by a self-employed person.

4. % of difference between HBS and SILC refers to the difference in income coming from agriculture as a share of difference in total disposable household income.

5. Withdrawals from self-employment activities in agriculture

14. *When we observe agricultural households in particular, income from agriculture accounts for 28% of TEDI for an average AH, and 38% in 1st decile in HBS. In SILC these shares are lower: 16% for an average AH, and 28% for AH in 1st decile.*

Difference in assessment of income from agriculture amounts to 49% of income discrepancy as measured by HBS and SILC, but much less in the lowest deciles. Even though this share might seem high, it mostly refers to higher deciles where the discrepancy is lower and other income components (other than agriculture) are estimated at a similar level in HBS in SILC. In the lowest five deciles on the other hand, agriculture affects the discrepancy to a smaller extent (Table 7). **In 1st decile, only 16% of discrepancy refers to different assessment of agriculture, and in 2nd decile 26%.**

As it will be elaborated in the following chapter, 16% of discrepancy related to the different assessment of income from agriculture in 1st decile is a cumulative effect of the following methodological differences:

- Different structure of agricultural households. Among key structural differences:
  - HBS overestimates, and SILC underestimates the share of AH in total number HH.
  - HBS overestimates, and SILC underestimates the share of commercially oriented AH in total number HH.
- Different scope in terms of consumption of own production
  - In HBS, entire COP measured by gross values is included in THDI (including fuel wood).
  - In SILC, only a fraction of COP is included in THDI measured by net values -- withdrawals from a business by a self-employed person or household are included, while HY170 is not included. Fuel wood is also not included in withdrawals.
- Different magnitude of income components related to different data collection methods and assessment approaches.

Similarly, high discrepancy in assessment of MIA in 10th decile between HBS and SILC is much more influenced by different share of commercially oriented agricultural HH, than by different assessment of MIA magnitude (for more, see page 44)

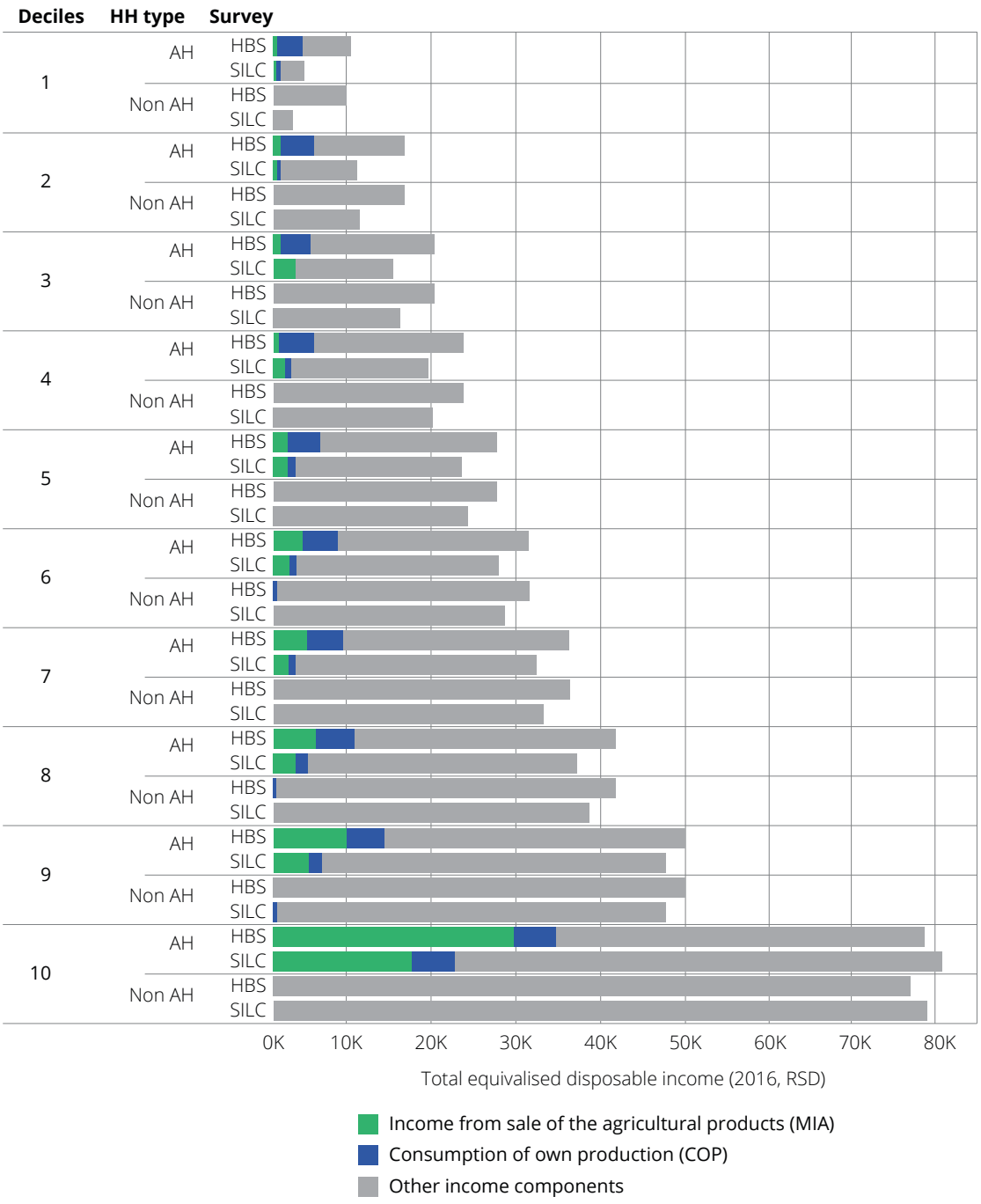
Still, it must be again noted that this 16% of discrepancy refers only to observed income from agriculture as measured in 2016 by these two surveys. This percentage slightly differs across years. As previously mentioned, this does not cover different level of other income components generated by different assessment of agriculture (e.g. overestimation of one-old-member AH type might have led to overestimation of pensions, and probably underestimation of income from employment). Thus, the level of 16% refers only to different assessment of income from agriculture, and not the total impact of different assessment of agriculture.

Furthermore, Figure 5 indicates that other income components aside from agriculture strongly contribute to the discrepancy in the lowest deciles. This is true both for agricultural and non-agricultural HH. In 1st decile, SILC reports 62% lower level of other income components (for agricultural and non-agricultural HH in total). Partly, this is due to the higher share of HH with zero THDI in SILC. Still, other deciles have also large differences. 2nd and 3rd deciles in SILC report 28% and 20% respectively lower amount of other

income. Finally, strong deviation refers also to 10th decile, but in opposite direction. HBS reports 9% lower income coming from sources other than agriculture in the highest decile. Note that values in Table 7 and Figure 5 are not affected by different treatment of negative values, since those were set to zero in both surveys. Discrepancies observed refer only to different assessment of income components (apart from the first decile which is affected by HH with zero THDI).

Different assessment of consumption of own production is stronger factor of difference in the lowest deciles, while (monetary) income from sale of the agricultural products becomes much more relevant in higher deciles. Expectedly, COP level is stable across deciles (households have similar level of agricultural production for own use), while income from sale (MIA) increases significantly in the higher ones. As Figure 5 indicates, SILC reports significantly lower MIA in the top five deciles compared to HBS. This might mean that SILC fail to cover "richer" agricultural HH, but also it might relate to the fact that SILC reports significantly lower level of commercially oriented HH. HBS reports even 20% of commercially oriented agricultural HH in total number of HH, while SILC only 9%.

Figure 5. HBS and SILC: Total equivalised disposable income1 - focus on agriculture income components in agricultural and non-agricultural HH (RSD, 2016)



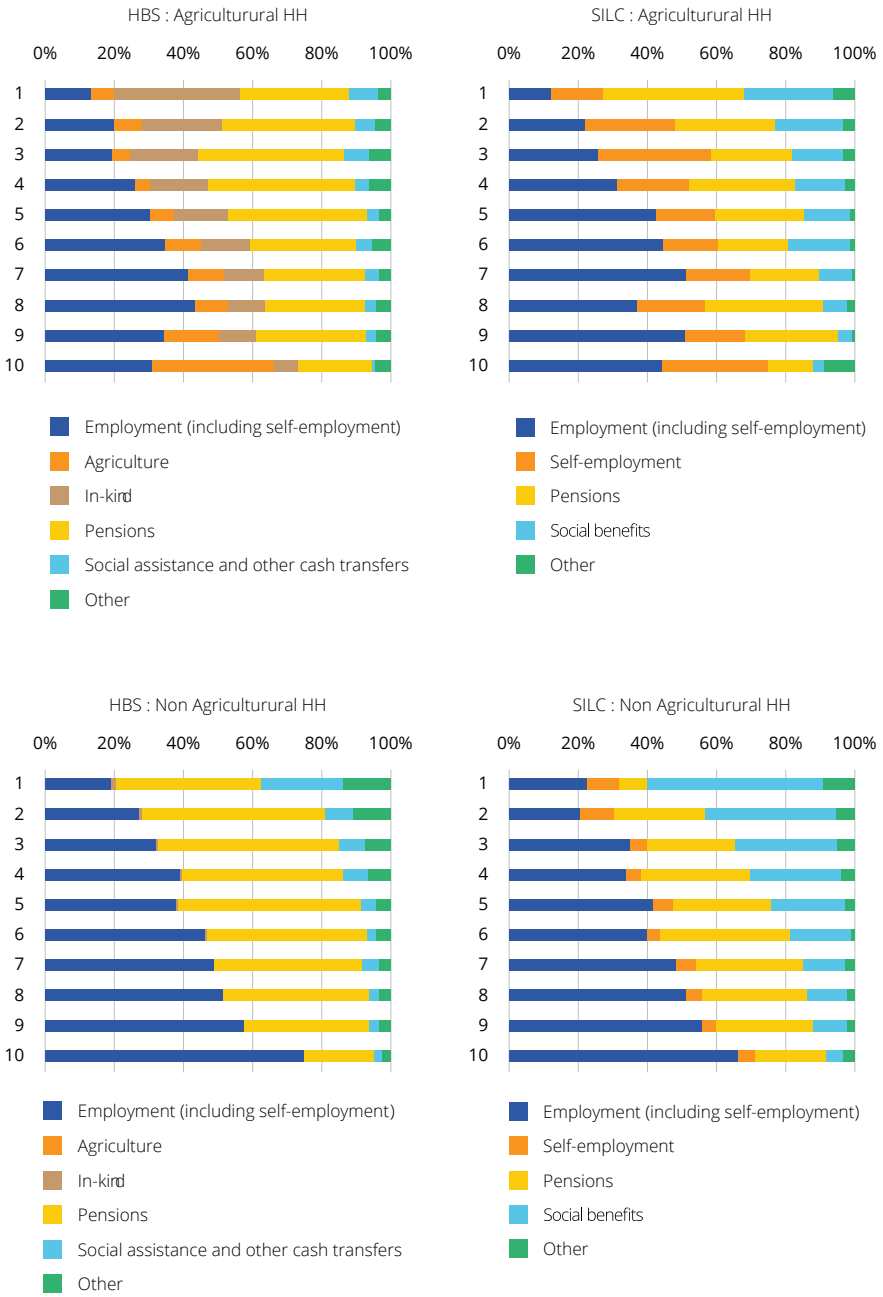
Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS (data for 2016). All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.

Notes: 1. Negative values of self-employment income sub-components both in SILC and HBS were set to zero.

2. Colours refer to the following income components: green colour: income from sale of agricultural products, dark blue: income from consumption of own agricultural production (in case on SILC, this refers only to withdrawals from a business by a self-employed person), and gray all other income components included in THDI.

Even though we do not analyse non-agricultural income components, if we put closer look on the structure of disposable income, we can see that pensions and social assistance make the largest difference. **Considering that other income components different widely across deciles, understanding methodological approach and sources of discrepancy in other income components deserve a much closer look.** It needs to be stressed that the definition of income components in SILC and HBS are different, so they cannot be directly compared. For example, SILC includes income from agricultural self-employment activity in income from self-employment, while HBS has it as a separate component. On the other hand, other self-employment activities in HBS are part of total income from employment. Nevertheless, we can observe share of pensions in total TEDI. Interestingly, non-agricultural HH in HBS has pensions as much higher share of TEDI compare to SILC.

Figure 6. SILC and HBS: Average total equivalised disposable income structure of agricultural and non-agricultural HH (2016, %)



Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS (data for 2016). All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.

IV. DEEPER FOCUS ON AGRICULTURE

In this chapter, we shed additional light on the specific aspects of assessing agriculture in HBS and SILC. As mentioned, income from agriculture on average amounts to 44% of discrepancy between SILC and HBS (and 16% in 1st decile). Here we aim to distinguish in which way three methodological aspects (structure, scope, magnitude) affect the discrepancy. The structural aspect aims to uncover whether SILC and HBS representatively sample agricultural households in Serbia. The scope refers to the coverage of income components coming from agriculture, and how it affects the discrepancy between SILC and HBS. The magnitude aims to uncover the quality of questionnaire tool (and other supplementary material that influence the success of interviewer) and its ability to properly estimate actual income level.

In the following sections, we pay attention to each of these aspects.

FOCUS ON: STRUCTURE OF AGRICULTURAL HOUSEHOLDS IN SERBIA

This section shows that HBS overestimates while SILC underestimates both the share of agricultural households in total number of HH, as well as the share of commercially oriented AH. This fact influences the overall significance of income from agriculture in average THDI observed for the entire population. For example, the fact that SILC does not include part of COP (HY170 is not included), is additionally amplified by the lower share of AH in total number HH. Thus, the discrepancy is expanded both by inadequate coverage of the structure of AH and by different coverage of agricultural income components. Thus, in the next two sections (focus on scope and magnitude), we should bear in mind that results are additionally influenced by different structure of AH in two surveys.

In this section, we aim to assess the extent to which SILC and HBS adequately sample agriculture households and capture their structure. This is particularly important due to the fact that agriculture is significant and highly fragmented in Serbia. Thus, we focus on key structural characteristics, such as: if agricultural households are properly represented in overall sample in SILC and HBS, if regional distribution is captured, if adequate share of AH in sample sell their products, and not use it only of own consumption etc. We conclude with the typology of agricultural HH that is classifies AH according to the size of their agricultural production and the level of commercialisation.

For the purpose of this analysis, we use Farm Structure Survey (FSS) data as a reference point, whose data are crucial for understanding the structure of agricultural households in Serbia. As mentioned earlier, FSS in Serbia was conducted FSS

in 2018, and covered 120 thousand agricultural households (22% of their total number). These represent the most detailed and recent data on agriculture in Serbia, after the agricultural Census in 2012.

We start by introducing regional characteristics of agricultural households in Serbia. The largest share of agricultural HH is in Šumadija and Western Serbia, while the most fragmented ones are in South-East Serbia and Belgrade (even 43% and 44% of AH has land smaller than 2ha respectively).

Vojvodina has the least fragmented, the most specialised and the most productive agricultural production. Namely, Vojvodina has the largest average size of utilised agricultural land (12,3ha) per AH, while even 25% of AH have utilised agricultural land larger than 10ha. Furthermore, even 71% of agricultural HH are specialised in either plant or animal production. The largest share refers to plant, particularly crop production (50% of AH is specialised cereals, oilseeds and protein crops). Its agricultural production is more productive in almost all types of agricultural production, except for vegetables and other horticulture. Productivity measured by SO per ha, is particularly higher in crop production (1,7 times more than the rest of Serbia). Finally, like in the rest of Serbia, old-age AH are dominant in the structure, but there are relatively slightly more young-age and mid-age AH compared to other regions.

Agricultural production is particularly fragmented outside Vojvodina, less specialised and refers to relatively older households. South-East Serbia and Šumadija and Western Serbia have even a third of HH engaged in agricultural production. However, the average size of utilised agricultural land is three times smaller compared to Vojvodina. Half of AH is between 2 and 10ha, while there are only cca. 7% of AH larger than 10 ha. Majority of AH does not specialise in any type of production, but rather have mixed production (even 70% of AH). Still, the productivity per ha is below Vojvodina. Šumadija and Western Serbia is more productive compared to South-East Serbia, while particularly excels compared to the rest of Serbia in production of vegetables and other horticulture. South-East Serbia on the other hand, is the least productive region in all types of production. When it comes to age structure of households, these two regions have relatively older structure compared to Vojvodina. Even 70% of agricultural households refer to HH whose holder is older than 54 years, and only cca. 26% are mid-age households (Table 8).

Finally, **being the most urbanised region, Belgrade region has the lowest share of agricultural HH in total number of HH.** Still, even though below Vojvodina, Beograd's agricultural production is less fragmented, more specialised and more productive compared to South-East Serbia and Šumadija and Western Serbia. The largest share of HH is specialised in either crop production (23%) or fruit production (16%).

Table 8. FSS: Basic structural characteristic of agricultural households

Selected list of characteristics	Serbia	Belgrade	Vojvodina	Šumadija and Western Serbia	South-East Serbia
Number of agricultural households	564,541	30,033	127,070	242,636	164,802
% in total number of households	100.0	5.3	22.5	43.0	29.2
% agricultural HH in total number of HH	22.9	5.0	18.4	36.8	32.1
Average size of utilized agricultural area (ha)	6.2	4.8	12.4	4.3	4.4
Share of AH in total number of AH within a region - structure of AH based on AH size (ha)	100.0	100.0	100.0	100.0	100.0
AH size: < 0,5 ha	7.2	9.3	14.2	4.7	5.0
AH size: 0,5 <= ha <2	32.3	34.5	22.4	33.1	38.2
AH size: 2 <= ha <10	49.3	49.1	38.2	54.8	50.0
AH size: ha >=10	11.2	7.1	25.1	7.4	6.8
Productivity (000 EUR)					
Average standard output per ha	1.4	1.7	1.3	1.6	1.3
Average standard output per household	8.6	8.1	16.3	6.8	5.5
Specialization in production	100.0	100.0	100.0	100.0	100.0
AH specialized in plant production	35.6	43.0	59.1	26.1	29.9
AH specialized in animal production	11.2	8.6	12.2	12.5	9.1
AH with mixed production	53.2	48.4	28.8	61.3	60.9
Structure of AH based on age*	100.0	100.0	100.0	100.0	100.0
Young-age households (up to 35 years)	3.3	3.4	4.9	2.8	2.8
Mid-age household (35 - 54 years)	28.6	25.5	34.7	27.2	26.5
Old-age households (55 years and more)	68.1	71.0	60.4	70.0	70.8

Source: CEVES' calculation based on secondary data of FSS 2018 (data for 2018). All data are weighted averages.

*Notes: *Age groups are based on the age of agricultural HH holder*

Compared to the structure of AH observed in FSS, HBS overestimates and SILC underestimates the share of agricultural HH in total number of HH. Based on FSS, 23% of households in Serbia can be considered agricultural. SILC on the other hand reports 19% of AH, and HBS 29% (Table 9). **HBS particularly strongly overestimates the share of AH in Vojvodina, which are on average larger and richer compared to the rest of Serbia** (see Appendix 2). In fact, HBS reports even 64% higher share of AH in Vojvodina than one reported by FSS. Interestingly, even 71% of the largest AH are located in Vojvodina (and Vojvodina has 22% of total number of AH in Serbia). By largest, we refer to a group of AH (see agricultural HH Type 4 in Appendix 2) that utilise average land of 310 ha and has average annual agricultural standard output level of 416 thousand EUR. **SILC on the other hand underestimates the share of AH in Šumadija and Western Serbia, and South-East Serbia** (Table 9).

Table 9. FSS, HBS, SILC: Basic structural characteristics of agricultural households

Indicator	Share (%)			Difference (p.p.) *	
	FSS	SILC	HBS	SILC	HBS
% agricultural HH in total number of HH	22.9	19.0	29.0	-3.9	6.1
Belgrade	5.0	6.1	8.7	1.1	3.7
Vojvodina	18.4	17.6	30.1	-0.8	11.7
Šumadija and Western Serbia	36.8	30.9	41.0	-5.9	4.2
South-East Serbia	32.1	24.4	36.9	-7.7	4.8
Regional distribution of agricultural HH	100.0	100.0	100.0		
Belgrade	5.3	8.0	7.3	2.7	2.0
Vojvodina	22.5	25.1	29.1	2.6	6.6
Šumadija and Western Serbia	43.0	41.4	36.7	-1.6	-6.3
South-East Serbia	29.2	25.5	26.5	-3.7	-2.7
Market orientation of agricultural HH					
% of commercially oriented AH in total number of HH	17.5	8.5	20.0	9.0	2.5
% of non-commercially oriented AH in total number of HH	5.4	10.5	9.0	5.1	4.6

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016), HBS 2016 (data for 2016) and secondary data of FSS 2018 (data for 2018). All data are weighted averages.

*Notes: * Absolute difference between FSS data, and SILC and HBS data in percentage points.*

Furthermore, HBS overestimates and SILC underestimates the share agricultural HH that sell their products. While FSS reports that 18% of agricultural households sell their product to customers, SILC and HBS report 9% and 20% respectively (Table 9). This difference between SILC and HBS strongly influence the discrepancy in average income from sale of the agricultural products (since that is influenced both by the structure and the level of income assessed). When it comes to share of non-commercially oriented AH, both seem to SILC and HBS overestimate it. Still, it is worth noting that this might be due to the possibility that both SILC and HBS do not capture HH that have marginal income from sale of agricultural products.

FOCUS ON: SCOPE - INCOME COMPONENTS COVERED

This section shed light on the part of income discrepancy between HBS and SILC affected by different coverage of income components related to agriculture. We focus on observable aspects of different coverage. There are also potential aspects that are not easy to determine. For instance, it seems that neither SILC nor HBS cover subsidies from agriculture, which should be part of income from agriculture, but we cannot be sure based on data.

Different coverage of agricultural income components strongly affects the income discrepancy, and entirely refers to COP. HBS and SILC differ in covering consumption from own production, while the scope of income from sale of AP is the same. As mentioned, unlike HBS, SILC neither includes agricultural production intended only for own consumption (captured by HY170) and nor fuel wood. These two sub-components of COP (fuel wood and HY170) represent important segments of households' own consumption, particularly in the poorest households in rural area. Based on HBS 2016, 12% of households use fuel food from own consumption. In the first decile 16% of HH use fuel food as COP, and that represents even 26% of their TEDI. Similarly, 21% of HH in 1st decile in SILC report HY170, which would represent 59% of their TEDI if HY170 was included.

However, even though important sub-components, inclusion of fuel wood is not envisaged by EU-SILC framework, while HY170 is not included in THDI since EU-SILC framework does not consider it a part of monetary income. Apart from the fact that it is a non-monetary income, for majority of EU counties HY170 represents a marginal component compared to THDI level. Thus, as it will be elaborated in detail in chapter V, none of EU countries includes neither HY170 in THDI (except for Croatia) nor fuel wood.

It is important to note that this section provides an order of magnitude estimation of the effect of different scope on total discrepancy between HBS and SILC. Thus, numbers are only a rough estimation, since it is hard to single out solely the effect of different scope. This effect is always multiplied by other effects, particularly by different structure and different magnitude. Namely, when we try to estimate, say, the effect of HY170 being excluded, this is additionally influenced both by the share of HH that reported having HY170 (structure), and the estimation method of HY170 that might overestimate od underestimate its level (magnitude).

As mentioned, both surveys cover entire income from sales of agricultural products, but there is a different coverage of consumption of own production (see page 19). There are two parts differently covered:

- **Fuel wood.** Consumption of own production in HBS covers agricultural products and fuel wood. In SILC, fuel wood is not included.

- **Production only for own consumption.** THDI in HBS includes (non-monetary) income from COP of all HH reporting it. SILC on the other hand includes consumption of own production only as part of withdrawals from production that was intended to sale. Agricultural production intended only for own consumption is captured by **target variable HY170**, and it is not included in THDI (HY020) (Table 3).

• **Additional difference refers to the fact that COP in HBS is reported in gross values, while SILC reports it in net values.** Thus, in Table 10, we present TEDI when HY170 is included both in net and gross terms (producers' price).

Different coverage of COP amounts to 18,5% of discrepancy between HBS and SILC in 1st decile, and even more in higher deciles. The effect of different coverage increases in higher deciles, and goes up to 35% of income discrepancy in 10th decile. It is worth mentioning once more that this high percentage is also due to the fact that discrepancy itself (relatively and absolutely) decreases in higher deciles, compared to lower deciles. When different coverage is taken into account, income discrepancy decreases but still remains high - 2,1 times higher TEDI as measured by HBS compared to SILC (8.910 RSD and 4.232 RSD respectively).

The effect of COP coverage outweighs the cumulative effect of COP aspects (including different structure of agricultural HH). Namely, different coverage of COP refers to 18,5% of discrepancy in 1st decile, while full effect of COP is 14,8%. The difference of -3,7 p.p. refers to a cumulative effect of different structure (the lower share of HH reporting COP in SILC) and the fact that SILC reports higher magnitude of COP compared to HBS (for the latter see next chapter). As it will be seen in the next chapter, SILC reports twice as high COP[15] in 1st decile compared to HBS. On the other hand, scope aspect is lower than overall COP effect in other 8 higher deciles. This difference is again related to the cumulative effect of mentioned aspects. For example, SILC reports significantly lower share of HH reporting COP in 5th and 6th decile, and have only slightly higher level of COP compared to HBS.

15. *Once the gross values of HY170 is included COP in SILC, and fuel wood is excluded from COP in HBS.*

Table 10. SILC and HBS: Average monthly total equivalised disposable income – different coverage of consumption of own production (2016, RSD)

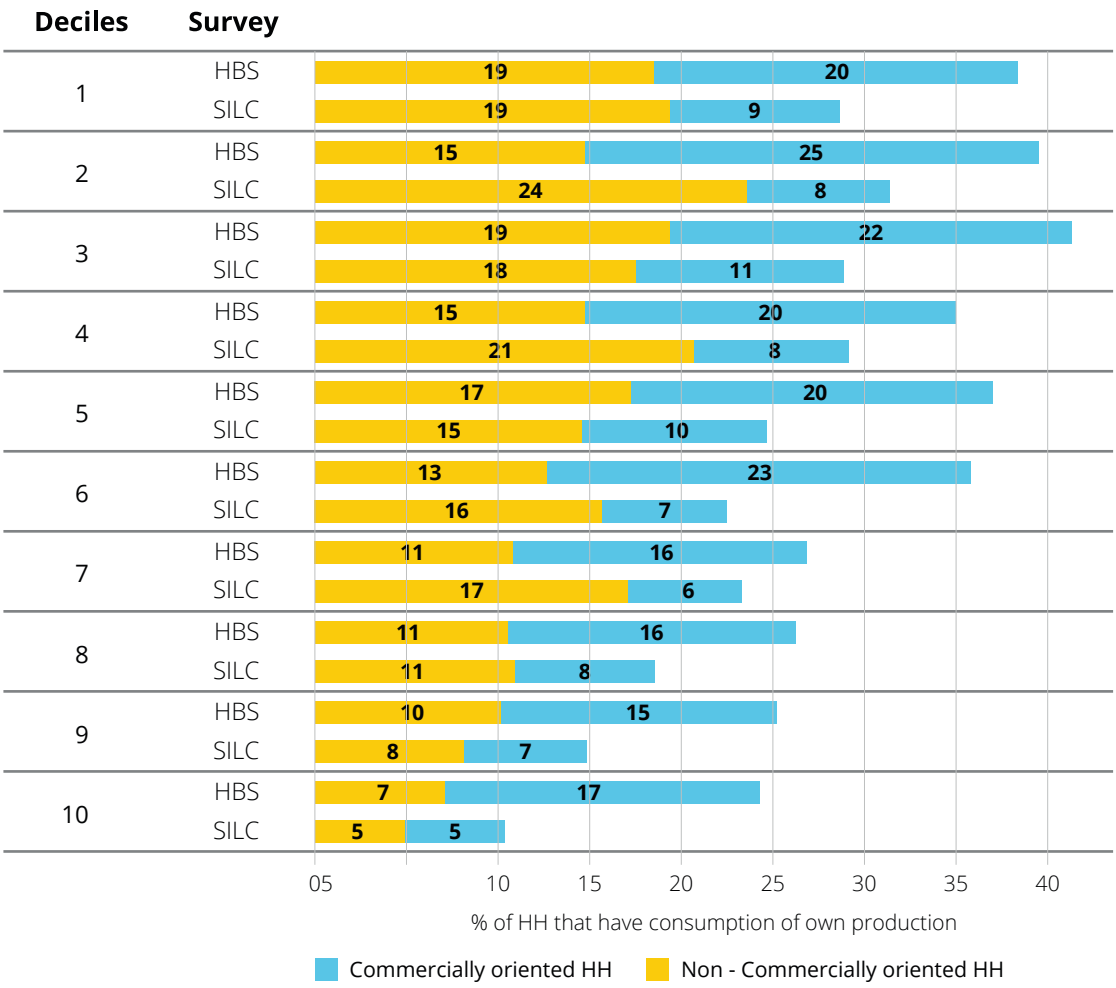
	HBS		SILC		
Deciles	As reported	W/o fuel wood	Negative set to zero[1]	With HY170 net	With HY170 gross
1	9,224	8,910	3,330	3,777	4,232
2	16,018	15,654	10,719	11,180	11,643
3	19,885	19,507	15,252	15,626	15,925
4	23,397	23,101	19,547	19,917	20,234
5	27,218	26,897	23,584	23,830	24,105
6	31,167	30,857	27,920	28,219	28,522
7	35,891	35,690	32,880	33,137	33,414
8	41,884	41,640	38,676	38,873	39,050
9	50,022	49,748	47,744	48,020	48,270
10	77,781	77,492	79,322	79,504	79,668

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016). All data are equivalized based on OECD modified equivalence scale. All data are weighted averages

Notes: 1. TEDI when HH whose negative income components are set to zero. For more, see notes in Table 6

As mentioned, effect of coverage is also influenced by different structure of agricultural HH -- lower share of HH reporting COP in SILC compared to HBS. HBS in general have higher share of HH reporting consumption for own production, compared to SILC. When we exclude fuel wood and observe only consumption of own production of agricultural products, 33% of HH on average report having COP in HBS and only 23% in SILC. This difference is evident across all deciles. For example, while 39% of HH in 1st decile report having COP, only 28% in SILC does so (Figure 7). However, the structure within also differs. SILC reports higher share of HH that are not commercially oriented, and whose COP is not included in THDI. In HBS, 14% of HH are non-commercially oriented and have COP, while in SILC there are 17% of such cases. Yet, part of this difference might relate to the inability of SILC to capture marginal sale of agricultural products (see page 35). That way, households that are at least slightly commercially oriented are underrepresented in SILC. This can be noted in 2nd decile, where the underlining structure is quite opposite.

Figure 7. SILC and HBS1: Share of HH2 that have any level of consumption of own production in total number of HH, based on their commercial orientation3 (2016, %)



Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016). All data are weighted averages

Notes: 1. Consumption of own production in HBS does not include fuel wood, in order to compare the same categories in SILC and HBS.

2. Values refer to all households that reported having consumption of own production, not just agricultural households. This share does not include HH that have agricultural production for selling, and do not have COP.

3. Non-commercial HH refer to those that have agricultural production only for own consumption, while commercial HH refer to HH that also sell a fraction of their agricultural production. In total, they constitute the share of HH that have COP.

Finally, we uncovered that subsidies for agriculture seem (at least systematically) not to be included into THDI. Unlike HY170, subsidies for agriculture represent a monetary income, so they should be included in THDI. However, it is not clear if SILC and HBS cover Government subsidies for agriculture (neither through registers nor questionnaire). Neither survey has separate question for it, not it can be found a side note in particular that some of the question include this type of subsidies. For an average AH this is not negligible income. Based on the Law on agriculture and rural development, each registered AH receives incentives by the Government provided to support agricultural activities. In SILC, the only question where respondents might note it, is: "Did you have any other income (in cash and/or in kind) not listed so far?". In fact, in SILC 2017, only three HH in total sample listed this subsidy. Based on our consultation with SORS, subsidies from should be included in income from self-employment (PY050 from agriculture). However, if interviewer does not explicitly ask or remind HH on it, there is a risk that HH will overlook it.

FOCUS ON: MAGNITUDE – THE LEVEL OF INCOME

This section shows that SILC seem to overestimate COP for majority of deciles, while MIA is reported at the similar level by SILC and HBS (apart from the highest deciles). This difference partly originates in the fact that two surveys have different data collection and estimation approaches. As mentioned, while SILC has high-level estimation approach, HBS have more detailed one. On the other hand, both suffer from usual obstacles in conducting households' surveys: (1) the fact that HH usually tend not to disclose or tend to understate the level of their income (Eurostat, 2017), and (2) issues with data collection as a consequence of possibly insufficiently experienced interviewers and/or inadequate instructions for them. Thus, the final difference is cumulative effect of all mentioned factors.

Even though we cannot pinpoint the exact underlining reasons for differently estimated magnitude of income, in this chapter we aim to draw attention to the level of differences or similarities in this regard.

As it was mentioned in Chapter II, HBS and SILC have different approach to estimating the magnitude of income from agriculture. While HBS has more detailed approach by asking series of questions in questionnaire, SILC uses high-level approach. Namely, the difference refers to the following:

- **HBS – detailed estimation approach.** HBS has much more detailed questionnaire regarding agricultural production and sale. Consumption from own production is obtained from detailed diary of consumption of each household collected for 15 days. Namely, HH record in detail quantity of goods consumed and note if that was bought, received as gift, produced etc. Regarding agricultural production sold, HH are asked about revenues and costs of relatively detailed products such as revenues from selling fruits, cereals, milk etc. This way both gross and net values can be calculated.

- **SILC – high-level estimation approach.** SILC on the other hand, from 2014 onward has a high-level approach of estimation. For agricultural production for sale, individuals in HH are asked to recall if they had a profit or loss, and the level of one they had. They are also asked to estimate the value of goods that were used for own consumption and not sold. Here it is wort noting that is not clear if the value estimated is net or gross values. On the other hand, for production for own consumption (HY170

relevant data), HH are asked to recall market and producers' value of goods produced for own consumption. This is different to SILC 2013, when questionnaire had more detailed questions for production for own consumption, and again high-level approach for income from sale.

Detailed questionnaire should ensure more reliable estimation, while recall approach can lead both to overestimation and underestimation of income magnitude. In the following segments we separately analyse differences in estimating magnitude of COP and MIA.

CONSUMPTION OF OWN PRODUCTION (COP)

Since HBS has a very detailed approach in measuring COP (diaries), we use its results as a trustworthy reference point. Thus, instead of stating that SILC has higher or lower level of COP compared to HBS, we can roughly state that SILC overestimates or underestimates it. **This section shows that SILC seem to significantly overestimate COP in the lowest and highest deciles.** When we observe HH that reported having COP, SILC reports twice as high COP compared to HBS in 1st decile, and 136% higher COP in 10th decile (Figure 8). This discrepancy is lower in other deciles, but still very high from 2nd to 6th, and in 9th decile. When observed at the level of individual households, this partly can be affected by extreme values in SILC and partly by HH group 3 (see Figure 13) that have potential issue of double counting. Once the latter are excluded, difference between SILC and HBS is slightly reduced.

Still, when observed on the level of entire population, this difference mostly becomes reduced and/or changed in direction, since SILC reports lower share of HH that had COP. Interestingly, for majority of deciles, COP in HBS becomes higher, because the difference in the structure (share of HH with COP>0) is high. This means that even SILC overestimates COP level for HH that report it, this is not observed on the level of entire population. For example, SILC reports 55% lower share of HH with COP in 6th decile (Figure 8). Thus, even though HH in 6th decile in SILC report 30% higher COP, when observed on the level of entire population of HH, relation becomes opposite and the level of COP in HBS becomes higher even 53% compared to SILC.

Figure 8. SILC and HBS: average monthly equivalised value of consumption of own production (RSD, 2016)*

Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016) . All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.

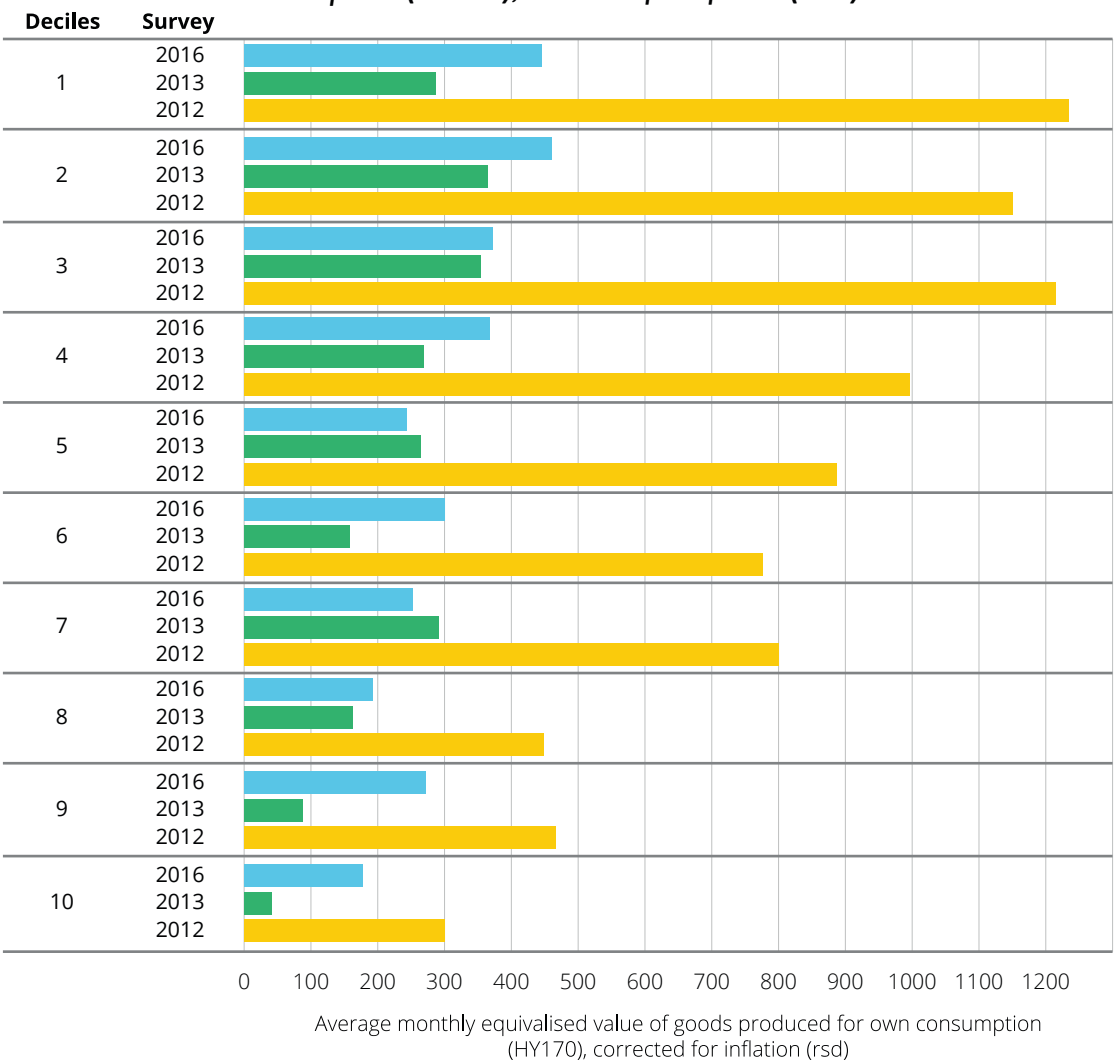
*Notes: * Average value of COP is calculated for HH that have agricultural production for own consumption. In order to obtain comparability, fuel wood was excluded from own consumption in HBS, while gross value of HY170 was included in SILC.*

Additionally, SILC 2013, which had much more detailed approach in measuring COP, seem to even more overestimate its magnitude. Change in SILC 2014 brought radically different results[16] regarding HY170. Net value of HY170 corrected for inflation in SILC 2013 was more than 2 times higher compared SILC 2014 (Figure 9). Particularly overestimated seem to be the lowest and the highest deciles (1st decile in SILC 2014 was 3,3 times lower, while 10th decile even 5,9 times lower). This difference was somewhat reduced throughout years, but in SILC 2017 it is still very high.

16. *Average share of HY170 in THDI (adjusted for the value of HY170) fell from 2,6% to 0,9%. Share of HH that reported having HY170 fell from 27% in 2012 to 18% in 2013, while average monthly HY170 among those that reported it fell from RSD 5.789 to RSD 2.693. These results originate solely in change of data collection in Serbia, since EU SILC methodology for target variables remained the same in observed period (European Commission, 2013).*

More importantly, we draw attention on the change in questionnaire occurred in SILC 2014, because there is no correlation between responses in SILC 2013 and SILC 2014 regarding HY170. Since 75% of the HH interviewed in one year remains in the following one, we could measure correlation in responses for the same households in two consecutive years. Namely, correlation between responses for 4.367 HH that remained the same in two years, was only 0,20. Interestingly, actual correlation for HH reporting HY170 is even lower, once HH that did not have goods produced for own consumption are excluded. Namely, large number of HH that did not have HY170 increase correlation since they all have value of zero. In fact, when observed only for HH that reported HY170 at least in one year, this correlation reduces to even 0,0009. This implies almost no correlation at all. Even 56% of HH that reported having HY170 in 2013, did not report it in 2014.

Figure 9. SILC: Average monthly equivalised net value of goods produced for own consumption (HY170), corrected for inflation (RSD)***



Source: CEVES' calculation based on primary data of SILC 2013, 2014 and 2017 (data for 2012, 2013 and 2016).All data are equivalized based on OECD modified equivalence scale. All data are weighted averages. All data are corrected for inflation (2016 is referent year).

*Notes: *Average monthly equivalised net value of goods produced for own consumption calculated on the level of entire HH population*

***Year given refers to a referent year, and not to the year as reported in SORS. For example, SILC 2017 refers to 2016 as a reference year which is given in this figure.*

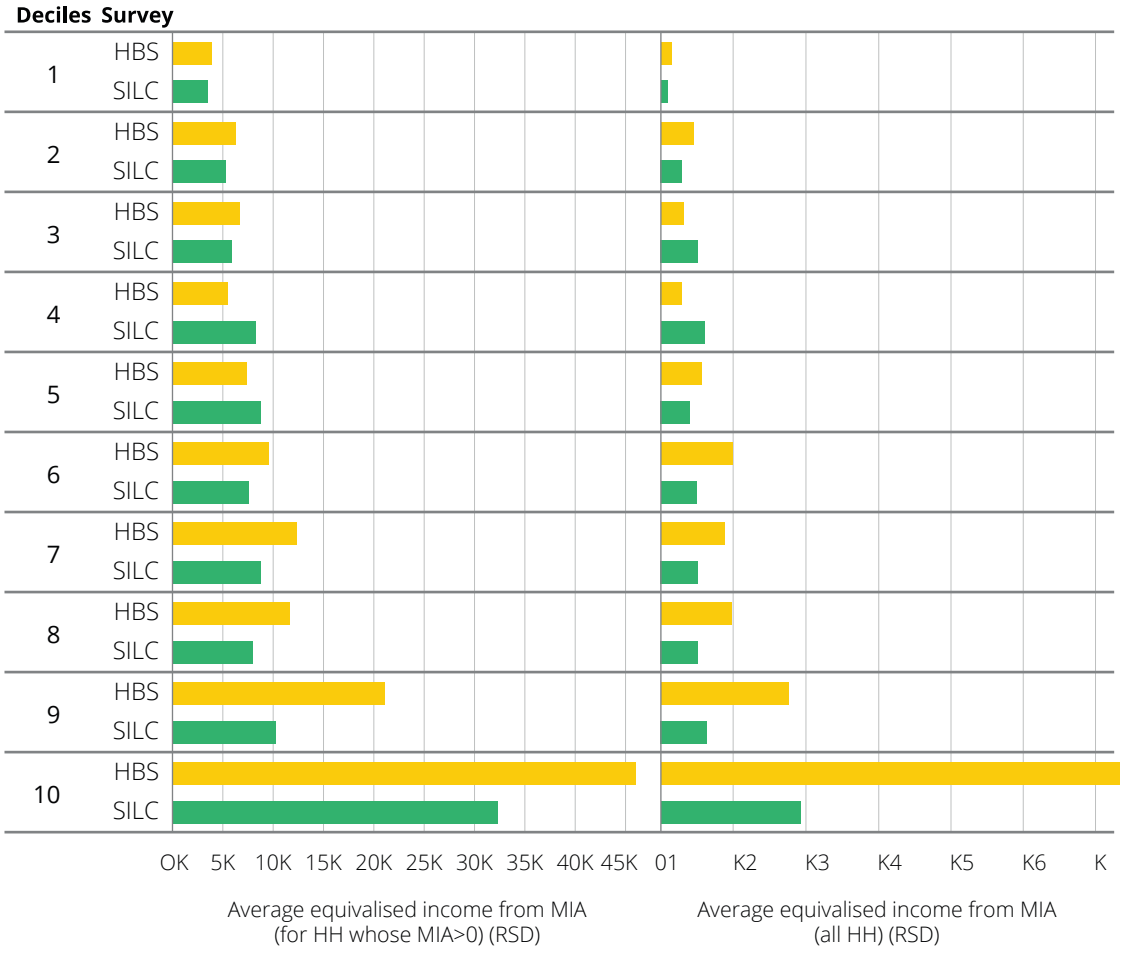
These observations indicate that the quality of questionnaire and its interpretation can greatly influence the results. The fact that the same agricultural HH reported having COP in one year and zero in other; or having relatively high COP in one, and marginal level in other; deserves particular attention. Surely, there might be such cases. But what is worrisome, is that there is almost no correlation among responses in two successive years among the same HH once the questionnaire was changed. Thus, we need to shed light and suggest additional research on the quality of:

- **Survey tool (questionnaire)** – number, level of details and type of the questions;
- **Instructions for interviewer** - that would guarantee proper understanding of questions;
- **Interpretation of questions during interviews** - that would avoid exclusion of small and marginal values, that would help interviewer in encouraging interviewees to provide honest and more precise answer.

(MONETARY) INCOME FROM SELLING AGRICULTURAL PRODUCTS (MIA)

For commercially oriented agricultural HH, SILC and HBS report relatively comparable level of income from sale, apart from the highest decile. The highest 4 deciles in HBS report more than 40% higher income from selling agricultural products (9th decile even 107% higher). This might indicate that when asked to recall, either HH tend to perceive relatively lower level of net income from sale, or HH in SILC were less willing to disclose actual level of income. Unlike in SILC, there are no extreme values observed in agricultural income in the sample, that could partly affect difference in higher deciles. However, this can be based on better sampling of HH with high income from agriculture. One part of explanation can come from the fact that HBS better capture households with higher income from agriculture sale in each decile. Finally, richer HH sometimes tend not to report true level of their income, which might influence both instruments.

Figure 10. SILC and HBS: Average income from selling agricultural products (2016, RSD)*



Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016) and HBS 2016 (data for 2016). All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.
*Notes: *Negative values in SILC were excluded. Value of income refer to net values.*

Finally, it is still interesting to note that both high-level and more detailed approach lead to similar results in lower deciles. Magnitude of MIA is quite stable up to 8th decile, and it range from 5 to 12 thousand RSD per household (equivalised value) for both surveys. The difference in the last deciles is a cumulative effect of different assessment of magnitude, but more importantly of different share of commercially oriented agricultural HH. As mentioned, in 10th decile HBS reports 18% of commercially oriented AH, while SILC reports only 6%.

V. USUAL PRACTICE AND EXPERIENCE OF SELECTED EU COUNTRIES IN EU-SILC SURVEY

In this section we shed light onto practice of EU-SILC countries in terms of topics discussed in this study. Namely, flexibility of the EU-SILC framework is evident when we consider different approaches that countries take in recording and (post)processing of main income variables. First, we consider how countries record and process HY170 – basically how do they differentiate between HY170 and withdrawals, and what sources they use. Then we present evidence that including HY170 in HY020 (THDI) would have generally only limited importance on poverty and inequality indicators. Next, we focus on how countries record monetary income from agriculture (MIA). Again, we are interested in sources, since countries can rely on registers, survey, or combination of the two. We are especially interested in questionnaire design in sense of questions about agriculture. Eventually, we examine approach that countries take in processing negative and extreme values.

EU PRACTICE IN RECORDING HY170

Consumption of own production (COP) consists of agricultural production that is aimed at selling, but partly is consumed within the same HH **(withdrawals)** and agricultural production that is aimed solely for own consumption **(HY170). As we show in Chapter II, the former should be included into income from self-employment, and therefore THDI, while the latter should not be.** Moreover, in the same chapter we have illustrated some conceptual difficulties which courtiers face when they assess and allocate COP. Here, we focus on common practices and outcomes.

Almost all EU-SILC countries comply with the guidelines – HY170 is generally not included into THDI. Therefore, potential inclusion of HY170 into THDI would compromise cross-country comparability. For instance, the sole exception to the methodological guidelines and common practice is Croatia. Namely, in the research on common methodology practices within the EU-SILC (Goedemé, Zardo 2020) Croatia is flagged as a country

that *"does not seem to follow the Eurostat guidelines"* for calculating the income from self-employment (PY050). **The reason was that Croatia used to calculate HY170 into PY050 (and therefore THDI)** (Goedemé, Zardo 2020). Croatian NSI stated that this misallocation will be corrected in the future – HY170 will be removed from PY050 (ibid.).

Countries take different approaches for separating between HY170 and withdrawals.[17] For example, in Bulgarian SILC questionnaire (Box 1), value of agricultural production is classified into production consumed by the HH (Q43. marked as HY170), production sold (Q45. marked as PY050) and production given as a gift (Q47 marked as HY130[18]). It could be that the value of Q43 is added to the value of Q45., if the value of Q45 is greater than zero (or any other threshold)[19], therefore converting complete COP into withdrawal. On the other hand, it could be that withdrawals are not included into PY050 at all, and that total COP is considered as HY170, even *if it comes from* withdrawal. However, without the raw database, we are not able to determine what in fact happens, but since the aforementioned study by Goedemé and Zardo (2020) did not find any irregularities when it comes to PY050, we deem that probably latter is the case. On the other hand, some countries, like Slovenia, have completely separate sections in their questionnaires for income from agriculture and own consumption. But again, we are not sure whether the HY170 is translated into withdrawal if income from the agriculture exists, since there is no question about withdrawals in section about commercially oriented production. Serbia tries to do methodologically correct thing by asking separate questions for withdrawals from agriculture and HY170, which can help in correctly differentiating between the two, but on the downside increases response burden and opens up space for potential double counting – respondents may find it difficult to disentangle what is withdrawal and what is HY170. It is interesting that Croatia used similar questionnaire form as Serbia, but somehow misclassified HY170 and included it into PY050.

Box 1: Classification of agricultural production in Bulgaria, separated by purpose[20]

At what amount approximately would you estimate	Annual amount in BGN	
Q42. The agricultural production of your HH		
Q43. The agricultural production consumed by your HH		**HY170**
Q45. The agricultural production sold by your HH		**PY050**
Q47. The agricultural production given free to persons outside your HH		**HY130**

17. *Bear in mind that COP = HY170 + withdrawals. Also, withdrawals are taken into account when calculating PY050, while HY170 is not.*

18. *Note that according to methodology HY130 (Regular inter-household cash transfer paid) should refer only to cash transfers.*

19. *That may be the reason for inexistence of Q44. in the questionnaire. Maybe Q44. is later created by adding Q43. and Q45., if Q45. is greater than zero (or any other threshold.*

20. *EU-SILC 2019 Bulgaria Household questionnaire*

Nevertheless, **from this point on, for the purpose of analysing the importance of HY170 as an income source, we consider that all countries rely on the best practice,** meaning that withdrawals and HY170 are separated and assessed with acceptable level of imperfection. By flagging only Croatia as a country with misclassified HY170, study by Goedemé and Zardo (2020) also provides ground for such assumption[21].

Recording data on HY170 is not (even) mandatory for the EU-SILC countries, neither the method for data collection nor value imputation is directly prescribed defined. Decision upon recording HY170 is to be made by the country itself, relying on a rather flexible recommendation by the guide[22] - *The value of food and beverages shall be included* ***when they are a significant component of the income at national level or they constitute a significant component of the income of particular groups of households (…)*** *The importance of this component should be assessed on an objective and empirical basis using for instance HBS results or National Accounts.* Also, the methodology of recording is not set in stone – some countries use the data from other surveys (if so, predominantly HBS) to assess and impute the value, and those that record it through SILC, do it with questionnaires, which vary widely in level of detail from country to country. Consequentially, to reduce the response burden, some countries, especially the more developed ones, do not collect the data on HY170 at all, while some rely on other surveys. Still, two thirds do record the data on HY170 in SILC (Table 11).

Table 11. Source of data on HY170 in different countries

Source	Country
Collect the data on HY170 in SILC*	Bulgaria, Czechia, Germany, Estonia, Greece, Spain, France, Croatia, Italia, Cyprus, Latvia**, Luxembourg, Hungary, Poland, Slovenia, Slovakia, Serbia
Collect the data on HY170 form another survey	Belgium, Romania, Finland
Do not collect the data on HY170	Denmark, Malta, The Netherlands, Austria, Iceland, Sweden, The United Kingdom***

** Some countries assess quantities through SILC, and then calculate monetary value in a subsequent step, by taking prices from HBS, or some other relevant source.*

*** The questionnaire in Latvia contains several very detailed questions on categories of own-consumption (cucumbers (fresh), cucumbers (pickled and / or sour), cabbage (fresh), sauerkraut (sour), (…), eggs, pork…), but respondents should only respond by yes or no for every product (if they have consumed it). Values are later imputed through HBS.*

**** Data on HY170 are collected in UK's version of HBS, but in SILC values for HY170 are set to zero.*

Source: We have relied on several sources: Assessment of the national SILC questionnaires, National Quality Reports, T. Čomić (2018), MetaSILC 2015 Database .

21. *Although the analysis did not cover HY170 explicitly, it did cover PY050. Therefore, misclassifications of withdrawals and HY170, as in case of Croatia, would be identified.*

22. *Methodological Guidelines and Description of EU-SILC Target Variables, Operation 2018.*

Expectedly, the impact of including HY170 into THDI is generally limited on the national level. One of the first comprehensive analyses on the importance of HY170 as a source of income was conducted by Paats and Tiit in 2010. **Their general conclusion was that the inclusion of HY170 would play largely insignificant role as a part of THDI** (its impact on target indicators stays within 1pp for almost all countries but Romania)[23] and that therefore **the question (or variable HY170) about it should be excluded from the SILC questionnaire.** However, authors do admit that *own consumption can be a tool for escaping poverty, but that it is hard to say that that tool is very important (except for Romania).* Authors have also stressed that different sources and methods of assessing HY170 compromise data comparability.

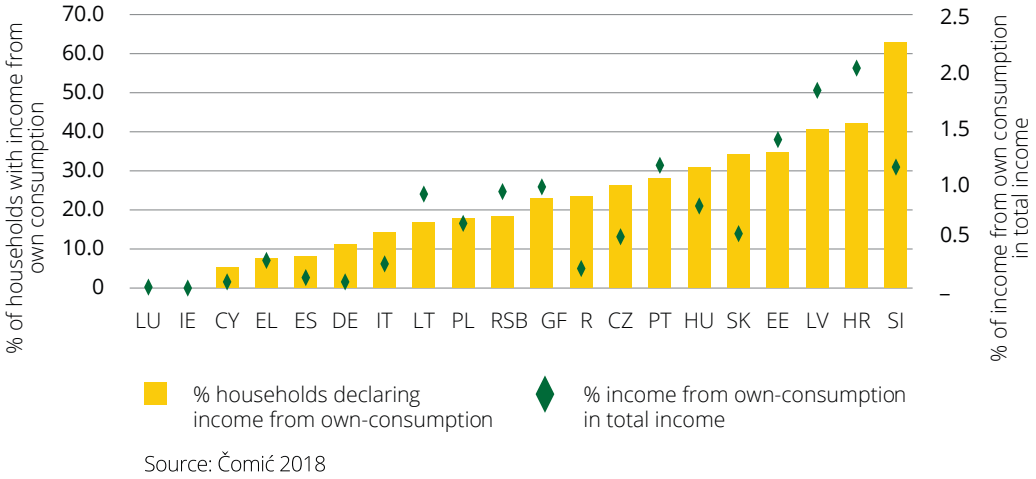
Nevertheless, the same study came up with an important conclusion – **more households reported the income from own-consumption when a detailed questionnaire was used for collecting these data.** Namely, Estonia switched from a single simple question (simple net value assessment) to a more detailed set of questions between 2006 and 2007. Share of HHs reporting HY170 surged from 11% to 52% in the span of just one year – most certainly as a consequence of changes made in the questionnaire. Furthermore, that share surpassed the result from HBS by around 20pp. However, HY170/THDI ratio stood at "only" 0,7%, while HBS reported 1%. Evidence that the choice of questionnaire hugely impacts obtained results can also be found in the case of Serbia – namely Serbia switched from a detailed to simplified questionnaire between 2013 and 2014. As a result, HY170/THDI ratio declined from 2,9% in 2013 to 0,9% in 2014, which can be almost fully attributed to the change of questionnaire.

More recent study confirmed that including HY170 into THDI makes little difference at a national level (Čomić, 2018). Again, ratio of HY170 in THDI (when included) stood below 1% in ¾ of the countries, reaching maximum of 2% in Croatia (Figure 13). Interestingly, Croatia does not use a detailed questionnaire when it comes to HY170 – it asks only if the household produced (or collected) any goods for own consumption (HY170), and then asks interviewee to assess its value. But there are two factors to consider – Croatian questionnaire asks for HY170 value (1) on a monthly basis and (2) asks for the market value (instead of net).

The share of households reporting HY170 is somewhat less uniform (Figure 11). Slovenia boasts highest share of households reporting income from HY170 – 63%, while Estonia, analysed in the previously mentioned study, still stays high with 35%. Interestingly, among 6 countries that report 30% and higher share of households reporting *income* from HY170 – 3 have detailed questionnaires (Slovenia, Estonia, Latvia), while 3 do not (Croatia, Slovakia, Hungary). Also, the share of HHs where HY170 makes more than 5% of THDI is not large among the countries – around 10% of HHs reported having HY170. Also, the share of households where the HY170 makes more than 5% of THDI is not overly significant. For the most NMS countries it stays around 10% (including Serbia), peaking to around 20% in Croatia, Estonia and Latvia (not shown in the graph).

23. *It could be that some form of a bias was present in the sample in case of Romania, since 99.2% HHs from the sample reported producing goods for own consumption – practically entire population. On the other hand, the same ratio for other NMS countries stood at 30-40%.*

Figure 11. Share of HHs declaring income from own consumption and share of income from own consumption in total household disposable income



Source: Čomić 2018

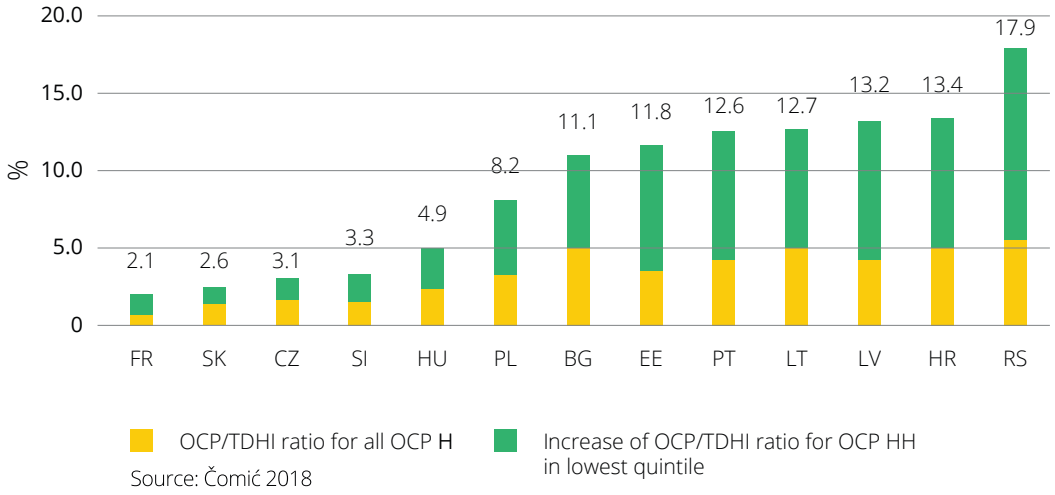
Inclusion of HY170 in THDI would not have substantial effect, if marginal, even for vulnerable sub-populations. Namely, if included, HY170 would make only up to 5,7% of the THDI[24] in the case of Serbia (and around 5% in Lithuania, Bulgaria and Croatia) and less in all other EU-SILC countries[25](Čomić, 2018). Interestingly, the same ratio for HHs in thinly populated areas (which can be regarded vulnerable) does not differ significantly. In the case of the poorest quintile[26], HY170 would make up to 17,9% of THDI in Serbia and somewhat over 10% in other East-European countries, while in Central-European countries it would typically make around than 3% (Figure 12).

24. *Only HHs reporting HY170 are considered. Note that according to methodology HY130 (Regular inter-household cash transfer paid) should refer only to cash transfers.*

25. *Only countries that collect the data on HY170 in SILC are considered (first row, Table 11)*

26. *Poorest 20% of the population*

Figure 12. Share of OCP in THDI in HHs that report OCP and its significance for the poorest quintile



Source: Čomić 2018

As far as the impact of including HY170 in THDI on income distribution (S80/S20 and Gini coefficient) and monetary poverty (at-risk-of-poverty rate) variables is considered, it would not make for overly significant change either[27]. Impact on S80/S20 is the most significant with reductions of around 6% in the case of Lithuania and Latvia, around 4,5% in the case of Serbia and Croatia and less than 3% for others. Gini coefficient decreases as well, although the decreases are for the most part negligible – less than 0.8 Gini points at best. The similar case stands for the decrease of at-risk-of-poverty rate, as it would stand below 2,3% at best (Lithuania). Testing for statistical significance of the changes that the inclusion of HY170 would make has not been provided by the author (Čomić, 2018), but nevertheless we can conclude with a high degree of certainty that most of these changes would not be statistically significant. For example, confidence intervals for at-risk-of-poverty rate (EU-SILC Quality Reports)[28] are typically at least 2p.p. wide, and expectedly wider for less developed countries with the higher rate, implying that almost none of these changes would be considered statistically significant. On the other hand, results obtained by Čomić confirm that the distribution of HY170 is skewed towards the poorest quintile, but nevertheless that HY170 is present in other quintiles as well. That can be seen from comparing the magnitude of change between S80/S20 and Gini. Namely, in the case of S80/S20, which evaluates distribution on its tails (in our case the poorest and the richest quintile) the decrease is sharper than in the case of Gini which measures income distribution across the whole population.

27. *Calculations from Čomić 2018*

28. *https://ec.europa.eu/eurostat/web/income-and-living-conditions/quality/eu-and-national-quality-reports*

Key takeaway from this section would be that the HY170 as a source of income is not overly significant in case of most countries. Therefore, it could be concluded that either reaching for existing sources like HBS to impute it, or omitting it completely is largely justified, especially in highly developed countries (Table 11). Moreover, different sources of data collection[29] negatively affect cross country comparability. Nevertheless, it can still serve as some form of development indicator and source of information, especially in the case of still-developing countries of Southeast Europe with significant agricultural population.

METHODS OF DATA COLLECTION OF (AGRICULTURAL) SELF-EMPLOYMENT INCOME

SOURCES OF DATA ON PY050

For the most part, the SILC data are collected thorough the combination of survey and register data, and income variables are not exception. As mentioned earlier, MIA is measured as income from self-employment (PY050), although sometimes with a specific set of questions, tailored to catch its specifics. Own consumption of agricultural products within the household that produces them is considered withdrawal and included into income only if the HH is commercially oriented (has income from **agricultural** self-employment – PY050). PY050 takes into account all business revenues[30] and expenses[31] (Methodological Guidelines, 2018). It is important to stress that PY050 also takes subsides into account, which is often especially important source of revenue for agricultural producers. Having defined the concept of self-employment this way[32], SILC framework allows for various alternative approaches to the measurement of resulting income (Eurostat, 2007):

- The 'entrepreneurial income' that corresponds to the concept of profit/loss normally used in business accounting;
- The 'net operating benefits/losses' shown on the annual tax accounts;

Having imposed this definition from the beginning, **SILC opened up space and allowed for the use of registers** as either primary or supplementary sources of information on PY050 when possible.

Positive sides of using registers in income assessment are numerous. First, they reduce biases and number of survey errors (Jäntti and Törmälehto 2013). Second, they rep-

29. *Note that SILC uses 12-month recall period, while HBS mostly relies on diary data over the past two weeks. Moreover, concept between the two also varies in terms of goods, as HBS includes them as they are consumed, while SILC includes them as they are produced.*

30. *Including not only market output, but also property income received in connection with financial and other assets and market value of goods and services bought for the unincorporated enterprise but consumed by the entrepreneur and his/her household members. Also note (including not only market output, but also property income received in connection with financial and other assets and market value of goods and services bought for the unincorporated enterprise but consumed by the entrepreneur and his/her household members).*

31. *Including intermediate consumption, compensation of employees, taxes on production and import taxes, interest paid on business loans, rents paid on land and other non-produced tangible rented assets and consumption of fixed capital.*

32. *Note that this concept is universal for all types of self-employment in SILC – agricultural and non-agricultural.*

resent a handy tool for quality control, imputation for missing or correcting survey error. Second, collecting data through registers allows that the information can be collected for many income components separately, and the problem of under/over-reporting is equal to mistakes in administrative data and problems related to measuring incomes from the grey/black economy (non-taxable incomes are usually collected through the questionnaire) (Goedemé, Zardo, 2018). Third, respondents may have a hard time in remembering how much income they received from each income source separately, but may know how much they received in total. However, it also appears that this often results in the omission (by the respondent) of small incomes (Goedemé, Zardo, 2018). And here, registers can be useful in assessing these categories. Fourth, relying on registers for some questions reduces the number of questions thus allowing for shorter questionnaires, lower data collection costs and reduced response burden. Indirectly, lower response burden may lead to higher response rates (Jäntti and Törmälehto 2013).

On the negative side it seems that main obstacles to increasingly relying on register data are mostly related to national legal barriers, governance and register infrastructures, and timeliness of the data (Jäntti, Törmälehto, 2018). However, registers can only be used in countries with lower rates of informal economy. Also, there is always concern whether the definition of the variable taken from registers fits the needs directly, or it has to be calibrated somehow, which opens up space misinterpretations and calibration mistakes. Additionally, the quality of the register data may vary across countries (needless to say the definitions), which can affect cross-country comparability.

Generally, it can be concluded that **SILC framework encourages use of registers**, but at the same time, wider application seems to be still concentrated in *register countries*[33] .(Eurostat 2006 and Jäntti, Törmälehto, 2018). Also, in these countries, income from informal activates is presumably much less present, which makes using registers reasonably accurate. According to Jäntti and Törmälehto, some of these countries are increasingly producing income inequality and income poverty indicators from entirely register-based sources.

Reliance of EU-SILC countries on registers as source of data on PY050 is not widespread yet (Table 12). It seems that the data on PY050 in most cases is still collected through surveys, somewhat over a half of countries rely solely on them. On the other hand, reliance solely on registers seems to be concentrated among five developed, register countries. Same number of countries reported using mixed-methods approach. However, at this point, we are not able determine whether some of the mixed method countries from the table have utilized registers in assessing income from agricultural self-employment (and how) or not. Also, some countries, like Bulgaria, use register data for imputation (if available) of missing variables or logical cross-check of extreme values (Bulgaria Quality Report, 2018), but they do not use registers as tool for collecting the data from the outset.

33. *Denmark, Finland, Iceland, Netherlands, Norway, Sweden, Slovenia*

Table 12: Primary data sources for Self-employment income[34]

Country	Method of collecting the data on PY050	Country	Method of collecting the data on PY050
Belgium	Survey	Luxembourg	Survey
Bulgaria	Survey	Hungary	Survey
Czech Republic	Survey	Malta	Mixed methods
Denmark	Registers	The Netherlands	Registers
Germany	Survey	Austria	Survey
Estonia	Mixed methods	Poland	Survey
Greece	Survey	Portugal	Other
Spain	Registers	Slovenia	Mixed methods
France	Other	Slovakia	Survey
Croatia	Survey	Finland	Registers
Italy	Mixed methods	Sweden	Registers
Republic of Cyprus	Survey	The United Kingdom	Survey
Latvia	Mixed methods	Republic of Serbia	Survey

Notes: Green – Country uses only registers, Orange – Country uses registers for some questions and survey for some, Yellow – Country uses only survey

Currently, in case of agriculture, use of registers is generally even more limited. Namely, reliable administrative data sources on income components from agriculture rarely exist for non-corporate agricultural production, especially in Southeast Europe. Even in cases of two developed countries, Slovenia and Luxemburg, reliable register data on agriculture has not been available. Namely, in case of Slovenia, author (R.T. Inglič, 2013) did not have any reliable administrative data source for agricultural incomes, and tax list data on agriculture is incomplete, since farmers pay taxes according to the area they have (land), but (...) anything can grow on this land and (register) data do not take into account different incomes from farming (Inglič, Rihard Tomaž, 2013). In Luxemburg, the administrative-based dataset (regarding agriculture) is an imperfect link between the components of the income variable and the reality of earnings (Liégeois, Berger, Islam, Wagener, 2013).

However, in general, the data on social contributions and subsidies should (could) represent the exemption to the rule. Tracing payments on social contributions for agricultural HHs that pay them should not be challenging in most countries. Also, it should be possible to identify HH that receives subsidy, along with the amount in the registry of competent ministry. Some SILC countries rely on this practice, with Ireland being one of the best-practice examples[35]. However, potential problem of this approach is that respondent has the right not to grant permission to statistics to use the registry data or she/he may decide not to disclose the information of her /his subsidy identification number.

34. *According to Zardo Trindade, L. and Goedemé, T. (2018) Net-SILC3 main findings and recommendations on the comparability of EU-SILC income variables, forthcoming.*

35. *See Ireland in the next question Questionnaire design*

QUESTIONNAIRE DESIGN

In this section we examine various questionnaire designs regarding the income from agriculture – covering both variables PY050 and HY170. Since the registries are generally of limited use when it comes to agriculture, questionnaire design can play paramount role in making accurate assessments of agricultural income. In this section we limit ourselves to countries that we recognized as having similar agriculture as Serbia, in way or another. We are interested in the level of detail – some countries ask only for the net profit/loss, while some go into specific details. Also, we are interested if the questionnaire asks for quantities or monetary values, and if it asks for monetary values – does it offer ranges, if respondent cannot remember or decide for a specific value. Also, we want to know if there exists question dedicated solely to the potential reception of (agricultural) subsidy. In other words, we want to see how much of a weight have the countries similar to Serbia given to agriculture in their SILC questionnaires.

Expectedly, questionnaires in our sample vary in majority of the observed aspects. Table 13 exemplifies the difference between Greece and Portugal that do not even have a single question specially intended for assessing the agricultural income, and extremely detailed Ireland. However, **almost all countries from our sample do recognize the existence of agriculture as a form of self-employment that is somewhat different the other forms, but most often without going into much detail:**

- **Serbia's questionnaire is among simpler ones** in the observed group. It asks only for simple net monetary values of agricultural income, but it has separate questions for withdrawals and HY170. From 2019. on, Serbia has introduced ranges, and moved questions about agriculture to HH questionnaire.

- **Greece and Portugal that do not even have a single question specially intended for assessing the agricultural income** – they regard it as any form of self-employment.

- **Croatia asks directly for the net income (from agriculture), but then goes into detail tax, social and health care contributions.** Similar to Serbia, it has separate questions for withdrawals and HY170

- **Slovenia also asks directly for the net income,** but it also **asks for the agricultural area** and it is one of the only two countries **offering a range for income.** It is to some extent peculiar that it has only four questions on commercial part of agriculture, while it evaluates presumably much less important HY170 through 12 questions.

- **Romania for instance asks for the net income, but it asks respondents to specify the source** – from agricultural company (presumably if they possess one) or association/cooperative, from sales of agricultural goods, animals and animal products, and/or from work provided to another agricultural HH. At the same time, it asks respondents to provide these values on monthly basis, for every month separately, from January to December, which could negatively impact response burden and consequent mistakes.

- **Bulgaria separates the revenue streams coming plant production and animal husbandry.** Then it a**sks for the total production, and subsequently what por-**

tion of it is produced for sale, own consumption and given free. However, **when assessing expenses, Bulgaria asks for lump sum of all categories**, but it offers examples what should be considered as expense[36].

- **Hungary** has a similar questionnaire, but nevertheless it lacks examples of what should be considered as expense and question about agricultural area.

- **Poland** relies on a concept that can neither be fully comprehended from the questionnaire itself, nor from the available sources, to Authors' knowledge. See Poland in Table 13.

- **Ireland has the most detailed and most comprehensive agricultural questionnaire.** Agricultural production is divided into numerous and extensively detailed categories. For example, it does not ask only for kind of an animal, but it also requires for a specific breed and sometimes age. Milk only has eight dedicated questions, including the one about average yield per cow. Plant production is generally assessed through asking questions about (1) area (2) under a specified plant (crop). Animal husbandry in general is assessed through providing headcount. All products from animal origin are assessed animal husbandry headcount, only milk production being assessed separately. To calculate agricultural income – Irish CSO applies income coefficient provided by the ministry of agriculture (CSO of Ireland, 2019). That way, most of the potential mistakes and biases can almost eliminated. Nevertheless, the response burden is certainly much higher.

Even though one of Eurostat's recommendations is that the respondents should not only be given the opportunity to provide the exact amount, but also the option to choose from among a range of values (Methodological Guidelines, 2018), only three out of ten[37] countries offer a range. Questions that specify subsidies a source of revenue are more common (in 50% of the cases) – Ireland being the most comprehensive. When it comes to main agricultural input, land, only four countries consider it in their questionnaires. In Slovenia, it is just a question about total area, without any details. On other hand, Poland and Bulgaria ask rather sensible questions – the former asks for total area, arable land and tax-equivalent area, while the latter asks for owned, rented and leased area. Agricultural product lists are present in Poland and Ireland (In Ireland, as described, extremely detailed).

Similarly, the questions on HY170 also differ while some deviations from the generally proposed rules are also evident. Bulgaria and Hungary hold onto the simplest solution and ask for net monetary value of consumed goods. Ireland, the country with most comprehensive questionnaire in terms of overall agricultural production asks only a single yes/no question – if any of the produced products were consumed by the household. Slovenia and especially Poland, take much more detailed approach. In case of Portugal, Bulgaria, Croatia and Hungary question on HY170 asks for (market) value of consumed products, and it remains unclear whether or not are costs included in calculation – contrary to the recommendation from the methodological note that the value of HY170 should be taken net of all expenses.

36. *Interviewer can read following examples directly from the questionnaire: (specify) total cost of sowing, seeds, seedlings, fertilizers, herbicides, transportation, purchase of animal, feed, veterinary services, leased land, payment of workers, etc.*

37. *Ireland is excluded, since its type of questionnaire does not require a range*

Table 13: Questionnaire review on self-employment income from agriculture

Country	Questions for assessing agriculture	Personal or Household Q	Type	Revenue assessment separated	Expenses assessment separated	Ranges	Q. about subsidies	Question about agricultural area	Agricultural product lists	Other
Serbia 2019	Yes	Household	Simple monetary - net income.	No	No	Yes	No	No	No	In 2019. questions about agriculture are moved to HH questionnaire and ranges are introduced. It asks for withdrawals and HY170 separately.
Serbia (2014-2018)	Yes	Personal	Simple monetary - net income	No	No	No	No	No	No	It asks for withdrawals and HY170 separately.
Serbia 2013	Yes	Household	Simple monetary - net income. Income from animal and plant production is observed separately.	No	No	No	No	No	No	Agricultural products list exists only for HY170.

Table 13: Questionnaire review on self-employment income from agriculture

Country	Questions for assessing agriculture	Personal or Household Q	Type	Revenue assessment separated	Expenses assessment separated	Ranges	Q. about subsidies	Question about agricultural area	Agricultural product lists	Other
Romania	Yes	Personal	Monetary only slightly detailed - net income – asks for data on monthly basis for all 12 months separately	No	No	Yes	Yes	No	No	It asks for three types of agricultural income – from: 1. Agricultural companies and associations 2.Sales of products/animals 3. Provision of work to others
Bulgaria	Yes	Personal and Household	Monetary - slightly detailed	Monetary somewhat detailed: plants and animals are separated, and there are some details about animal production	Monetary simple - costs for total production. Examples of possible costs offered	No	Yes	Yes - owned, rented and leased	No	Agricultural production is separated by purpose into production that is: 1. Market-oriented 2) Own-consumption 3) Given free

Table 13: Questionnaire review on self-employment income from agriculture

Country	Questions for assessing agriculture	Personal or Household Q	Type	Revenue assessment separated	Expenses assessment separated	Ranges	Q. about subsidies	Question about agricultural area	Agricultural product lists	Other
Greece	No	Personal	Simple monetary - net income	No	No	No	No	No	No	-
Hungary	Yes	Household	Monetary - slightly detailed	Monetary somewhat detailed: plants and animals are separated; agricultural services are offered as a source of income as well	Monetary simple - costs for total production.	No	Yes	No	No	-
Poland	Yes	Household	It asks only whether you have or have not generated revenue from a list of agricultural activities, but asks only Yes/ No questions. How do they calculate net income, remains unclear.	It asks only whether you have or have not generated revenue from a list of agricultural activities, but asks only Yes/ No questions.	No	No	Yes	Yes - total area, arable, and tax area	Yes	-

Table 13: Questionnaire review on self-employment income from agriculture

Country	Questions for assessing agriculture	Personal or Household Q	Type	Revenue assessment separated	Expenses assessment separated	Ranges	Q. about subsidies	Question about agricultural area	Agricultural product lists	Other
Slovenia	Yes	Household/ Personal	Net income - simple with offered range	No	No	Yes	No	Yes - total area	Not for income - only for HY170	-
Croatia	Yes	Household/ Personal	Simple monetary - net income	No	Very detailed about tax, social and health care contributions	No	No	No	No	It asks for withdrawals and HY170 separately.
Portugal	No	Household/ Personal	Monetary - for self-employment in general	Monetary - not particularly detailed or agriculture specific	Monetary - not particularly detailed or agriculture specific	No	No	No	No	-
Ireland	Yes	Household/ Personal	Income from agriculture is assessed based on an extremely detailed questionnaire with numerous categories of agricultural products. Plant production is assessed through area under specified plant (crop). Animal husbandry is assessed through providing headcount. All products from animal origin are assessed animal husbandry headcount. Only milk is assessed separately.			No	Yes - in detail	Yes - in detail	Yes - in detail	

Table 14: Questionnaire review on HY170

Country	Collected through	Type	Ranges	Comment
Serbia	SILC	Simple Monetary – asks for the market value of consumed products, and producers' price of the consumed products		From 2019 on, integrated within agriculture income assessment
Romania	HBS	-	-	-
Bulgaria	SILC	Simple Monetary - asks only for value, costs are presumably taken as a share of total expenses	No	Integrated within agriculture income assessment
Greece	SILC	Simple monetary		-
Hungary	SILC	Simple monetary - asks only for value, costs are presumably taken as a share of total expenses	No	Integrated within agriculture income assessment
Poland	SILC	Monetary, detailed - asks only for value, costs are presumably taken as a share of total expenses	No	For a list of common agricultural products (milk, eggs, fruit, vegetables...) respondents evaluate what portion of their consumption comes from their own farm on a scale from 1 (entirely) to 4 (not at all).
Slovenia	SILC	Detailed, but asks only Yes/No questions	No	Remains unclear how the actual values are calculated
Croatia	SILC	Simple Monetary - asked for value at market prices (asked as value on monthly basis)	No	Questions about own consumption in commercially oriented HH and non-commercially oriented HH are separated
Portugal	SILC	Simple Monetary - asked as value at market prices	No	Does not take costs into account
Ireland	SILC	Asks only if any of the products were consumed by the HH - Yes/No question	No	Unclear if and how monetary value is assigned

DATA PROCESSING

It is within the nature of income to take widely different values within different HHs in a country. Most of these values follow something which could be called "expected" income distribution – there are HHs with low incomes which are relatively poor and those with high incomes that are relatively rich. The others fall in the middle, more or less dispersed around the median income. However, ***special cases* of those "at the tails" of income distribution are of particular interest to us.** Those are **zero, negative and extreme (very high or very low) income values. Their presence in the sample may have undesirable effect** on survey estimates – both conceptual (effect of negative income on well-being) and statistical (inflated variance of survey estimates). For these reasons, **EU-SILC countries have adopted procedures** which we cover in this section, that aim **to tackle these issues.** However, due to scarcity of the available information[38] and diversity of the procedures which we here illustrate, we are unable to provide definite conclusions and recommendations.

These procedures are not uniform for all countries. As Törmälehto (Törmälehto 2019) states (on negative values from self-employment): *"the different treatment/measurement of negative self-employment incomes may distort the comparison"*. Also, some earlier studies (Eurostat 2010) suggest that some countries allow for zero or negative income values, while some do not. Thus, we cannot give any definite recommendation on treatment of negative values, other than that **these issues should be discussed and resolved in direct cooperation with Eurostat.** On the other hand, fresh information on processing of the extreme income values have become available in the study by Goedemé, Zardo (2020). **To improve quality of their data most of the countries do process extreme values** – some only perform validity checking, some subsequently correct them by imposing a ceiling, by correcting weights or by imputation, while there are also those that do not make any validations and corrections (ibid.). Nevertheless, both criteria and procedures are tailored to country's specifics – availability and reliability of other sources on information about income and capacity of the NSI as well.

NEGATIVE AND ZERO INCOME VALUES

One of the main purposes of THDI is to serve as a measure of economic well-being, the question how the negative values should be processed remains an issue. It is often claimed that negative or zero values of disposable income do not provide a useful measure of well-being which can serve as a proxy for living standards (Eurostat 2010). Also, the process of equivalisation of income – which adjusts household income to take into account economies of scale – also makes little sense when applied to negative quantities (Ibid.). Unclear instructions (or lack thereof) have led to situation where different countries employ different practices – some allow negative values, some set them to zero, while some do not even allow zero income values (Table 15). Needless to say, these different approaches hamper cross-country comparability (Törmälehto 2019, Eurostat 2010). Having this in mind,

38. *Generally, information on data processing in the EU-SILC is scarce. Quality reports that are regularly produced (every year) by each country most often do not contain information about data processing in terms of zero, negative or extreme income values. Official information on these topics may also often be obsolete and even the newer ones, no matter how detailed or meticulous they are, do not cover all of these topics in sufficient detail.*

these issues should only be resolved in direct consultation with Eurostat – both at country and EU-SILC level.

Here, we illustrate diversity of procedures when it comes to processing of zero and negative income values[39]:

- **Almost two thirds of the EU-SILC countries allow for the incidence of negative THDI values.** Negative income values occur in 16 out of 26 EU-SILC countries in a study conducted by Eurostat in 2010[40]. However, proportion of HHs with negative income values seem to be small – highest value is 0.7% of HHs in Germany, while the average is around 0.3% HHs.

- **Incidence of (negative or) zero income values is somewhat higher.** Slightly over three quarters (20/26) countries allow for zero income value. Yet again, the share of these HHs is relatively small (note that in the Table 15, these values are given combined – HHs with income less than or equal to zero). HHs with zero or negative incomes are mostly present in Italy (1%), while the average is around 0.5%. Note that the countries that allow for the incidence zero and negative values, but do not allow for negative values only, are probably those that set negative values to zero – for example Finland, Iceland and Ireland.

- **Half of the EU-SILC countries allow for the incidence of negative income from self-employment (PY050).** However, some countries exhibit peculiar patterns. For example, Austria, Hungary and Luxembourg allow for the incidence of negative self-employment income values, but they do not allow for negative THDI values. Of course, it is possible that negative income (loss) from self-employment can be covered with other sources of income in some cases, the case that it is covered for all HHs seems less probable. It could be that these countries "preserve the information" about negative self-employment income in variable PY050, but when calculating THDI, they set it to zero. Anyhow, we are lacking sufficient information to determine what is really the case. In terms of income from agriculture, there is no evidence that any of the countries processes it different from its usual practice for income from self-employment.

EXTREME INCOME VALUES

Presence of extreme values has a considerable effect on Gini and S80/20. While these do not affect at-risk-of-poverty rate, they can have a high impact on measures on inequality Gini and S80/20. Also, since incidence of extreme values within a sample violates the assumed normal distribution, these consequentially greatly inflate the variance of the survey estimates and adversely affect their comparability over time and across different countries (Goedemé, Zardo 2020).

Majority of the EU-SILC countries have a procedure for the incidence of extreme or outlying values for income variables. According to Goedemé, Zardo (2020) around 70% of the countries perform some sort of testing and processing of the extreme and outlying values. Those procedures are usually a combination of statistical methods for detection of outliers and subsequent validity checking. Extreme values from the sample are most often compared with other national sources – registers or surveys, or in case of Italy, microsimulation model is run. **In case of most countries, if an extreme value is also a valid one, it stays in the sample. However, some countries impose a ceiling** above which income values cannot go. For example, in France, the income values cannot exceed those observed in the "Tax and Social Incomes Survey (ERFS)". In Spain

39. *The main limitation to these conclusions is that they are based on study from 2010 which is further based on data from 2007, and therefore some procedures may have been changed in the meantime.*

40. *Eurostat, 2010, An assessment of survey errors in EU-SILC, Eurostat, Luxemburg*

limit is applied for each income component – the limits are defined depending on the distribution of that income component, and then the observations exceeding those limits are excluded and then imputed. Denmark on the other hand sets the ceiling on the negative side of income values. Limit is defined as 100.000 euros, and the negative values exceeding 100.000 stay in the sample, but get a lower weight.

Table 15: Incidence of negative income values in main income categories

% of HHs	TEDI		PY050	Correction for extreme values
Countries	**<0**	**<=0**	**<0**	**Yes/No**
Austria	0.0	0.0	0.4	Yes
Belgium	0.3	0.4	0.1	Yes
Czech Republic	0.0	0.0	0.0	Yes
Cyprus	0.0	0.0	0.0	No
Denmark	0.6	0.6	3.5	Yes
Germany	0.7	0.8	0.0	No
Estonia	0.2	0.6	0.5	Yes
Iceland	0.0	0.1	0.0	No data
Ireland	0.0	0.1	0.0	No data
Greece	0.3	0.6	0.0	Yes
Spain	0.3	0.9	0.8	Yes
France	0.1	0.1	0.0	Yes
Italy	0.4	1.0	0.2	Yes
Latvia	0.4	0.9	0.2	Yes
Lithuania	0.1	0.5	0.0	No data
Luxembourg	0.0	0.0	0.1	No
Hungary	0.0	0.0	0.4	Yes
Netherlands	0.5	0.5	2.3	No
Norway	0.5	0.6	2.9	No data
Poland	0.1	0.2	0.0	No
Portugal	0.0	0.0	0.0	No data
Slovenia	0.0	0.0	0.0	Yes
Slovakia	0.2	0.2	0.2	Yes
Finland	0.0	0.1	0.0	No
Sweden	0.2	0.4	4.3	No
United Kingdom	0.5	0.5	0.0	Yes
Bulgaria	No data	No data	No data	Yes
Croatia	No data	No data	No data	Yes
Malta	No data	No data	No data	Yes

Source: First three columns: Eurostat (2010); Fourth Column: Goedemé, Zardo (2020)

Notes: Colours refer to the following: Blue = do not allow for negative values, Green = correct for extreme values, Brown = no data available

VI. RECOMMENDATIONS

Results of this analysis uncover that, even though not entire income discrepancy between SILC and HBS can be attributed to SILC methodology, there are important methodological aspects that should be given a careful attention. Referring to the two observed aspects, SILC methodology in Serbia could be improved, but up to the limits defined by SILC harmonised framework.

We propose 5 key areas in need of further analysis and improvement:

- **Reviewing the statistical segmentation, sampling and weighting of households.** Sampling and weighting processes, being crucial for good quality data collection, should be thoroughly analysed in SILC in order to assure that sampled population adequately represent the structural characteristics of households in Serbia. As previously mentioned, this report indicates strong deviations in terms of the size and structure of agricultural household sampled both in SILC and HBS. Even though we cannot conclude that other structural households' characteristics are also inadequately represented, the difference related to agriculture suggest the possibility of there being other deviations from actual structure. In Serbia there are strong regional differences, and different economic and demographic trends that should be carefully taken into account when defining sampling and weighting processes.

- **Uncovering underlying reasons for high share of households with zero and very small income.** Since SILC focuses also on poverty and social exclusion, its capacity to adequately capture reality in this regard is of crucial interest for social policy targeting. This includes proper capturing of the share and characteristics of deprived HH/individuals in need of social assistance. 23% of HH in 1st decile with no income and no consumption from own production seem very high. Even if this share was adequately captured in SILC so far, the question of the structure would remain. For example, it should be analysed which of HH that reported zero disposable income do not belong to 1st decile, but rather refuse to provide information on income. Eurostat often draws attention to the fact that sometimes HH from upper deciles are those that avoid providing info on income.

- **Comparing the size and characteristics of the poorest population in SILC to recipients of social assistance based on official data.** This is in alignment with the previous recommendation and it goes in both directions: the analysis should cover both the capacity of SILC to capture the population that (should) receive social assistance, and the capacity of social assistance instruments to capture targeted population. For this purpose, further analysis should uncover actual typology and characteristics of HH that are in need of social assistance, and compare it both to SILC and official data od social assistance receivers.

- **Switching to use of registers where possible.** SILC framework encourages countries to rely on registers when they can. Using registers has many benefits in form of

reduced errors, biases and lower response burden. Serbia might consider registers related to social assistance, income from employment, pensions, subsidies for agriculture etc. EU countries still dominantly rely on survey data (50% of countries), 38% use mixed approach (combining data from survey and registers), while 12% rely dominantly on data from registers. Still, there are issues regarding using register data, due to legal barriers, difference in definitions or timeliness of the data etc. Particular issue refers to personal data protection and obtaining personal identity number during data collection.

• **Improving data collection capacity. This includes Improved questionnaires, instructions and trainings for interviewers.** Questionnaires should be adjusted so they cover clear and unequivocal questions in measuring income from agriculture (e.g. clear distinction of withdrawals and goods produced for own consumption). More importantly, since SILC uses high-level estimation approach, and asks only one question per income category, additional instructions to the interviewers are needed to explain many concepts that should be covered. For example, income from agriculture should also include subsidies received for agriculture. Since this is not noted in the questionnaire itself, such information should be provided in instructions, so that interviewers can explain what each income category includes. Once questionnaires and instructions are improved, it is up to interviewers to ensure good quality of data collection. Referring to the previous example, when interviewers ask about income from agriculture, they should remind HH that subsidies should be included. In particular, interviewers should be trained to overcome non-response risk, and to motivate HH to provide proper answers on income level.

In addition to these, we propose the following recommendations:

• **Consider different treatment of negative income level from self-employment activities.** EU does not set strict requirements regarding the treatment of negative income, but does leave the option to have negatives income components set to zero. There is a different practice among EU counties. In fact, around a half of the countries allow for the incidence of negative values, while a half sets them to zero. Still, in order to have higher alignment with HBS practice, SORS might consider setting to zero negative income from self-employment sub-components.

• **Consider alternative analysis of HY170 through additional development indicators.** Our analysis of EU-SILC framework and practice indicated that we cannot recommend HY170 to be included in THDI. In fact, among other issues regarding agriculture, inclusion of HY170 is highly disputed issue even on an EU level. EU-SILC methodology leaves a choice for a country to make – it can choose to collect, not to collect the data on HY170 at all, or to collect it form another survey, like HBS. However, since it is a non-monetary part of income and represent rather a marginal part of THDI, all EU countries except Croatia do not include it in THDI. Still, after being flagged by Eurostat as a country that "does not seem to follow the Eurostat guidelines", will stop including it in THDI. Thus, inclusion of HY170 would negatively affect cross country comparability. Nevertheless, HY170 can still serve as some form of development indicator, especially in the case of developing countries of Southeast Europe with significant agricultural population.

• **Thoroughly analyse other income components as a source of discrepancy between HBS and SILC in lower income deciles.** As showed in Chapter IV magnitude of income components that are not related to agriculture differ widely across all deciles between HBS and SILC. Among other reasons, this might be related to different segmentation of HH, and thus different assessment of share of persons employed, pensioners, self-employed etc. Additionally, it should be determined if other income components are covered adequately and that some components are not systematically missing.

• **Consider implementing cross-checking mechanism with other instruments such as FSS, Labour Force Survey (LFS) etc.** Bearing in mind that SILC, HBS, FSS, LFS etc, are all very different instruments, there are some "overlapping points" that might serve as an opportunity to check the validity of the results. Thus, LFS might serve to compare employment indicators with HBS and SILC. FSS might be used to compare the size and structure of agricultural households etc. These cross-checkings would surely have many issues, which should be taken into account when data are analysed and compared.

• Finally, if benefits are higher than costs, **SORS might consider integrating several additional questions in Farm Structure Survey that can serve for assessment of income from agriculture and other sources of income.** As already mentioned, FSS is a very detailed survey that interviews almost a quarter of agricultural HH and covers a wide range of quantitative questions referring to production. We believe that it would highly useful to add several more questions regarding income that would additionally create knowledge on agricultural production and can be used for comparison with HBS and SILC. For example, AH might be asked if they have other income sources not related to AH, or to estimate which percentage of agricultural production has been sold and/or consumed within the same HH etc. Based on selling and production prices, some estimation of income from agriculture could be made. While Eurostat uses other instruments (earlier even a separate detailed instrument (Eurostat, 1996)) for assessing income statistics for the agricultural household sector in EU, expansion of FSS survey tool might be a cost-effective solution.

• **Consider switching to gross values in SILC questionnaire (revenues and expenses) instead of net values such as income and loss in agriculture.** If such change would be cost-effective, it would contribute to somewhat higher comparability -- revenues from agriculture can serve for comparison with HBS, and roughly with FSS (particularly in case the previous recommendation would be taken into account). However, switching to gross values would require detailed instructions for interviewers that would be able to remind and explain HH which sub-categories are included in revenues and expenses from agriculture (e.g. animal feed, fertilizers etc.).

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VIII. APPENDICES

APPENDIX 1. OTHER IMPORTANT METHODOLOGICAL CONCEPTS AND TERMINOLOGY

Decile analysis. Decile analysis implies splitting total number of households into 10 equally large groups based on the size of their total disposable income. 1st decile represent one tenth of all households in the sample with the lowest income, and 10th decile refer to those with the highest income. This means that if there was a sample of 10.000 households, there would be 10 groups of 1.000 HH. However, for the purposes of this analysis, deciles could not be divided into groups with exactly the same number of households. It often happens that there are several HH with the same level of disposable income that equals the cut off decile level. Separating HH into 10 equal groups would than mean that we need to arbitrary decide which HH will end up in lower and which one in upper decile. In terms of decile analysis of disposable income that would not make much of a difference. However, since we observe households' characteristics within each decile group, that would make a difference. Thus, we calculate cut off point, and then catch all HH that has income equal or below it. Still, this approach does not lead to high difference in the size of the groups. Maximum difference between groups is up to 1,2%.

The analysis focuses on **equivalised disposable income,** which is defined as "the total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalised adults; household members are equalised or made equivalent by weighting each according to their age, using the so-called modified OECD equivalence scale[41]" (Eurostat). **In order to obtain comparability, OECD-modified equivalence scale is applied both to SILC and HBS income data.** This scale assigns a value of 1 to the household head, of 0,5 to each additional adult member and of 0,3 to each child 14 years old and younger (Eurostat). Each observed disposable income component (e.g. agricultural income or fuel wood as part of own consumption) is equivalized in order to be comparable across households and different decile groups.

All results presented in this study are weighted averages, based on cross-sectional household weights in SILC and household weights in HBS.

Since we focus on agriculture, **it is crucial to define an agricultural HH.** Neither SILC nor HBS have a definition of agricultural HH. In order to be able to compare SILC and HBS to FSS results, we separate three types of HH dealing with agriculture: (1) agricultural HH (which is a subset of type 1); and (2) commercially oriented agricultural HH (which is a subset of AH). More info in the following part:

41. *For modified OECD equivalence scale, see page Methodology section.*

1) Agricultural household.

- **Agricultural household (FSS).** FSS defines agricultural HH as is technically and economically independent production unit that has single management and at which a company, agricultural cooperative, institution or other legal entity, unincorporated enterprise or family agricultural holding conduct agricultural production as their primary or the secondary activity. More precisely, FSS defines an agricultural HH as one that utilise either land larger than 0,5 ha, utilise less than 0,5 ha but has intensive crop, fruit etc. production, or have certain number of animals on a HH (e.g. two cattle). This definition excludes HH with marginal agricultural production. As mentioned on page 28, 27% of HH are HH with agricultural production (even marginal), while 23% of HH can be labelled as agricultural HH (SORS data).

- **Agricultural household (SILC and HBS).** In order to have sufficiently comparable results to FSS, we define agricultural household as a household with agricultural production located in other then urban area (HBS), and a household with agricultural production located in intermediate and thinly populated area (SILC) that have total income from agriculture higher than 1.000 RSD. In case of SILC, loss in agriculture is added in absolute terms. That way we do not exclude agricultural HH that faced loss. Finally, we exclude urban area, since we assume that the largest share of households with agricultural production in this area would not fulfil criteria for agricultural HH in FSS, thus households located in urban area (HBS) and in densely populated area (SILC) were excluded from households with agricultural production. For example, we want to avoid including a HH in urban are that has COP related to one apple tree in their backyard.

2) Commercially oriented agricultural household (FSS, SILC and HBS) – refers to agricultural HH (as previously defined for each instrument) that sell any level of their agricultural production. This does not indicate the level of commercialisation, but rather tend to distinguish HH that sell part of their production from those that have it solely for own consumption.

APPENDIX 2. TYPOLOGY OF AGRICULTURAL HOUSEHOLDS (FSS)

Agricultural households significantly differ based on the level of agricultural production and the level of commercialisation. These basically affects the level of household income coming from agriculture. In broader terms, this income can refer both to income from sale, and non-monetary income from consumption of own agricultural production. As it will be elaborated later, vast majority of households sell some amount of their agricultural products (Table 16). However, these varies from a sporadic and marginal sale to a large, highly organised and commercially oriented production. Some AH has agricultural production only for their existential needs, and sell or present some products only occasionally. On the other hand, there are other households that have larger, sometimes very modernised, more productive agricultural production, that is a source of much larger income.

In order to better understand the structure of agricultural HH, we introduce a likely typology of AH. This typology is based on existing classification of agricultural households according to their size class (level of standard output of AH). FSS estimates standard output (SO) as an annual measure of total agricultural production of an AH in producers' prices, and might be used as a proxy of agricultural production. FSS methodology recognise 14 groups of AH. For the purpose of this study, CEVES aggregated these groups into four likely types of agricultural households:

- **Type 1.** Small, family and elderly agricultural households, dominantly oriented on agricultural production for own consumption (SO < 4.000 EUR)
- **Type 2.** Small, family agricultural households, with moderate commercial orientation (4.000 <= SO < 8.000 EUR)
- **Type 3.** Medium, family, commercially oriented agricultural households (8.000 <= SO < 100.000 EUR)
- **Type 4.** Large commercially oriented agricultural households (SO >= 100.000 EUR)

- **Type 1. Small, family and elderly agricultural household**
(289 thousand AH -- 51% of total)

The largest share of agricultural HH refers to small, family households, that usually have agricultural production dominantly for own consumption. These AH have small utilized size of land of only 1,7 ha on average. The annual level of agricultural production is up to 4.000 EUR, and on average 1.945 EUR per AH. This includes entire production regardless whether it was sold or not. To illustrate, this level means that an average household with mixed production, can have 2 cows, milk, vegetables and fruit production dominantly for own consumption. These households are dominantly consisted of old-age households whose holder is older than 55 years[42] (even 75% of AH), and beside him/her there is on average one more person (Table 16). These households usually sell a small fraction of their products, but due to the low level of production, they can earn relatively low amount of money.

Based on FSS, even half of total number of agricultural AH in Serbia belong to type 1. This means that 51% of AH rely on agriculture dominantly for own consumption (sometimes out of necessity), but can have marginal, usually sporadic income from sale (Table 16). **However, we cannot determine if these households rely solely / dominantly on agriculture, or have other sources of income.** On the other hand, we assume that majority of AH within the lowest deciles in terms of disposable household income is of type 1 (or in some cases type 2).

42. *Even 46% of AH have a holder 65+ years old, which is much more compared to other AH types.*

Table 16. FSS: Structural characteristics of agricultural households' types

Selected list of characteristics	Total	Type 1	Type 2	Type 3	Type 4
Number of agricultural households (thousands)	564.5	288.9	213.3	60.0	2.3
% in total number of households	100.0	51.2	37.8	10.6	0.4
Average size of utilized agricultural area (ha)	6.2	1.7	5.3	19.3	310.5
Average number of persons per AH	2.3	2.0	2.6	2.9	3.1
Average number of family members per AH	1.3	1.0	1.6	1.9	1.9
Average agricultural production					
Average standard output per household (EUR)	8,611	1,945	7,683	28,550	416,373
Average standard output per annual work unit (EUR)	6.7	2.9	5.4	13.3	59.5
Structure of AH based on age**					
Young-age households (up to 35 years)	3.3	2.1	3.5	7.9	10.3
Mid-age household (35 - 54 years)	28.6	23.4	30.1	47.0	55.3
Old-age households (55 years and more)	68.1	74.5	66.4	45.0	34.4
Market orientation of agricultural HH					
Own consumption higher than 50% of their agricultural production (% in total number of type)	16.9	20,8	16,2	1,2	0,0
Regional distribution	100.0	100.0	100.0	100.0	100.0
Belgrade	5.3	5.5	5.1	5.3	2.9
Vojvodina	22.5	18.5	21.1	44.8	71.8
Šumadija and Western Serbia	43.0	42.5	46.1	35.3	17.4
South-East Serbia	29.2	33.5	27.7	14.6	7.9
Belgrade	100.0	53.2	36.0	10.6	0.2
Vojvodina	100.0	42.2	35.4	21.1	1.3
Šumadija and Western Serbia	100.0	50.6	40.5	8.7	0.2
South-East Serbia	100.0	58.7	35.9	5.3	0.1

Source: CEVES' calculation based on secondary data of FSS 2018 (data for 2018). All data are weighted averages.

Notes: ***** *Number of persons includes all individuals engaged in agricultural production on observe agricultural households, including head of AH, AH family members, employees on AH.* ****** *Age groups are based on the age of agricultural HH manager* ******* *Potential average income from agriculture assumes monetary value of income per person that could be obtained on the monthly level if entire standard output of household was sold or used for own consumption. It is calculated as 8,7% of standard output (the assumption that earning from agriculture after costs have been extracted is 8,7% of total standard output value), divided with 12 months and number of AH persons. This is preliminary, only to provide very rough order of magnitude of income.*

• **Type 2. Small, family agricultural households, with moderate commercial orientation** *(213 thousand AH -- 38% of total)*

Second type refers to small, family AH that have agricultural production large enough to have some commercial activities. They are more inclined to produce also for sale, and not only for own consumption. These AH have three times larger utilised agricultural land (5,3ha) and four times larger agricultural production compared to AH type 1. Still, even though this production can bring relatively solid potential income, it is still not commercially oriented at a scale of type 3 or type 4. Like type 1, these AH are dominantly located in Šumadija and Western Serbia, and South and East Serbia. And also similar to type 1, they are seldom specialised and more often have mixed agricultural production (62% of AH type 2).

• **Type 3. Medium, family commercially oriented agricultural households** *(60 thousand AH -- 11% of total)*

Unlike previous two types, third type are family agricultural households that have agricultural production fully commercially oriented. They are much more productive, and almost all AH sell more than 50% of their entire production. They cultivate large agricultural land (19ha on average) and have annual agricultural production of about 29 thousand EUR. Thus, income from agriculture for these AH is significantly higher compared to previous two types. These AH are located in Vojvodina and Šumadija and Western Serbia.

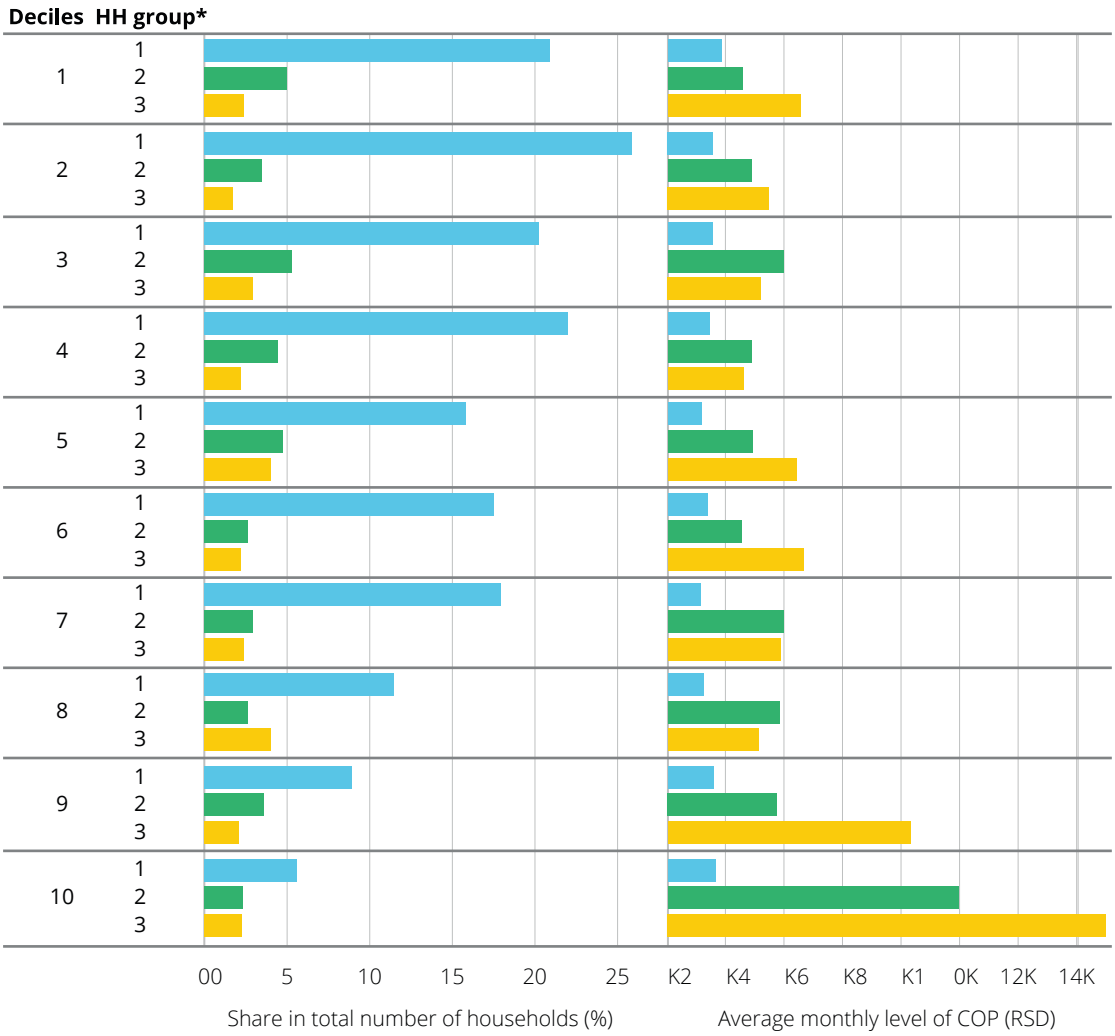
• **Type 4. Large commercially oriented agricultural households** *(2,3 thousand AH -- 0,4% of total)*

The smallest share of households refers to large commercially oriented households, that annually have agricultural production larger than 100 thousand EUR. Lion's share of these refer to AH with production level up to 250 thousand EUR (72%), while only 2% have production higher than 1 million EUR. These are also dominantly family households, but in type 4, family households usually have agricultural production up to 250 thousand EUR. 64% of AH with agricultural production larger than 250 thousand EUR are legal entities, while remaining are family households. On average, AH have agricultural production of 416 thousand EUR. Unlike type 1 and type 2, these 77% of these AH are specialised in either plant or animal agricultural production (53% and 24% respectively). These AH are dominantly located in Vojvodina (72%), while 17% of AH is in Šumadija and Western Serbia. These households are usually led by younger and mid-age individuals up to 54 years (66% of AH). They cultivate large agricultural land of 311 ha on average.

APPENDIX 3. POTENTIAL DOUBLE COUNTING ISSUE - COP

Splitting COP into two parts in SILC (HY170 and withdrawals) might lead to potential overestimation of COP due to potential issue of double counting. This issue originates in questionnaires, which might not be sufficiently clear in differentiating these two parts. Namely, questions regarding COP are found in two different questionnaires. Question related to withdrawals is in questionnaire for HH members, and questions regarding HY170 in questionnaire for HH as a whole. This way, if interviewer is not explicit enough in splitting these two types of COP, HH might report the same or similar level of COP twice.

Figure 13. SILC: Share of COP households' type in total number of households (%) and the average equivalised monthly value of COP (RSD)



Source: CEVES' calculation based on primary data of SILC 2017 (data for 2016)

*Notes: *Groups of households refers to the COP: HH Group 1: HH has only COP (HY170); HH Group 2: HH has only withdrawals from sale of AP; HH Group 3: HH that have both HY170 and withdrawals from sale of AP.*

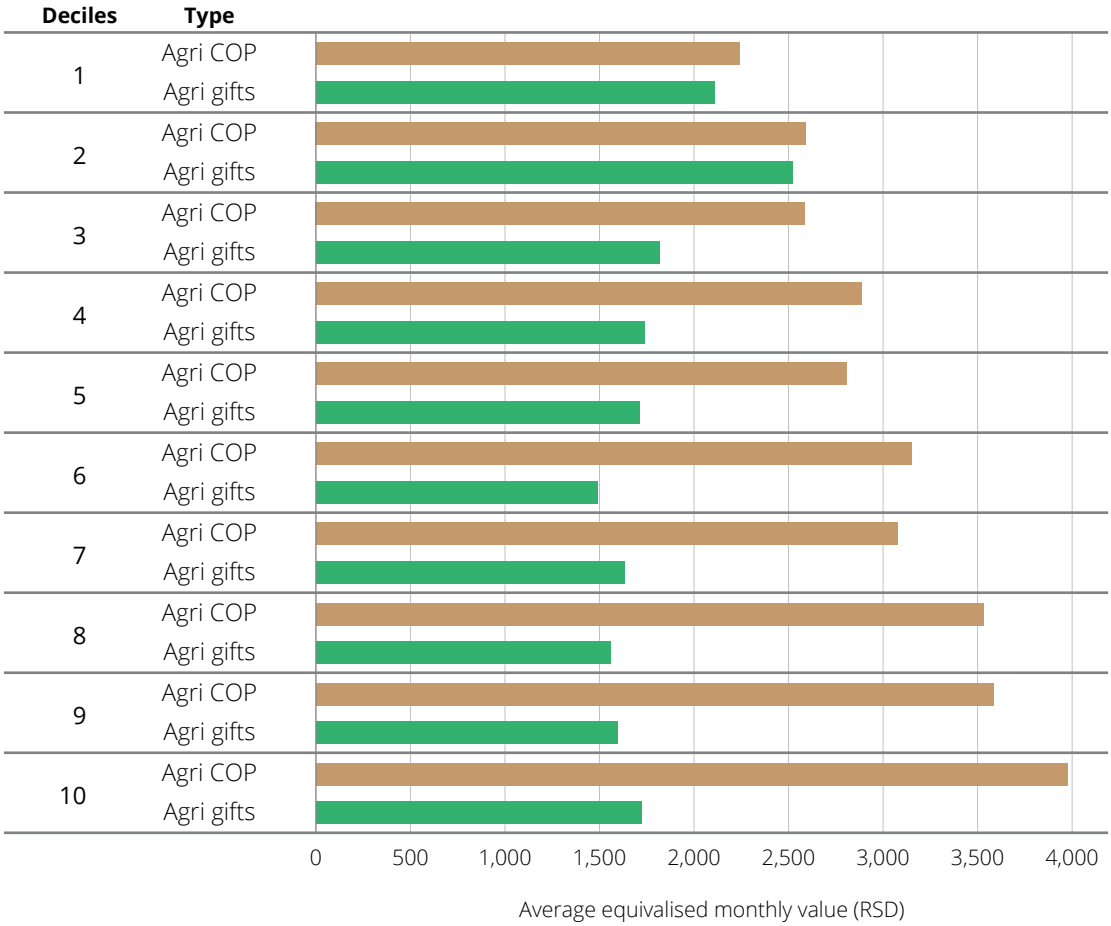
Potential issue of double counting in SILC is reflected in higher values of COP in HH that reported both HY170 and withdrawals in some deciles. Referring to this issue, we created three groups of households based to their response regarding consumption from own production in SILC (Figure 13). The 1st and the largest share refers to those reporting agricultural production solely for their own consumption (HY170). The 2nd group refers to those that reported only withdrawals from agricultural production intended for sale. And finally, there is a 3rd group of HH, that reported withdrawals from agricultural production intended for sale, but also reported having agricultural production only for own use (HY170). As previously mentioned, this is possible when a HH has commercially oriented agricultural production, but additionally has a green garden only for own use. However, when we observe average amount of COP reported by 3rd group, in some deciles it is at least 50% higher compared to other two groups. We believe that this is less likely. HBS, which has more detailed approach to measuring consumption, indicates that there is a similar level of COP across deciles in HBS. In HBS, average equivalised COP is 2.963 rsd, so it seems that equivalised COP of even 8 thousand dinars in 9th decile is highly overestimated.

APPENDIX 4. AGRICULTURAL PRODUCTS AS GIFTS

Since agriculture represents a significant sector in Serbia, does not surprise that even 24% of households in Serbia receive agricultural products as gifts. Among these, 67% refer to non-agricultural HH. Among HH that receive these gifts, 41% of households refer to urban, non-agricultural HH (particularly in higher deciles). Total share of households that receives agricultural products as gifts is somewhat lower but close to the share of those that have AP as part of own consumption (Figure 14). Even a third of households in two the lowest deciles receive agricultural products as gifts. For those that do receive, that on average represent 15% (1st decile) and 8% (2nd decile) of their total disposable income[43]. Similarly, a quarter of urban non-agricultural households in the lowest deciles receives agricultural products as gifts.

Expectedly, neither SILC nor HBS include agricultural products as presents in total disposable income, but they should also be observed as a separate indicator in order to gain additional insight on basic standard of living of the poorest HH.

Figure 14. HBS: Value of average monthly income from agricultural products coming from COP and gifts (RSD,2016)*



Source: CEVES' calculation based on primary data of HBS 2016 (data for 2016) .All data are equivalized based on OECD modified equivalence scale. All data are weighted averages.

*Notes: *Agricultural products does not include fuel wood.*

43. *This share refers to the total households' disposable income with agricultural products as presents included.*

INCOME OF THE POOREST DECILES
OF SERBIA'S POPULATION,
FOCUS ON AGRICULTURAL ACTIVITIES

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