STUDY

Comparability of implementation of EU SILC survey and its outputs with other data sources providing comparable outputs

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CONTENT

I. Analysis of comparability of implementation and outputs

Introduction .................................................................................................................. 4
1 EU SILC – Statistics on income and living conditions ........................................... 6
   1.1 Description of methodology of creation of database ..................................... 6
   1.2 Description of domains and areas ................................................................. 7
   1.3 List of comparable variables ....................................................................... 8

2 Sources of information for estimation of comparability of implementation and outputs
   2.1 State statistical surveys .............................................................................. 16
   2.2 Administrative data sources ...................................................................... 32

3 Results of comparability of implementation of project EU SILC and other surveys
   3.1 Differences in procedures of data collection .............................................. 33
   3.2 Differences in definitions of variables ....................................................... 37

4 Results of comparability of outputs from individual data sources ...................... 38
   4.1 Demographic variables ............................................................................. 40
   4.2 Social variables ....................................................................................... 43
   4.3 Income variables ..................................................................................... 46

5 Results of comparability of outputs with data from administrative data sources
   5.1 Analysis and comparability of information sources of EU SILC project and relevant external administrative sources .............................................. 51
   5.2 Comparison of outputs of EU SILC project and outputs of administrative information sources ................................................................. 52

Conclusion ............................................................................................................... 61

References .............................................................................................................. 63

II. Alternative approaches to evaluation of data comparability and data quality

Introduction ............................................................................................................... 64

1 Targets of EU SILC project and its realization in conditions of the Slovak Republic .................................................................................................................. 66

2 Dimensions of EU SILC output quality and creation of output in national conditions ................................................................................................................. 68

3 Measurement of income situation and social exclusion of population
................................................................................................................................. 71

4 Characteristics of comparative type .................................................................. 75

5 Additional variables of identifications and evaluation of income differentiation ......................................................................................................................... 79
6 Analysis of poverty – Sen’s coefficients .................................................................................................................. 87

7 Analysis of reliability of primary EU SILC data – Bedford’s law .................................................. 90

Conclusion ............................................................................................................................................................ 95

References ............................................................................................................................................................ 98
I. Analysis of comparability of implementation and outputs

Introduction

Complexity of view of social reality involves using the broadest spectrum of tools to understand. One of these tools, which have the aim to create statistics on income and living conditions, is EU SILC survey. The survey is conducted from 2005 in all 25-member states of the European Union. This survey became reference source of data and information on income, poverty and social exclusion within EU.

As result of effort to improve quality and comparability of all existing results is successive transition from evaluation of results of relevant statistical sample survey to comparison of its results within whole system of data collection. It is related to sample surveys as well as administrative data sources. Within regulation No. 1177/2003, which represent legal framework for EU SILC, there is in article 16 Reports and studies in section 4 listed: „The Commission (Eurostat) shall organise from 2004 methodological studies to estimate the impact on comparability of the national data sources used and to identify best practices to be followed.”

Similarly aspect of coherence is listed in Action plan for improvement of EU SILC. This plan was accepted in conference „Comparison of statistics on income and living conditions: Problems and challenges”, which was held in Helsinki in 2006. As it is mentioned in connection with request for EU SILC comparability: „Key problem, which will involve permanent methodological monitoring, will still emphasise impact of using different sources and especially information from registers versus information based on data collection. In this connection development of systematic cross-sectional validation of results from EU SILC with other data sources such as registers, National Accounts, ESSPROS and other household surveys is important.

In general coherence of statistical information reflects level, in which these data could be successfully linked with other statistical information within large analytical system. Coherence of statistical data includes coherence between different data components, which relate to certain time period, coherence of similar data components in time and international coherence.
There could be used three different approaches in coherence:

1. **Development and using of standard procedures**, concepts, variables and system of classification for all main variables and in accordance with international standards.

2. To ensure with view of the **measurement processes will not lead to inconsistency** between data sources (using generally defined questions, harmonized methodology and system)

3. **Analyse of data each other and view of comparison and integration of data** from different sources. There is included feedback from external users and separately analyse of data in such a way that problems of coherence with actual data are shown.

The aim of the study is measurement of influence of methodology on comparability and quality with respect to recommendations of Eurostat. In compliance with approaches mentioned above there will be applied the third approach, partially there the second approach especially on level of recommendations. Study will be oriented on analyse and comparability of data from EU SILC in relation to other statistical sources, especially to Household Budget Survey (HBS), Labour Force Survey (LFS) and National Accounts and on the other hand it will be centred on external administrative sources.

According to principles of ensuring of quality, statistical using of administrative sources includes:

- using them as a sampling frame or for support of existing sampling frame,
- replacement of data collection, i.e. using of tax information for small enterprises instead of looking for data from survey,
- using them for data processing and imputation,
- direct compilation of tables,
- their indirect using in estimations,
- evaluation of the survey including confrontation of data, i.e. comparability of estimates from survey with estimations from relevant administrative sources).
1 EU SILC – STATISTICS ON INCOME AND LIVING CONDITIONS

1.1 Description of methodology of creation of database

Statistics on income and living conditions EU SILC is carried out in Slovakia from 2005. Regulation Commission No. 1983/2003 specifies uniform content for database. In regard to fact that on the present it is only one statistical survey, which is the source of information on income, poverty and social exclusion, since the beginning specified national requests for collection of variables have been also taken into account without any impact on requirement to international comparability. So existing database comprises of not only target primary and secondary variables and additional variables, but also national variables.

Database is divided into 4 data files (D, R, H and P), which are subject of data transmission to Eurostat. As well there exists database UDB_SR, which comprises of variables collected only on national level, but also variables, which are follow-up in detailed structure and they are source for calculation of selected target primary variables on EU level.

Sample survey EU SILC is based on following basic procedures:
- formulation of questions, on which it is possible to make an answer through data,
- acquirement of principles of data collection, data processing and presentation of relevant data in order to formulate these questions
- choice and using of sufficient statistical method for data analyse
- suggestion and evaluation of results (inferences) and predictions through data
- comprehension of sampling from population and comprehension of the role, which sampling plays in statistical inference

Data from EU SILC are collected from different sources using various ways. Output variables of the survey could be:
- constructed by
• derived from sampling frame
• derived from sampling design
  - specified by interview
  • collected from respondent for whole household
  • collected from household members
  • collection based on proxy.

1.2 Description of domains and areas

Statistical unit is household sharing of expenditures and persons (current and former household members). Individual variables are follow-up within cross-sectional and longitudinal component. Variables of cross-sectional component are source of data, which are related to certain time or time period. Variables of longitudinal component monitor changes in time on individual level. Household members aged 16 and over answer questions in individual questionnaire themselves, in certain cases it is possible to make interview with another household member (i.e. proxy interview).

Households answer questions about basic information (region, household structure, personal identification), incomes (gross and net income components on household level), social exclusion (arrears in connection with housing and non-cash variables of material deprivation of households, physical and social environment), information on labour and housing (e.g. type of dwelling, property, dwelling facilities, housing costs).

On the base of personal interview individuals provide information on demographic character (month, year of birth, marital status, country of birth and citizenship), from area of incomes and their structure, education, labour (current economic status, economic status during income reference period, activity history and calendar of activities) and health (including access to health care).

Main task of this statistical survey is gathering of representative and comparable information on income level and distribution, on level and structure of poverty and social exclusion. As results there are databases of data on income, health, education, employment, housing of individuals and households, including some
demographic information. Obtained information allow objective evaluation, international comparison and analyzing of quality of life of population in regions and individual states of EU.

1.3 List of comparable variables

Comparability of implementation of EU SILC survey and its outputs with other data sources providing comparable outputs is based on creation of list of selected variables from each data source. For each EU SILC variable included into list of comparable variables with variables from other data sources are analysed these differences:
- in methodology of collection of database information for construction of variables
- in definitions of variables
- in estimated values of variables.

Sampling network for EU SILC survey was made in such a way to provide representative values of output variables not only on level of the Slovak Republic, but also for disaggregated groups of households, or persons. Comparison of implementation of EU SILC is mainly aimed at comparison of average values of incomes on national level and also for household groups or group of persons according to following distribution characteristics:

**As the basic distribution characteristic is region specified on level:**
- NUTS1 – Slovak Republic
- NUTS3 – Regions: Bratislavský region
  Trnavský region
  Trenčiansky region
  Nitriansky region
  Žilinský region
  Banskobystrický region
  Prešovský region
  Košický region
Distribution characteristics of households are variables such as structure of household - numbers of:

- household members:
  - 1 to 6 and more household members
- economically active household members:
  - 0 to 2 and more economically active household members
- dependent children in household:
  - 0 to 3 and more dependent children
- economical activity status of head of the household:
  - working
  - unemployed
  - in retirement
  - other inactive person

As distribution characteristics of persons are demographic and social variables such as:

- age group:
  - 5-years age groups
- sex:
  - male and female
- marital status:
  - never married
  - married
  - separated
  - widowed
  - divorced
- education:
  - primary
  - secondary
  - tertiary
- economical activity status:
  - working
  - unemployed
Variables of groups of households, or persons will be calculated and estimated for groups of households, or persons created according to such combination of distribution characteristics mentioned above, for which there are also estimated variables from other data sources.

As result of EU SILC survey there are databases related to income, health, education, employment, housing of individuals and households, including some demographic data.

Representative variables – which can be estimated from database for groups of households, or persons created from defined distribution characteristics - are these following:

- **numbers of households and persons** according to changes in distribution characteristics of households and persons,
- **average household income, or personal income** or average equivalent income per individual income components.

**In EU SILC following income components are collected:**

**Working incomes**

- **Employee cash or near cash income** represents employee income, which is provided to employee for work done on the base of existence of labour relation (state-employment relation, service relation and member relation) in form of wage, salary, remuneration for fulfilment of function and other kind of rewards, which are regarded as income from dependent activity. It includes income from main job, additional job, bounties, share of profits and other cash payments paid by employer.
- **Non-cash employee income** includes only income component related to benefit from using of company car, which is provided by employer to private purposes and
provided with other associated costs (e.g. free fuel, car insurance, taxes and duties).

- **Cash benefits or losses from self-employment** comprise of:
  
  - Net operating profit or loss accruing to working owners of, or partners in, an unincorporated enterprise, less interest on business loans
  
  - Royalties earned on writing, inventions, and so on not included in the profit/loss of unincorporated enterprises
  
  - Rentals from business buildings, vehicles, equipment, etc not included in the profit/loss of unincorporated enterprises.

**Social incomes**

- **Old age benefits** include old-age pension, early retirement pension, pension for extended employment and other periodical and lump-sum cash old-age benefits such as extra payment to the pension, retirement benefits, lump-sum Christmas contribution and others.

- **Unemployment benefits** comprise of unemployment benefit and other periodical and lump-sum cash allowances and benefits such as subsidy on pursuance of graduates´ practise, self-employment activity benefit, job-moving benefit and others.

- **Disability benefits** include disability pension, cash benefits for compensation of extra costs, other cash periodical and lump-sum compensation benefits (e.g. cash transport allowance, allowance on personal assistance, contribution for personal assistant of self-employed person, who is disabled, subsidy to a disabled person for the operation or performance of self-employment activities and others).

- **Sickness benefits** include sickness benefit, allowance for care of family member and other cash benefit, e.g. accidental allowance, lump-sum compensation, remuneration of trouble and hindered social application, accidental annuity and others.

- **Survivors´ benefits** include widow’s and widower’s pension, orphan’s pension, funeral allowance and other periodical and lump-sum cash benefits (e.g. compensation of living costs of survivors, survivors´ accident annuity, lump-sum reparation for survivors of policeman or soldier and others).
- **Family/children-related allowances** include child allowance, parental allowance, maintenance benefit for soldier’s family, lump-sum and regular foster care benefits, maternity allowance, equalising contribution, child-birth contribution and other cash benefits.

- **Education-related allowances** comprise of grants, scholarships and other educational help received by students. Scholarships and similar benefits, which are paid in terms of income of persons situated in material need are not collected in this variable.

- **Social exclusion payments not elsewhere classified** include material need assistance, scholarship for students of elementary and secondary schools, special schools, vocational schools and training centres, social scholarships for university students and other cash benefits (lump-sum and regular cash benefits provided to household by municipality or by other entity). Within material need assistance there is collected information on *benefit for material need assistance* and individual allowances to mentioned benefit: activation benefit, protection benefit, housing allowance and health-care allowance.

**Private incomes**

- **Income from rental of a property or land** refers to the income received from renting a property (for example renting a dwelling – rent not included in the profit/loss of unincorporated enterprises, receipts from boarders or lodgers, or rent from land) after deducting costs such as mortgage interest repayments, minor repairs, maintenance, insurance and other charges.

- **Income received by people aged under 16** is defined as the gross income received by all household members aged under sixteen during the income reference period. It includes e.g. allowance for apprentices.

- **Regular inter-household cash transfers received** include alimony, voluntary alimony and child support, regular cash support from persons other than household members and from households abroad.

- **Interest, dividends and profit from capital investments in unincorporated business** refer to the amount of interest from assets such as bank accounts, certificates of deposit, bonds, participation certificate, debenture bond, bill of credit and etc,
Other income components

- **Housing allowance** refers to help households meet the cost of housing. Within this variable was collected non-refundable contribution from the State Housing Development Fund.

- **Value of goods produced for own consumption** includes amount (value) of goods produced and intended for own consumption of household. Value was calculated on the base of basic market price of these products after deducting direct costs, which were paid in order to their production.

- **Regular taxes on wealth** refer to taxes that are payable periodically on the ownership of land, buildings, dwellings or non-housing spaces by owners (i.e. immovable property tax).

- **Regular inter-household transfers paid** include annual amount paid during the income reference period to other households or individuals, such as: compulsory alimony, voluntary alimony and child support, regular cash support to persons other than household members, regular cash support to households abroad.

- **Tax on income and social insurance contributions** is calculated from employee incomes, incomes from self-employment, incomes from rental of property or land, incomes from capital investments and other incomes (e.g. incomes from occasional activities, occasional rental of chose in possession, incomes from cession of immovable property and others).

- **Contributions to individual private pension plans** include contributions to individual pension plans related to old age, survivors, sickness, disability and unemployment, e.g. those resulted from agreement with supplementary pension insurance company (III. Pillar).

- **Pension from individual private plans** refer to pensions received from individual private insurance plans on the base of existence of pension insurance, which was concluded by individuals independently of their employers or government (III. Pillar).

Data collected in EU SILC are bases for calculation or estimation of following – the most usual comparable – income variables:

- total gross household income
- total disposable household income
- total disposable household income before social transfers other than old-age and survivor’s benefits
- total disposable household incomes before social transfers including old-age and survivor’s benefits
and then
- working incomes
- social incomes
- private incomes
- other income components.

Choice of methodology for estimation of output variable from data of sampling population survey depends on:
- sampling frame and design of sampling network
- type of sampling units
- type of interview
- definition and complexity of output variable.

Different bases of design of estimation of output variables in ensuring their representativeness for chosen groups of households, or persons, should not have evident influence on comparability of values from different sources.

2. Sources of information for estimation of comparability of implementation and outputs

Data sources, from which estimations of variables comparable with results from Statistics on income and living conditions of households are made, can be divided into two groups:
- state statistical surveys and
- administrative data sources from state institutions.

State statistical surveys and also administrative data from state institutions relating to population of the Slovak Republic – so data sources, from which estimations of variables comparable with results from EU SILC are made – have as the main goal to ensure qualified assumptions for estimation of representative variables:
- for whole Slovak Republic and
- for 8 regions.

Generally data sources in population provide representative estimations of follow-up variables:

- **for groups of households** in the Slovak Republic according to distribution characteristics of households
  - number of household members
  - number of economically active household members
  - number of dependent children in household
  - economical activity status of head of the household

- **for groups of persons in the Slovak Republic** according to following distribution characteristics of persons
  - 5 years age groups
  - sex
  - marital status
  - education
  - economical activity status

From EU SILC and other sample population surveys variables for households, persons or regions and also for groups of households created from distribution characteristics mentioned above are compared.

Comparable are following variables:

- numbers of households
- numbers of persons

and

- values of selected income components, from which the most important are
  - total gross household income
  - total disposable household income and its components, e.g.
    - working incomes
    - social incomes
    - private incomes
• other income components
• up to selected income components.

2.1 State statistical surveys

Following state statistical population surveys provides outputs comparable with outputs from EU SILC:
   a) Population and Housing Census and demographic statistics
   b) Household Budget Survey (HBS)
   c) Labour Force Survey (LFS)
   d) Earnings statistics (Enterprise Statistics on Labour)
   e) European System of National and Regional Accounts.

Comparability of EU SILC implementation with other statistical surveys involves comparison of relevant methodologies and variable definitions.

a) Population and Housing Census and demographic statistics

Demographic statistics together with periodical Population and Housing Census and system of additional population surveys ensure determining share of information on population as a whole, its distribution, status, structures, but also characteristics in concrete time period.

Population and Housing Census belongs to the most important and the most large-scale statistical surveys, which is traditionally carried out in ten years intervals in Europe, but also in other countries all over the world. Censuses conducted around 2000 were prepared with harmonisation of standard methodological recommendations by relevant international organizations OSN and European Union compiled on the base of UN Economic and Social Council resolution No. 1995/7 of 19 July 1995. Consequential document was Recommendations for the 2000 censuses of population and housing in the ECE region. The Population and Housing Census in the Slovak Republic was prepared and conducted in compliance with the above-mentioned recommendations and according to Act No. 165/1998 Coll. of 12 May 1998 on 2001 Census of Population, Houses, and Dwellings.
Population

- **Permanently resident population** includes all those who had permanent residence in the territory of Slovak Republic at the time of census enumeration regardless of whether or not they were present in their permanent place of residence at the time of census enumeration. If they were not present in their permanent place of residence at the time of census enumeration, they were counted as resident persons, but temporarily absent ones.

- **Present population** includes all those who were present in the territory of Slovak Republic at the time of census enumeration. If they were not present in their permanent place of residence at the time of census enumeration, they were counted in the place of their temporary residence as temporarily present persons.

- **The permanent place of residence of a person surveyed** is the place (district, municipality, house, dwelling), where the permanent residence of the person counted has been registered.

- **The population age groups** defined by relationship to the economic activity:
  - persons under 14 were included into **pre-reproductive age**
  - persons aged 15-64 were included into **reproductive age**
  - persons aged 65 years and were included into **post-reproductive age**

- **Marital status** was surveyed according to legal status. De facto marriages (common-law husband, common-law wife) were surveyed only in regard to the relation to the dwelling occupant and to the heads of household sharing of expenditures and census household.

- **Citizenship** was surveyed according to the legal relation of the inhabitant to the state. In general, children aged under 15 acquired citizenship by their parents. If the parents’ citizenships are different, children acquire citizenship upon their mutual agreement. In the case of dual citizenship, both citizenships were indicated.

- **Educational attainment** reflects the highest grade of completed by an individual.

- Economic activity status
  - People are considered to be **economically active** if they have, at the time of census enumeration, labour, membership, service or similar relations to a
certain organisation, co-operative, private person, or other legal entity, i.e. employers, contributing, unemployed, self-employed persons, regardless of time spent at work.

Also, persons in military service, substitute or civilan service, on military training, in custody and in execution of punishment were counted as economically active as long as they had a labour relation, as well as persons on maternity (parental) leave, provided they had a labour relation.

- **Unemployed persons** comprise of individuals aged 16 and over who were out of work at the time of census enumeration, actively looking for work, and immediately available to start work.

- **Persons not in labour force** are all persons aged 16 and over whose subsistence depended on one household member and persons not participating in a working process at the time of census enumeration. For example, persons raising children, extramural university students and unemployed graduates from secondary schools and universities, unless they had been actively looking for work, were included here.

- All pension beneficiaries are considered to be pensioners, with the exception of children aged under 16 and full time students or apprentices. Children aged under 16, apprentices, and students receiving pension are counted as pensioners only if the pension is their only source of income. Employed pensioners are also included in the category of pensioners.

- People are classified as dependent if their subsistence depends on the breadwinner (economically active or inactive household member with his/her own source of living). Dependent persons include children aged under 16, apprentices, students attending secondary schools and universities, and persons not in labour force without their own source of income.

- Data on occupation serve to determine a particular activity (last) performed by an individual, which has been or was a source of his/her income. The denomination of the occupation was based on functional classification (technical and administrative functions) and by classification of occupations (worker professions).

- Non-employed pensioners, unemployed persons, persons in military service, substitute or civilian service, on military training, in custody and in execution of
punishment, and persons on maternity (parental) leave indicated their last occupation.

- **Social group** was surveyed on the basis of employment status, type of economic activity, and type of remuneration for the work done. Non-employed pensioners, unemployed persons, persons in military service, substitute or civilian service, on military training, in custody and in execution of punishment, and persons on maternity (parental) leave indicated the social group according to their last occupation.

- The social group of **employees** includes persons in paid work receiving wage, salary or other kind of remuneration. For these persons, the sector of national economics, in which the given persons were working was also surveyed – state, cooperative, private or other employer.

- People are classified as **members of production co-operatives** if they have a membership relation to production, agricultural, or other co-operatives. Neither the employees of these co-operatives nor members of consumption co-operatives were included here.

- The social group of **entrepreneurs with employees** and **entrepreneurs without employees** comprises of persons registered in companies’ register, in Trade Licence Register, and persons conducting business on basis of special regulations.

- The group of **contributing (unpaid) family workers** includes persons working on a basis other than a labour relation basis.

- **Jointly managed households** and census households
  The relations between persons living in the same dwelling served as a basis for processing the census and jointly managed households.

- **Census household** includes all related or unrelated persons living together in one dwelling within one household sharing of expenditures. It is a basic unit not to be divided further.
Census households comprise of:

- **family households, whose comprise of:**
  - **complete family** - married couples (or common-law partners) without children or with children (regardless of their age, unless the adult children constitute a separate census household);
  - **incomplete (single-parent) family** - one of parents with at least one child (regardless of child’s age, but taking into account joint management);
- **other households**
  - **a) non-family (group) household**, consisting of two or more jointly managing persons, relatives or non-relatives, who, however, do not constitute a family household;
  - **b) one-person household** one natural person occupying the dwelling either alone or as subtenant or together with another census household, but managing independently.

**Subtenants** have always constituted a separate census household.

- **Jointly managed households** consist of persons living together in one dwelling and jointly covering the greater part of main household expenditure (housing, food, household maintenance, heating, electricity, gas, etc.). The amount of shared household expenditure coverage is not relevant. A jointly managed household can also consist of one or more census households. The data on jointly managed household were processed on the basis of declarations on joint management made by persons surveyed. Households of subtenants are always referred to as independently managed households.

**Jointly managed households and census households** are made up of people permanently resident in dwellings or units other than dwellings. Households are represented by persons with temporary residence in the dwellings due to work or study in case they were the only dwelling occupants.

**Dwelling household** is made up of persons living together in the dwelling.

Houses and dwellings

- As **house** was regarded each separate house intended for living with its own house number, each separate residential or occupied building with a private
entrance, though without its own number (adjacent building), other buildings (dwellings), in which someone lived or overnighted at the time of census enumeration.

- **A permanently occupied house** is a house with at least one permanently occupied dwelling or where an accommodation establishment with at least one permanently resident person is placed.

- A **family house** is a building designed for family living with a private entrance from the public road; it may consist of a maximum of three dwellings, two aboveground floors, and an attic. The tenure status is not relevant. Cottages used for recreational purposes are also included here.

- A **multi-dwelling building** is a building intended for living made up of four and more dwellings accessible from a common hall or staircase, with common main entrance from outside. The number of storeys is not relevant. Villas not satisfying the criteria for being classified as family houses are also included here.

- An **unoccupied house** shall mean a house intended for living with no permanently occupied dwelling at the time of census enumeration.

- An **accommodation establishment without dwelling** is a hotel, hospital, college dormitory etc. with no dwellings and with no persons registered for permanent residence.

- **Construction or reconstruction period** is the date on which the building was inspected and approved (house/flat inspection).

- A **dwelling** is a group of rooms or a single room with bathroom and lavatory, arranged to a functional unit with a lockable door and designed for permanent living.

- A **permanently occupied dwelling** is a dwelling in which at least one person has a permanent residence or in which the occupant has a temporary residence due to work or study. Dwellings, whose occupants are temporarily absent, even for a longer period of time, are also considered permanently occupied.

- An **unoccupied dwelling** is a dwelling with no occupiers at the time of census enumeration. Also a dwelling where the reason for un-occupancy is not stated shall be classified as unoccupied.
Dwelling characteristics

- **Total floor area in sq. m** is the total floor area of all rooms, kitchen and habitable rooms with accessories (entrance-room, hall, store-room, corridor, bathroom, lavatory) excluding the area of balconies or terraces.

- **Habitable floor area in sq. m** is the total floor area of all habitable rooms with an area of more than 8 sq. m excluding the kitchen floor area. Only the part of the kitchen floor area that exceeds 12 sq. m shall be regarded as a part of the habitable floor area. If the kitchen is the only room in the dwelling, its total area is included in the habitable floor area.

- **Kitchen floor area in sq. m** is the area of a room (kitchen) intended, due to its equipment and arrangement, for food preparation, separated from other rooms by a wall or in another way (thus not being a part of other rooms).

- A **habitable room** is a room, which can be aired directly, exposed to light, with a direct or sufficient indirect heating and, due to its arrangement and equipment, designed for year-round living. The number of habitable rooms with the floor area over 8 sq. m is indicated. If the kitchen is the only room in the dwelling, its total area is included into the habitable room floor area.

Dwelling categories

- **1st category** - dwellings with central, remote or single-storey heating and complete basic amenities are taken into account

- **2nd category** - dwellings with heating as mentioned above, without their own basic amenities, or dwellings with their own basic amenities, without heating as mentioned above are taken into account

- **3rd category** - dwellings without heating as mentioned above, with either bathroom or flush toilet are included here

- **4th category** - dwellings without heating as mentioned above, without basic amenities or with insufficient basic amenities are included here.

Demographic statistics

- Demographic statistics depends on results of relevant Population and Housing Census. In whole Slovak Republic there is used procedure of balancing of development of population in period between two Censuses (re-balancing of
results from Census retrospectively to the 1 of January of the year, in which Census is carried out and subsequently yearly balancing of development of population is made up to the next Census).

- Data are retrospectively adjusted after subsequent Census in spite of the fact that through Census there are found different numbers as are found by statistics on Development of Population. This difference is caused by that the method of self-enumeration is used and not all inhabitants meet the obligation to provide information in Census. Other difference in data results in system of statistical survey on movement abroad, when it is the same case that moving inhabitants do not always meet the obligation to register in registration office or in Bureau of Border and Alien Police in case of foreigners.

- However results of Census are base for balancing of numbers and structure of population in period between Censuses.

Collection and data processing of demographic statistics are based on individual reports on individual demographic events for each Slovak citizen as well as for each foreigner granted permanent residence permit in the Slovak Republic. They are:
- OBYV 1-12 (Statistical Report on the Conclusion of Marriage)
- OBYV 2-12 (Statistical Report on Birth)
- OBYV 3-12 (Medical Report and the Statistical Report on Death)
- OBYV 4-12 (Statistical Report on Divorce)
- OBYV 5-12 (Statistical Report on Change of the Address of Permanent Residence/Report on Migration)

b) Household Budget Survey

Household Budget survey (HBS) provides information for analyses of living standard and social situation of private households, especially information on development and structure of their expenditures and incomes. In the Household Budget Survey, international classification of individual consumption by purpose of usage was applied up to year 2003, as required for HBS by Eurostat (COICOP-HBS), which is published in "Household Budget Surveys in the EU: Methodology and recommendations for harmonisation, 1999". In case of income components, the survey followed Regulation (EC) No 1177/2003 of the European Parliament and of
the Council concerning Community statistics on income and living conditions (EU SILC).

**Incomes and expenditures of households** were collected on regular basis – annually – from sample of selected households (around 0.1% of households of Slovakia). As weights we used quota coefficients, which took into account expected size of group in structure of all households in the Slovak Republic and number of months for which households participate in survey. Quota criteria were: region (8 groups); social group of households, which was defined by social membership of head of the household (5 groups); net monetary income per person and month (2 groups); number of dependent children in households with economically active head of the household (4 groups), or number of members in households of pensioners (2 groups) and sex in one parent pensioner's households.

Since 2004 random sampling has been used in HBS for creation of sampling network and Eurostat recommendations for harmonisation of surveys in connection with data collection for 2005, listed in updated document "Household Budget Surveys in the EU: Methodology and recommendations for harmonisation, 2003" were implemented in HBS. Since 2005 sampling network has represented about 0.3% of households in the Slovak Republic.

**Private household** in Household Budget Survey is comprises of one or more persons meeting two basic conditions:
- they live together in the same dwelling (residence) and
- they share expenditures, especially those ones related to housing and catering.

Eurostat recommendation is to use similar definition of household incomes in HBS as is used in EU SILC. In order to obtain sufficient information on expenditures in Slovak households with self-employed member also in HBS, incomes from self-employment are collected only up to the amount, which is used for household needs (purposes).
In Household Budget Survey there are collected and estimated following components:

- **gross money income** - represents the sum of employee income, amount as part of income from self-employment used for household purpose, social income, property income and other money income including loans.

- **net money income** - is calculated from gross money income deducting tax on income and compulsory social insurance (i.e. contributions to Health Insurance Company and Social Insurance Agency).

**Working incomes**

- **Gross employee cash or near cash income** represents wages and salaries paid in cash for time worked or work done, piece rate payments, enhanced rates of pay for overtime, remuneration for time not worked (holiday payments, trainings and others), supplementary payments (e.g. thirteenth month payment), allowances paid for working in remote locations, fees paid to directors of incorporated enterprises, payments for fostering children (for professional foster care), commissions, tips, profit sharing, bounty, company benefits, payments made by employers to an employee in lieu of wages and salaries when unable to work through sickness, disability or maternity leave where such payment are paid by employer (e.g. payments made by employers to an employee in lieu of wages and salaries for the first 10 days in case of sickness absence), front wages.

- **Other non-cash employee incomes** include wages and income in kind, free using of subject, remuneration and payments of expenditures and others.

- **Cash profits or losses from self-employment (including royalties)** include:
  - cash profits or losses from self-employment (net operating profit or loss accruing to working owners of, or partners in an unincorporated enterprise, less interest on business loans);
  - royalties earned on writing, inventions, and so on
  - rentals from business buildings, vehicles, equipment after deduction of related costs (such as interest on associated loans, repairs and maintenance and insurance charges).
It excludes: Rent from land and receipts from boarders or lodgers listed in part II/5  
Income from rental of a movable and immovable property. A profit from capital  
investments is included into part II/5 Interest, dividends, profits from capital  
investment.

Social incomes
- **Old-age benefits** include following benefits: old-age pension, early retirement  
pension, pension for extended employment, old-age pension and widow’s and  
widower’s pension, pension of the wife, survivors’ benefits paid after reaching  
the normal retirement age, termination payments, other cash payments and  
others.
- **Disability benefits** include also disability pension including payments paid in  
connection with early retirement in case of reduced ability to work before reaching  
standard retirement age, nursing allowance, allowance for personal assistance  
and others.
- **Survivors’ pensions such as** orphan’s pension, widow’s and widower’s  
pension including funeral allowance (without funeral costs).
- **Sickness benefits** include benefits in sickness and nursing benefits.
- **Maternity benefits** or parental allowance.
- **Unemployment benefits** including benefits compensating employees for  
employment ending before the employee has reached the normal retirement age  
by reason of redundancy, benefit in case of retrain, severance and termination  
payments, redundancy compensation, payments in case of mobility and  
resettlement, benefit for extended employment and other.
- **Family-related allowances**, i.e. child allowance, child-birth contribution,  
equalising contribution in maternity and pregnancy, maintenance benefit for  
soldier’s family, reward of the foster parent, tax bonus and other cash benefits  
supporting specific costs reimbursement, covering needs of families in bringing up  
children.

- **Social assistance:**
  - *Education-related allowances are* grants, scholarships and other educational  
help received by students.
• Other social incomes are benefits of social assistance and other cash benefits provided in order to poverty reduction or support in precarious situations.

Property income

- **Interests** from assets such as bank accounts, certificates of deposit, bonds and etc,
- **Interest, dividends** and profit from capital investments in unincorporated business, in which the person does not work.
- **Income from rental** of a movable and immovable property – land, land closed to house, after deducting costs such as mortgage interest repayments, minor repairs, maintenance, insurance and other charges.

Other cash incomes of households

- **Gross incomes from sale of excess produce** from household agriculture activities (stock cattle and fatstock, poultry, meat, meat products, milk, eggs, butter, lard, bacon, legume, cereal products, potatoes, vegetables, fruits, forage crops, soft wines and others) and from sale of worn clothes, furniture and others.
- **Regular inter-household transfers received** – alimony (compulsory, voluntary), regular cash support from persons other than household members.
- **Insurance reimbursements** (paid to household including part of them paid by insurance company directly to organization, which solves insurance event).
- **Other incomes** (supports in case of strike, gains, lump-sum alimony (subsidiary alimony) and other cash gifts, inheritance, benefits in case of using own subjects in order to work for organization – employer.

Income in kind represents the sum of consumption in kind and gifts in kind.

- **Consumption in kind** is defined as immediate consumption of food produced by own household production or own agricultural/food enterprise, consumption of products obtained by picking (fruits) or by hunting.
- **Gifts in kind** represent good and services given to households by other persons or organizations or obtained as remuneration for work done.
Total income is the sum of money income and income in kind.
Gross money expenditures include consumption expenditures and other gross expenditures.
Net money expenditures include consumption expenditures and other net expenditures.

c) Labour Force Survey (LFS)

Labour Force Survey in households is carried out in accordance with international comparable methodology intended for monitoring of situation on labour market. The Statistical Office of the Slovak Republic from 1993 realizes this survey. Concept and methodology is based on definitions and recommendation of International Labour Office (ILO) and corresponds fully with relevant regulations of the ES. The survey is conducted continuously with quarterly periodicity of data processing and dissemination of results. Sample is based on stratified two-stage sampling design and comprises of 10 250 dwellings. All collected data are calculated to actual demographic data on population of the Slovak Republic.

Additional surveys (ad hoc modules) belong to LFS from 2000, which are carried out always for 2-nd quarter of reference year. Content of these ad hoc modules is defined by regulation of ES, e.g. the 2005 ad hoc module on reconciliation between work and family life, the 2006 ad hoc module on transition from work into retirement, the 2007 ad hoc module on accidents at work and work-related health problems.

Comparison of data from EU SILC with data from LFS is based on comparability of definitions and number of follow-up persons, especially recipient of individual income components in EU SILC and LFS.

Recipients of incomes are in LFS defined as:
- Economically active population (EAP) comprise of persons aged 15 and over, who belong to working and non-working persons. From 1997 to 2005 within EAP are included also soldiers performing basic military service.
- **Economically inactive population** comprise of persons who are out of work in reference week, because they are preparing to start working, they are drawing a pension, taking care of family, attending the course to retrain and by reasons mentioned above (or other reasons) they have not been actively seeking job during the last four weeks or they have been but they are not able to start to work in the next two weeks. Also persons on parental leave belongs to this group, persons, who are on long-term unpaid leave and persons, who want to work but they have not been seeking job, because they do not know whether they would find adequate job. Into this group there also belong persons under 15 years old.

- **Working persons** comprise of persons aged 15 and over, who, during the reference week performed at least one hour of work for wage, salary or profit including persons working abroad. It could be job on full-time or part-time basis, permanent job, temporary, casual or seasonal job. The definition of employed persons also includes contributing family workers of self-employed persons; who do not receive any wage or salary and professional members of the armed forces. Up to 2005 as employed persons were also regarded persons in civil service. As employed persons are also taken into account persons, who had a job but did not work due to illness, holiday, maternity leave, training, bad weather conditions, strike and lock-out, with the exception of persons on long-term unpaid leave from work and persons taking parental leave.

- **Employed persons** are those working persons, who performed at least one hour of work for wages, salary in reference week. Members of co-operatives belong here.

- **Self-employed persons** are persons working in his own business (self-employed persons with employees), own-account workers (without employees) and contributing family workers of self-employed persons.

- **Unemployed persons** are defined as those aged 15 years and over, who fulfil the following three conditions:
  
  - did not have any work during the reference week
  - had been actively seeking a job during the last four weeks or who found a job to start within a period of at most three months
  - was able to start to work in the next two weeks.
These persons can but do not have to be registered in employment bureau as job seeker.

Active methods for looking for a job are considered: having been in contact with a public employment office, private agency, asking among friends or relatives, answering job advertisements, applying to employers directly, taking a recruitment test or examination or being interviewed to find work and trying to start own business.

d) Earning statistics

It is aimed at collection of average wages, which give average monthly level of wages of employee in SKK, for whole economics of the Slovak Republic (without income of management and self-employed persons).

**Average monthly income for quarter** includes gross wage, which comprises of basic salary, remunerations, premiums work barriers and pay overtime and other payments, refund of wages and income in kind. Wages in kind include financial value of goods, production and services. Here is included tax on income and social insurance contributions paid by employees (pension insurance, health insurance, sickness insurance, unemployment insurance).

Data are collected quarterly. Sample unit (enterprise) is asked to fill report up to 14-th calendar day after finish of reference quarter.

Earning statistics provide following output variables, which are comparable with EU SILC data:

- monthly number of employees
- wages (salaries)
- employees working full-time and
- employees working part-time calculated to full time employed.

**Methods for calculation:**

Average monthly wages are calculated by averaging of sum of total monthly wage on monthly basis and it is dividing by average daily level of employment rate during quarter. Data are disseminated as average gross nominal month wages.
Processing of missing data:
Method of donor in actual period „hot deck“ is used. Data from missing reports are replaced by information, which was provided by comparable sample unit per actual period. Comparable sample unit is selected according to variable added value, which is the most occurred in relevant stratum, following criteria of the same branch code of two digits and code of size according to number of employees.

Annually data:
Data for whole year are processed through cumulation of data for reference quarters (arithmetic average of year is calculated for number of employees). Yearly volume of wages is calculated according to yearly aggregation of wages.

e) European system of National and Regional Accounts

ESA 1995 or only ESA represents international compatible accounting framework for systematic and detailed description of whole economics (i.e. region, country or group of countries), its components and its relations with other economic systems. ESA 1995 replaces European system of integrated economic accounts issued in 1970 (ESA 1970; second slightly modified publication published in 1978). ESA 1995 is system, which is fully consistent with revised widespread methodology of national accounts – System of National Accounts (SNA 1993, or only SNA; this methodology was formed by Organisation of UN, International Monetary Fund, Commissions of European Communities, OECD and World Bank).
System of ESA is mainly aimed at conditions and needs of data in the European Union (EU). Similarly as System of National Accounts, ESA represents system, which is in accordance with terms and classifications used in many other social and economic statistics. They are especially employment statistics, industry statistics and foreign trade statistics.

System ESA can serve as central reference framework for social and economic statistics of EU and for its member states.
2.2 Administrative data sources

In terms of data traits, which are follow-up within project EU SILC in the present and which could be interesting also for future analytical works, there are considered as relevant products these following institutions’ information:

a) Tax directorate of the Slovak Republic
b) Ministry of Labour, Social Affairs and Family
c) Centre of Labour, Social Affairs and Family
d) National Bank of Slovakia
e) Social Insurance Agency

From large-scale data sets, which are directly observed by institutions mentioned above, these following sources and data are directly comparable with outputs of EU SILC:

a) Tax directorate of the Slovak Republic

<table>
<thead>
<tr>
<th>Data source</th>
<th>Title of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income tax return of natural persons</td>
<td>tax basis</td>
</tr>
</tbody>
</table>

b) Centre of Labour, Social Affairs and Family

<table>
<thead>
<tr>
<th>Data source</th>
<th>Title of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly report of registered unemployment</td>
<td>number of unemployed persons</td>
</tr>
<tr>
<td>Review of number and structure of registered unemployed young persons</td>
<td>number of unemployed graduates</td>
</tr>
<tr>
<td>Benefit to material need assistance and relevant allowances</td>
<td>benefit to material need assistance</td>
</tr>
<tr>
<td>Benefits of state social assistance</td>
<td>benefits of state social assistance</td>
</tr>
<tr>
<td>Specific benefits and cash benefits for compensation of permanent disability</td>
<td>cash benefits for compensation of social consequences of permanent disability</td>
</tr>
<tr>
<td>Subsidiary alimony</td>
<td>subsidiary alimony</td>
</tr>
</tbody>
</table>
Social-legal security contributions for support of foster care of children

c) National Bank of Slovakia

<table>
<thead>
<tr>
<th>Data source</th>
<th>Title of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual report on deposits and loans by regions</td>
<td>quantity of household loans</td>
</tr>
</tbody>
</table>

d) Social Insurance Agency

<table>
<thead>
<tr>
<th>Data source</th>
<th>Title of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly report on premiums and contributions and annex to Monthly report on premiums and contributions Temporary sick leave by reason of sickness and injury List of monthly tables of state, motion and operative pension statistics State pension statistics</td>
<td>number and amount of pensions (in detailed structure) number and amount of pensions</td>
</tr>
</tbody>
</table>

3 Results of comparability of implementation of project EU SILC and other surveys

Comparability of implementation of project EU SILC and other surveys will be evaluated according to size and importance of differences:

- in procedures of data collection
- in definition of variables
- in values of variables.

3.1 Differences in procedures of data collection

Procedures of data collection for population sample surveys in the Slovak Republic have following common basis:
− **Sample unit** for all population sample surveys in the Slovak Republic, i.e. for Statistics on income and living condition, Household Budget Survey and LFS, is household sharing of expenditures (jointly managed households). Selection of them is localized by permanently occupied dwelling.

− **Sampling frame** for each survey comprises of updated information from 2001 Population and Housing Census. Sampling frame is updated through information on new-built dwellings/houses and passed buildings as capable, or defunct dwellings and houses in individual regions.

− **Design of sampling network** of individual surveys is quite different. Random two-stage sampling design is realized, where region and population size of municipalities and communes were strata.

Specifics of individual sample surveys involve *different approaches* in application of following bases:

− Specifying of sample size for individual surveys:
  
  • For *Statistics on income and living conditions* minimum effective sample size in relation to poverty threshold was calculated. According to this condition in Slovakia it is possible to find statistically significant information on income differentiation in the case if selected sample size has higher value than 4250 households.

  • *Household Budget Survey* collects data about expenditures in around 4700 households. Need to collect information during whole year is the consequence of seasonal character of expenditures and consumption. Sampling network 4700 households is thus divided into subgroups, where 400 households from sample network fill questionnaire every month. This fact demands more attention to compile questionnaire and process data on monthly basis to annually, i.e. to create database of annual data and to create outputs.

  • *Labour Force Survey* (LFS) is continuous quarter *sample survey* with rotational panel. Sample population has 10 250 dwellings. Size of rotational component is about 20% of sample population for each quarter, i.e. in each quarter 2 050 dwellings are excluded from sample population and 2 050 „new“ dwellings are included from sampling network prepared in advance.
• Application of sampling network in time, i.e. timetable of individual surveys
  
  • In *EU SILC* information for about 6000 households are collected during short period (one month), reference period is previous calendar year, last 12 months or current situation for most of collected data.

  • *Labour Force Survey* is continuous quarter survey. By practical reasons data are collected continuously (in each month) during reference period, however this fact does not have any influence on creation of database, estimation of output variables and etc.

  • In *Household Budget Survey* data are collected every month. Sample of selected units is changing from month to month, each of them comprises of subgroup of households derived from sampling network prepared in advance, which is representative for whole Slovakia. Annual data are created from monthly data. Calculation of monthly data to annul data is done on the base of individual methodology.

  On the present bases for changing of design of sampling network are prepared. That application of rotational panel is suggested, which would use experience of sampling network, especially in the case of LFS but also in EU SILC.

• Methodology for creation of data of annual database

  Each survey is calibrated to total number of households, or persons in the Slovak Republic according to data from actual Development of Population. However individual surveys do not use identical calibration variables.

  Calibration variables for data from *EU SILC* are numbers of persons in 5-years age groups by sex in individual regions. Additional calibration variables are qualified estimations of household numbers by number of persons in each regions.

  • Calibration variables for data from *HBS* are household numbers by number of persons in individual regions and additional calibration variables are numbers of persons by sex in individual regions (without taking into account age structure) according to Development of Population.
• *LFS* uses more types of weights. Base calibration weights are numbers of persons by age-sex structure in individual regions according to Development of Population.

- **Methodology of weights design**
  - In *EU SILC* **integrated weights** are calculated. Using calibration variables *number of persons* (by 5-years age groups and by sex in regions) personal weights are calculated and on the base of them average per household is calculated. Additional calibration variables (qualified estimation of household numbers in regions by number of members) are used for calculation of household weights. Then, using shorter linear method, where g-weights are limited by fixed values determined ahead, integrated weights for each household identical to each household member weight are calculated.
  - In *HBS* household weights are calculated using calibration variables. These weights are adjusted using iteration method in such a way that total numbers of persons by sex in individual regions are to be achieved.
  - Data from *LFS* are calibrated to number of persons in individual regions.

The fact that data from individual population sampling surveys in Slovakia are calibrated using different calibration variables and different methods, it has influence on comparability of outputs of subgroups of households and persons.

However each survey is calibrated to total number of population in Slovakia according to relevant data from Development of Population and thus values of output variables for the Slovak Republic should not represent statistically significant differences.

- **Interview methodology**
  - Questionnaire for EU SILC is created in such a way that questions aimed at demographic and social matters of household and persons are related to concrete (unified) date for each sample unit and questions connected with incomes are related to previous calendar year.
• Sample units for HBS fill questionnaire for relevant month, i.e. demographic, social and economic data are collected for that month, for which household is part of sampling network.

• Sample units for LFS fill questionnaires for more months by reason of sampling network is based on rotational base.

− Methodology for creation of administrative data sources

• Centres and central bodies create administrative data sources by processing of data, which are recorded in individual regional offices.

3.2 Differences in definitions of variables

The most significant differences, which make impression of using of ambiguous definitions, are mostly caused by:

- differences in reference period and also in time of interview (data collection)
  • the later after reference period is data collection, the higher probability of some mistakes is in answer
  • the longer is period, whose questions are related to (whole previous year, quarter, month, short period within reference period and etc.), the higher probability of inaccurate answer is

- differences in definiteness of asking question
  • it is related to questions about aggregated income components on certain level, e.g. content of working incomes or social incomes. If we ask about each income component, probability of inaccuracy in answers is lower. In general calculated aggregated income components are more comparable than aggregated components collected directly.

„COMMISSION REGULATION (EC) No 1980/2003 of 21 October 2003 implementing Regulation (EC) No 1177/2003 of the European Parliament and of the Council concerning Community statistics on income and living conditions (EU-SILC) as regards definitions and updated definitions“ is applied for definition of household not only for EU SILC survey, but also for sample survey HBS and LFS.
If there are some differences in definitions of demographic and social variables of persons and households, these ones are not so important and they meet requirement of specified content goal of this survey. Some surveys involve, but not in all surveys, using of detailed classification of variable, in some of them using of value on aggregated level is sufficient.

**Household incomes** in EU SILC and also in HBS result from valid regulation intended for EU SILC. Thus differences between outputs related to income components are not caused by definitions of individual components.

Some differences could be or are caused by differences in wording of questions about observed variable and differences in organization of way of making interview.

For example in EU SILC level of incomes are filled by interviewer after asking question about concrete income component, in HBS values are filled by sample unit, i.e. these values are recorded in tables in relation to title of individual income component. Similarly it is in filling of demographic and social characteristics also in relation to LFS.

**Most of collected variables are defined in accordance with recommendations of Eurostat.** Differences are in details of collection of income variables. In EU SILC income components are collected on the lowest level and in most cases concrete values for period determined exactly are collected. HBS is mainly aimed at observation of detailed expenditure structure in compliance with COICOP classification and income components are collected mainly in order to check and determine limited values for expenditures. The consequence is that total income components, such as working components, social components, income on property, etc. do not take into account those similar and equally defined components and also components collected in similar way.

**4. Results of comparability of outputs from individual data sources**

In EU SILC there are collected data, of which estimated variables can be divided into three basic groups:

- demographic variables
- social variables
- income variables.

Estimated values of individual variables depend not only on plausibility of data sources – of which variable is constructed – but also on sensible decision on technical tool and appropriate application of individual recommendations of EU SILC project.

- So accuracy of estimated variables is not only isolated, e.g. consequence of inaccurate estimation of demographic variables is also inaccurate of income variables for individual household groups or persons.

- In other words, inaccuracy of estimated variables depends not only on accuracy of values collected during fieldwork, but also on choice of parameters and calibration variables used in weighting. Not less important is choice of appropriate weighting method and technical solution of application of chosen method, etc.

Main calibration variables of EU SILC data weighting in Slovakia are number of persons in 5-years age groups according to sex in individual regions (Source: Development of Population) and additional ones are numbers of households by number of persons in regions (Source: Qualified estimation – Research Demographic Centre).

It is deal that:

**Accuracy and comparability of demographic variables from EU SILC is necessary assumption for comparability of social and income variables.**

Comparability of estimated values of EU SILC variables is evaluated as:
- first, comparability of demographic variables is evaluated (those variables, whose accuracy has influence on comparability of social variables) and
- then, comparability of income variables in relation to holder of incomes, whose comparability is accepted, is analyzing.

Comparability is realized on the base of EU SILC data, approved by Eurostat, i.e. data per years 2004 and 2005. Forasmuch as methodology of collection and data processing of EU SILC and comparability of data sources did not change in 2006, assumption is that comparison with year 2006 would give similar results.
4.1 Demographic variables

Table 1: Number of households and persons in the Slovak Republic

<table>
<thead>
<tr>
<th></th>
<th>SILC_2005</th>
<th>Other source</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households sharing of expenditures</td>
<td>1 858 476</td>
<td>1 900 344</td>
<td>2001 Census 2001, the SO SR</td>
</tr>
<tr>
<td>Persons</td>
<td>5 384 822</td>
<td>5 382 574</td>
<td>Development of Population, SO SR,2004</td>
</tr>
<tr>
<td>Working full-time</td>
<td>2 227 503</td>
<td>2 170 350</td>
<td>LFS, SO SR, 2004</td>
</tr>
<tr>
<td>Working part-time</td>
<td>61 602</td>
<td>56 800</td>
<td>LFS, SO SR,2004</td>
</tr>
<tr>
<td>Unemployed persons</td>
<td>299 800</td>
<td>427 500</td>
<td>LFS methodology, SO SR,2004</td>
</tr>
<tr>
<td>In retirement</td>
<td>1 133 473</td>
<td>1 465 225</td>
<td>Disposable unemployed, methodology CLSAF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Paid old-age benefits, of which:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Old-age pension, which are paid concurrently</td>
</tr>
</tbody>
</table>

- Number of households sharing of expenditures in data file EU SILC 2005 is by 2,2 % lower than relevant qualified estimate of Research Demographic Centre. This fact is caused by methodology of design of integrate weights and limit parameters in using short linear method.
- From EU SILC 2005 average number of working full-time is by 2,6 % higher and average number of working part-time is by 8,4 % higher than on the base of LFS in relevant period.

Average number of unemployed persons is by 29,9 % lower than in LFS and it is by 19,7 % lower than number of registered unemployed persons on the base of data from Centre of Labour, Social Affairs and Family.

Differences are influenced by fact than in LFS unemployed persons are follow-up continuously during calendar year and in EU SILC observation of unemployed persons are related to previous calendar year. It means possibility of application of more strict conditions in definition of unemployed person in LFS.

- Average number of persons in retirement is parameter comparable with number of old-age benefits, which are not paid concurrently, such as old-age pensions, early retirement pension and disability pension. According to data from Centre of Labour, Social Affairs and Family number of them is by 2,0 % lower than according to EU SILC 2005.
Table 2: Number of persons in the Slovak Republic and in regions

<table>
<thead>
<tr>
<th>Source</th>
<th>Numbers of persons EU SILC 2005</th>
<th>Mid-year population Develop. of popul. 2004</th>
<th>Difference (in %)</th>
<th>Numbers of persons EU SILC 2006</th>
<th>Mid-year population Develop. of popul. 2005</th>
<th>Difference (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>5 384 822</td>
<td>5 382 574</td>
<td>-0.04</td>
<td>5 389 180</td>
<td>5 387 285</td>
<td>-0.04</td>
</tr>
<tr>
<td>Bratislavský</td>
<td>600 311</td>
<td>600 277</td>
<td>-0.01</td>
<td>602 543</td>
<td>602 433</td>
<td>-0.02</td>
</tr>
<tr>
<td>Trnavský</td>
<td>552 443</td>
<td>552 624</td>
<td>0.03</td>
<td>552 969</td>
<td>553 768</td>
<td>0.14</td>
</tr>
<tr>
<td>Trenčiansky</td>
<td>601 932</td>
<td>601 722</td>
<td>-0.03</td>
<td>606 025</td>
<td>600 904</td>
<td>-0.85</td>
</tr>
<tr>
<td>Nitriansky</td>
<td>710 129</td>
<td>709 414</td>
<td>-0.10</td>
<td>712 872</td>
<td>708 737</td>
<td>-0.58</td>
</tr>
<tr>
<td>Žilinský</td>
<td>693 182</td>
<td>693 824</td>
<td>0.09</td>
<td>660 127</td>
<td>694 634</td>
<td>4.97</td>
</tr>
<tr>
<td>Banskobystrický</td>
<td>657 469</td>
<td>658 753</td>
<td>0.19</td>
<td>697 018</td>
<td>657 757</td>
<td>-5.97</td>
</tr>
<tr>
<td>Prešovský</td>
<td>799 899</td>
<td>795 848</td>
<td>-0.51</td>
<td>792 896</td>
<td>797 692</td>
<td>0.60</td>
</tr>
<tr>
<td>Košický</td>
<td>769 457</td>
<td>770 112</td>
<td>0.09</td>
<td>764 730</td>
<td>771 360</td>
<td>0.86</td>
</tr>
</tbody>
</table>

- In 2004 differences between numbers of persons in individual regions were minimal according to EU SILC and Development of Population.

- In 2005 according to EU SILC and Development of Population differences between numbers of persons in individual regions were minimal, except of Žilinský and Banskobystrický region. Differences about 5% in these regions are caused by demand on design of integrate weights. In these regions proportion of dependent children is the highest, however number of completed questionnaires by households with higher number of children was proportionally lower in each region. Limits for adjustment of integrate weights and demand on holding accuracy of age-sex structure were such, that short linear method solved this problem at the expense of accuracy of total numbers of persons in regions.

- Other comparisons of numbers of persons were realized according to sex and 5-years age groups in individual regions. Under expectations statistically insignificant differences were results of comparison. Differences between numbers of persons in the Slovak Republic and in subgroups of persons are positively explicable using chosen weighting method.
Table 3: Persons by sex and marital status in the Slovak Republic

<table>
<thead>
<tr>
<th></th>
<th>2004 Popul. balance (abs.numbers)</th>
<th>EU SILC (absolute numbers)</th>
<th>2005 Popul. balance (abs.numbers)</th>
<th>EU SILC (absolute numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>male</td>
<td>female</td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>single</td>
<td>1 238 294</td>
<td>1 065 322</td>
<td>1 192 181</td>
<td>956 188</td>
</tr>
<tr>
<td>married</td>
<td>1 208 464</td>
<td>1 218 730</td>
<td>1 315 639</td>
<td>1 327 421</td>
</tr>
<tr>
<td>divorced</td>
<td>116 235</td>
<td>162 507</td>
<td>56 468</td>
<td>124 992</td>
</tr>
<tr>
<td>widowed</td>
<td>50 497</td>
<td>324 773</td>
<td>49 203</td>
<td>362 731</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2 613 490</strong></td>
<td><strong>2 771 332</strong></td>
<td><strong>2 613 490</strong></td>
<td><strong>2 771 332</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2004 Population balance (%)</th>
<th>EU SILC (%)</th>
<th>2005 Population balance (%)</th>
<th>EU SILC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>male</td>
<td>female</td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>single</td>
<td>47.4</td>
<td>38.4</td>
<td>45.6</td>
<td>34.5</td>
</tr>
<tr>
<td>married</td>
<td>46.2</td>
<td>44.0</td>
<td>50.3</td>
<td>47.9</td>
</tr>
<tr>
<td>divorced</td>
<td>4.4</td>
<td>5.9</td>
<td>2.2</td>
<td>4.5</td>
</tr>
<tr>
<td>widowed</td>
<td>1.9</td>
<td>11.7</td>
<td>1.9</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**DIFFERENCES EU SILC compared to Development of Population [in %]**

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>single</td>
<td>-1.76</td>
<td>-3.94</td>
</tr>
<tr>
<td>married</td>
<td>4.10</td>
<td>3.92</td>
</tr>
<tr>
<td>divorced</td>
<td>-2.29</td>
<td>-1.35</td>
</tr>
<tr>
<td>widowed</td>
<td>-0.05</td>
<td>1.37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0.00</strong></td>
<td><strong>0.00</strong></td>
</tr>
</tbody>
</table>

- Population structure by sex and marital status from EU SILC data is comparable with structure by Population balance.
- In EU SILC for both years there is relatively higher number of married persons at the expense of other alternatives in marital status.
- The highest difference is related to lower number of divorced men in EU SILC project at the expense of Population balance.
4.2 Social variables

Table 4: Household structure – average numbers of persons in the Slovak Republic

<table>
<thead>
<tr>
<th></th>
<th>EU SILC</th>
<th>HBS</th>
<th>Differences between EU SILC and HBS [abs.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of household members</td>
<td>2.90</td>
<td>2.88</td>
<td>2.90</td>
</tr>
<tr>
<td>Economically active members</td>
<td>1.45</td>
<td>1.44</td>
<td>1.35</td>
</tr>
<tr>
<td>Of which: working</td>
<td>1.26</td>
<td>1.28</td>
<td>X</td>
</tr>
<tr>
<td>unemployed</td>
<td>0.19</td>
<td>0.16</td>
<td>X</td>
</tr>
<tr>
<td>Dependent children</td>
<td>0.76</td>
<td>0.73</td>
<td>0.82</td>
</tr>
<tr>
<td>In retirement</td>
<td>0.63</td>
<td>0.63</td>
<td>0.53</td>
</tr>
<tr>
<td>Other members</td>
<td>0.06</td>
<td>0.08</td>
<td>0.20</td>
</tr>
</tbody>
</table>

- Differences between average numbers of individual types of persons from HBS and EU SILC for years 2004 and 2005 are statistically insignificant.
- Average household size is almost equal (2,9) in both surveys.
- Average numbers of dependent children is higher by 0,06 or 0,11 (2005 or 2006) according to HBS than on the base of EU SILC.
- Average number of economically active persons is higher by about 0,1 person per both years in EU SILC.
- According to EU SILC average number of retired persons is higher by about 0,1 person per both years.
- Significant differences are in number of other household members; in EU SILC only 0,06-0,08 members belong to this group, while in HBS it is 0,2-0,22 members.

Differences in average numbers of household members are caused by differences in definitions of these persons and also by differences in way of data collection in connection with reference period. It is not possible to expect that in case of using such low number of households as is observed in HBS per individual months, there will be provided, without post stratification on level of individual regions, outputs of such accuracy than in EU SILC, for which minimum effective sample size was determined without financial limits (as it is in case of Household Budget Survey).
EU SILC project uses almost identical definitions for expression of relations of sample units to economical activity as are used in LFS. Certain differences are in strictness of conditions for definitions of working and unemployed persons.

Relative and also absolute differences between numbers of working persons, structure of working by classification using in similar way in both surveys, differences in number of unemployed persons, structure of unemployed by regions from these both sources are displayed in Table 5 to 11.

Table 5: Number of working and unemployed persons

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male and female Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working</strong></td>
<td>2 170.4</td>
<td>2 216.2</td>
<td>2 342.9</td>
<td>2 395.0</td>
<td>172.5</td>
<td>178.8</td>
</tr>
<tr>
<td><strong>Unemployed</strong></td>
<td>480.7</td>
<td>427.5</td>
<td>346.6</td>
<td>299.8</td>
<td>-134.1</td>
<td>-127.7</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working</strong></td>
<td>1 193.7</td>
<td>1 233.0</td>
<td>1 238.5</td>
<td>1 253.2</td>
<td>44.8</td>
<td>20.2</td>
</tr>
<tr>
<td><strong>Unemployed</strong></td>
<td>249.9</td>
<td>223.6</td>
<td>167.8</td>
<td>139.6</td>
<td>-82.1</td>
<td>-84.0</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working</strong></td>
<td>976.6</td>
<td>983.1</td>
<td>1 104.5</td>
<td>1 141.9</td>
<td>127.9</td>
<td>158.8</td>
</tr>
<tr>
<td><strong>Unemployed</strong></td>
<td>230.9</td>
<td>203.8</td>
<td>178.8</td>
<td>160.2</td>
<td>-52.1</td>
<td>-43.6</td>
</tr>
</tbody>
</table>

Differences between numbers of working and unemployed persons according to EU SILC and LFS for 2004 and 2005 are partially reasoned by different definitions of persons in these surveys.

− In EU SILC number of working persons is by 170 000 persons higher than in LFS.
− In EU SILC number of unemployed persons is by 130 000 persons lower than in LFS.

Table 6: Structure of working persons by age groups in 2005

<table>
<thead>
<tr>
<th>Age groups</th>
<th>LFS [%]</th>
<th>EU SILC [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>10.1</td>
<td>8.8</td>
<td>-1.3</td>
</tr>
<tr>
<td>25-34</td>
<td>27.9</td>
<td>27.1</td>
<td>-0.8</td>
</tr>
<tr>
<td>35-49</td>
<td>41.4</td>
<td>41.2</td>
<td>-0.2</td>
</tr>
<tr>
<td>50-54</td>
<td>13.0</td>
<td>14.1</td>
<td>1.1</td>
</tr>
<tr>
<td>55-59</td>
<td>5.9</td>
<td>7.1</td>
<td>1.2</td>
</tr>
<tr>
<td>60 and more</td>
<td>1.7</td>
<td>1.6</td>
<td>-0.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Table 7.1: Structure of working persons by education in 2005

<table>
<thead>
<tr>
<th>Education level</th>
<th>LFS [%]</th>
<th>EU SILC [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary</td>
<td>4.6</td>
<td>3.0</td>
<td>-1.6</td>
</tr>
<tr>
<td>secondary</td>
<td>78.2</td>
<td>76.7</td>
<td>-1.5</td>
</tr>
<tr>
<td>tertiary</td>
<td>17.2</td>
<td>20.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 7.2: Structure of working persons by the highest ISCED level attained

<table>
<thead>
<tr>
<th></th>
<th>LFS [%]</th>
<th>EU SILC [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary education</td>
<td>1.5</td>
<td>0.4</td>
<td>-1.1</td>
</tr>
<tr>
<td>lower secondary education</td>
<td>23.9</td>
<td>18.5</td>
<td>-5.4</td>
</tr>
<tr>
<td>upper secondary education</td>
<td>64.3</td>
<td>67.0</td>
<td>2.7</td>
</tr>
<tr>
<td>post-secondary non tertiary education</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>first stage of tertiary education</td>
<td>9.8</td>
<td>13.3</td>
<td>3.5</td>
</tr>
<tr>
<td>second stage of tertiary education</td>
<td>0.1</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>missing</td>
<td>0.4</td>
<td>0.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 8: Structure of working persons by economical activity status in 2005

<table>
<thead>
<tr>
<th>Working persons</th>
<th>EU SILC [%]</th>
<th>LFS [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working persons</td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>- employee</td>
<td>90.0</td>
<td>87.1</td>
<td>2.9</td>
</tr>
<tr>
<td>- self-employed without employees</td>
<td>6.9</td>
<td>9.0</td>
<td>-2.1</td>
</tr>
<tr>
<td>- self-employed with employees</td>
<td>3.1</td>
<td>3.4</td>
<td>-0.3</td>
</tr>
<tr>
<td>- family worker</td>
<td>0.0</td>
<td>0.1</td>
<td>-0.1</td>
</tr>
<tr>
<td>- missing</td>
<td>0.0</td>
<td>0.4</td>
<td>-0.4</td>
</tr>
</tbody>
</table>

Table 9: Structure of working persons by Classification of Occupation – ISCO-88 (COM) in 2005

<table>
<thead>
<tr>
<th>Working persons</th>
<th>EU SILC [%]</th>
<th>LFS [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working persons</td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>- Legislators. senior officials and managers</td>
<td>6.7</td>
<td>6.1</td>
<td>0.6</td>
</tr>
<tr>
<td>- Scientists and brain workers</td>
<td>14.3</td>
<td>11.0</td>
<td>3.3</td>
</tr>
<tr>
<td>- Technical. medical. pedag. and related fields profess.</td>
<td>17.4</td>
<td>17.8</td>
<td>-0.4</td>
</tr>
<tr>
<td>- Administrative workers (officials)</td>
<td>8.5</td>
<td>6.5</td>
<td>2.0</td>
</tr>
<tr>
<td>- Workers in services and trade</td>
<td>13.0</td>
<td>14.5</td>
<td>-1.5</td>
</tr>
<tr>
<td>- Qualified workers in agricult. fores. and related fields</td>
<td>1.0</td>
<td>1.2</td>
<td>-0.2</td>
</tr>
<tr>
<td>- Craftsmen and qualified producers. repairmen</td>
<td>17.6</td>
<td>19.2</td>
<td>-1.6</td>
</tr>
<tr>
<td>- Plant and machine operators</td>
<td>13.3</td>
<td>13.7</td>
<td>-0.4</td>
</tr>
<tr>
<td>- Supporting and non-qualified staff</td>
<td>7.6</td>
<td>9.5</td>
<td>-1.9</td>
</tr>
<tr>
<td>- Missing</td>
<td>0.7</td>
<td>0.0</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Table 10: Structure of working persons by NACE classification in 2005

<table>
<thead>
<tr>
<th>Working persons</th>
<th>EU SILC [%]</th>
<th>LFS [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Agriculture, hunting and forestry; fishing</td>
<td>3.3</td>
<td>5.0</td>
<td>-1.7</td>
</tr>
<tr>
<td>- Mining and quarrying</td>
<td>0.9</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>- Manufacturing</td>
<td>23.3</td>
<td>26.9</td>
<td>-3.6</td>
</tr>
<tr>
<td>- Electricity, gas and water supply</td>
<td>2.1</td>
<td>2.0</td>
<td>0.1</td>
</tr>
<tr>
<td>- Construction</td>
<td>8.1</td>
<td>9.3</td>
<td>-1.2</td>
</tr>
<tr>
<td>- Wholesale and retail trade</td>
<td>10.7</td>
<td>12.1</td>
<td>-1.4</td>
</tr>
<tr>
<td>- Hotels and restaurants</td>
<td>3.6</td>
<td>4.0</td>
<td>-0.4</td>
</tr>
<tr>
<td>- Transport, storage and communications</td>
<td>7.2</td>
<td>6.6</td>
<td>0.6</td>
</tr>
<tr>
<td>- Financial intermediation</td>
<td>2.2</td>
<td>2.0</td>
<td>0.2</td>
</tr>
<tr>
<td>- Real estate, renting and business activities</td>
<td>5.3</td>
<td>5.8</td>
<td>-0.5</td>
</tr>
<tr>
<td>- Public administration and defence; compulsory social security</td>
<td>11.1</td>
<td>6.8</td>
<td>4.3</td>
</tr>
<tr>
<td>- Education</td>
<td>8.7</td>
<td>7.4</td>
<td>1.3</td>
</tr>
<tr>
<td>- Health and social work</td>
<td>6.2</td>
<td>7.0</td>
<td>-0.8</td>
</tr>
<tr>
<td>- Other community, social and personal service activities</td>
<td>6.1</td>
<td>4.0</td>
<td>2.1</td>
</tr>
<tr>
<td>- Activities of households</td>
<td>0.2</td>
<td>0.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>- Extra-territorial organizations and bodies</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>- Missing</td>
<td>0.9</td>
<td>0.2</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Table 11: Structure of unemployed persons in regions for 2005

<table>
<thead>
<tr>
<th>Region</th>
<th>EU SILC [%]</th>
<th>LFS [%]</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bratislavský</td>
<td>3.8</td>
<td>4.0</td>
<td>-0.2</td>
</tr>
<tr>
<td>Tmavský</td>
<td>8.1</td>
<td>7.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Trenčiansky</td>
<td>7.4</td>
<td>5.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Nitriansky</td>
<td>14.4</td>
<td>14.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Žilinský</td>
<td>11.8</td>
<td>11.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Banskobystrický</td>
<td>15.7</td>
<td>18.2</td>
<td>-2.4</td>
</tr>
<tr>
<td>Prešovský</td>
<td>21.7</td>
<td>18.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Košický</td>
<td>17.2</td>
<td>20.4</td>
<td>-3.2</td>
</tr>
<tr>
<td><strong>Total SR</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>0.0</strong></td>
</tr>
</tbody>
</table>

4.3 Income variables

Some income variables are connected with household members according to economical activity status. If there are some differences in average numbers of household members by their economical activity status, then differences will be also on level and structure of incomes, where part of differences is caused by differences in household structure.
Level of average nominally wage was compared with value according to Earnings statistics (Enterprise Statistics on Labour). In EU SILC collected values are by 15% lower than in Earnings statistics. It is related to differences in definitions of wage, reference period of observation, inaccuracy of responses (respondent does not always remember nominally value of his/her wage, most of them remember that nominally value, which respondent received as the last one.)

Table 12: Average nominally monthly wage (SKK)

<table>
<thead>
<tr>
<th>Reference period</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings Statistics</td>
<td>15 825</td>
<td>17 274</td>
</tr>
<tr>
<td>EU SILC</td>
<td>13 669</td>
<td>14 445</td>
</tr>
<tr>
<td>Difference [in %]</td>
<td>13.62</td>
<td>16.38</td>
</tr>
</tbody>
</table>

Some income components per person according to HBS are comparable with values estimated in EU SILC. It is necessary to emphasize that in EU SILC individual income components were collected exactly in accordance with given regulation and also in compliance with regulation of Eurostat other variables were constructed. For collection of incomes in HBS there is no external regulation valid for HBS, it is not possible to follow definitions of incomes valid for EU SILC the same consistently in HBS.

Table 13: Monetary incomes of private households in the Slovak Republic per person and month in SKK

<table>
<thead>
<tr>
<th></th>
<th>HBS</th>
<th>EU SILC</th>
<th>Difference [in %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross monetary incomes in total</td>
<td>8 206</td>
<td>8 558</td>
<td>7 937</td>
</tr>
<tr>
<td>Gross employee cash income</td>
<td>4 890</td>
<td>5 073</td>
<td>5 529</td>
</tr>
<tr>
<td>Self-employment income</td>
<td>707</td>
<td>774</td>
<td>340</td>
</tr>
<tr>
<td>Social incomes</td>
<td>2 120</td>
<td>2 273</td>
<td>2 040</td>
</tr>
<tr>
<td>Old-age pensions</td>
<td>1 272</td>
<td>1 382</td>
<td>1 269</td>
</tr>
<tr>
<td>Other pensions</td>
<td>312</td>
<td>319</td>
<td>229</td>
</tr>
<tr>
<td>Sickness benefits</td>
<td>41</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td>Unemployment benefit</td>
<td>77</td>
<td>67</td>
<td>59</td>
</tr>
<tr>
<td>Family related social incomes</td>
<td>290</td>
<td>360</td>
<td>220</td>
</tr>
<tr>
<td>Social welfare benefits</td>
<td>128</td>
<td>106</td>
<td>237</td>
</tr>
<tr>
<td>Property incomes</td>
<td>36</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Other monetary incomes</td>
<td>453</td>
<td>416</td>
<td>7</td>
</tr>
<tr>
<td>Net monetary incomes in total</td>
<td>7 279</td>
<td>7 567</td>
<td>6 644</td>
</tr>
<tr>
<td>Net employee cash incomes</td>
<td>3 963</td>
<td>4 081</td>
<td>4 257</td>
</tr>
</tbody>
</table>
Comparison of average monetary income of private households in the Slovak Republic per person and month in SKK from HBS and EU SILC data for years 2004 and 2005 provide following differences:

- Employee cash incomes estimated from EU SILC are by 15 % higher than done by HBS
- In 2004 self-employed incomes according to HBS were almost by half higher than on the base of EU SILC, however in 2005 this difference represents 15 %.
- Differences in amount of social incomes are not significant between two surveys.
- Significant are those differences in structure of social incomes, what is caused with high probability by level of des-aggregation of components of social incomes in questionnaire (respondent know, which income is social income, however respondent and also interviewer is disoriented by reason of huge amount of valid regulations related to social incomes).

Table 14: Basic income components and expenditures in households (in mill. SKK, current prices) for 2005

<table>
<thead>
<tr>
<th>Variables (components)</th>
<th>National Accounts</th>
<th>EU SILC</th>
<th>Difference in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remunerations of employees (from all sectors)</td>
<td>597 091</td>
<td>429 242</td>
<td>-28.1</td>
</tr>
<tr>
<td>Of which: gross wages and salaries</td>
<td>468 842</td>
<td>383 197</td>
<td>-18.3</td>
</tr>
<tr>
<td>Social benefits</td>
<td>192 414</td>
<td>153 530</td>
<td>-20.2</td>
</tr>
</tbody>
</table>

In table 14 there are results of comparison of selected income variables from EU SILC project with variables from National Accounts.

Outputs of sample surveys comprise of part of foundations for construction of National Account variables. By this reason direct comparison of variables collected within EU SILC project with variables from National Accounts shows more significant differences. Calculated values from EU SILC do not include all parameters, which are available and are used in more complex methodology of construction of variables for needs of National Accounts.

- In 2005 within EU SILC remunerations of employees from all sectors were lower by 28 %, gross wages and salaries by 18 % and social benefits by 20 %.
### Table 15: Expenditures and incomes on social protection by ESSPROS and EU SILC for 2005

<table>
<thead>
<tr>
<th>8 purposes by ESSPROS</th>
<th>ESSPROS</th>
<th>EU SILC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPS per person and a year</td>
<td>SKK per person and a year</td>
</tr>
<tr>
<td>1- Sickness/health care</td>
<td>622</td>
<td>12 645</td>
</tr>
<tr>
<td>2- Disability</td>
<td>145</td>
<td>2 948</td>
</tr>
<tr>
<td>3- Old age</td>
<td>876</td>
<td>17 808</td>
</tr>
<tr>
<td>4- Survivors</td>
<td>29</td>
<td>590</td>
</tr>
<tr>
<td>5- Family/children</td>
<td>240</td>
<td>4 879</td>
</tr>
<tr>
<td>6- Unemployment</td>
<td>36</td>
<td>732</td>
</tr>
<tr>
<td>7- Housing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8- Social exclusion</td>
<td>64</td>
<td>1 301</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2012</td>
<td>40 902</td>
</tr>
</tbody>
</table>

PPP=20.329

Foundation for comparison of data from EU SILC with data from ESSPROS values from publication „Social protection in the Slovak Republic in comparison with other EU member states“ (author: Alexandra Petrášová) were presented in Table 6. In Table 15 there are summarization of original data for selected presented benefits by purposes from mentioned publication and also data from EU SILC for selected benefits according to title of last column. Expenditures for selected benefits by ESSPROS purposes in PPS per person and a year 2005 were calculated to SKK using purchasing power parity (listed on web site of the SO SR, i.e. 20,329) in order to be comparable with relevant values of EU SILC 2006, where data were collected for the year 2005.

Comparability of ESSPROS data by purposes or programmes and EU SILC is influenced by differences in definitions of variables. Information on expenditures and incomes on social protection according to methodology „European System of Integrate statistics on social protection“ include social benefits, administrative expenditures and other expenditures by social protection purposes („ESSPROS Manual, 1996“).

According to EU SILC data include benefits, which households and persons receive.
Social protection includes all interventions of public or private organisations, whose aim is to disburden of households and persons in connection with defined risks or needs provided that simultaneously or individual agreement does not exist.

Purpose of social protection benefit represents main goal, for which social protection is provided irrespective of legislative or institutional enactments.

Comparison of expenditures on selected benefits according to ESSPROS data with EU SILC data was realized on purpose level and on level of indicator of purpose.

- **Purpose 1 – sickness and health care** included indicators of paid sickness benefits, hospital care, and primary health care. In EU SILC only sickness benefits were collected. Total of them (25 SKK per person and month) represents third of expenditures according to variable paid sickness benefits in ESSPROS (42 PPS per person and year, i.e. 71 SKK per person and month).

  Difference is caused by fact that compensation of wage in case of temporary sickness absence (first 10 days paid by employer), this income is in ESSPROS included into variable sickness benefits and in EU SILC is this kind of income regarded as employee income component.

- **Purpose 2 – disability** includes variables disable benefit, social services connected with accommodation and assistance in household. According to EU SILC Disability benefits represent 228 SKK, what is by 30 SKK (15%) more than according to variable disability pension (per person 117 PPS, i.e. 198 SKK per person and month).

- **Purpose 3 – old age** represent variables old-age pension, pension for extended employment, social services connected with accommodation and assistance in performance of everyday activities. Expenditures on old-age pension represents 96% of whole expenses for purpose 3 and 90% of personal income from old-age benefits according to EU SILC.

- **Purpose 4 – survivors** represent variables survivors´ pension. Its value in ESSPROS represents about 28% of survivors´ benefits according to EU SILC.

- **Purpose 5 – family/children** includes variables child birth contribution, maternity benefits, family and children allowances, support in case of child birth, daily care of children and social services connected with accommodation. According to ESSPROS family or children allowances represents 266 SKK (157 PPS per
person and year), this amount is by 9 % higher than amount of family and children allowances according to EU SILC (242 SKK).

- **Purpose 6 – unemployment** represent variables unemployment benefit, benefit paid in consequence of early retirement and special training. According to ESSPROS unemployment benefit represent 39 SKK (23 PPS per person and a year), what represents 73 % of unemployment benefit according to EU SILC (54 SK).

- **Purpose 7 – housing** does not provide comparable data.

- **Purpose 8 – social exclusion** represents variable support of incomes. Support of incomes is by 70 % higher than incomes from social exclusion not elsewhere classified according to EU SILC.

5 Results of comparability of outputs with data from administrative data sources

5.1 Analysis and comparability of information sources of EU SILC project and relevant external administrative sources

Outputs collected through EU SILC project provide exceptional valuable data for professional and laic public users. Consistence of these data with data, which are collected from other sources, especially through other approaches of data collection, plays very important role in evaluation of their quality.

In most cases it is related to administrative products of report character. In view of legislatively defined content of these products, as well as extend and structure of sampling units, not only representativeness is obvious, but in most cases it is also content identity, or closeness to relevant output values from EU SILC.

According to SO SR following central institutions and their bodies could be included into structure of officially follow-up administrative sources:

1. **Attorney Generalship of the Slovak Republic**
2. **Ministry of Defence of the Slovak Republic**
3. **The Department of Home Affairs of the Slovak Republic**
4. **Ministry of Justice of the Slovak Republic**
5. **Ministry of Finance of the Slovak Republic**
6. **Tax directorate of the Slovak Republic**
In regard to character of data, which are currently collected within EU SILC project and which could be also interesting for future analytical works, products of these following institutions seem to be relevant:

1. Ministry of Finance of the Slovak Republic
2. Tax Directorate of the Slovak Republic
3. Ministry of Labour, Social Affairs and Family
4. Centre of Labour, Social Affairs and Family
5. National Bank of Slovakia
6. Social Insurance Agency

From large-scale data file, data, which are directly comparable with outputs from EU SILC project, are data directly follow-up by institutions mentioned above, they are displayed in chapter 2.2.

5.2 **Comparison of outputs of EU SILC project and outputs of administrative information sources**

In evaluation and comparison of quality of EU SILC outputs with information, which were obtained from other administrative sources, we used especially data sources, whose overview is listed in Table 1:
Concrete values of variables, which are included in used administrative sources mentioned above, were compared with values of variables of EU SILC project. Results of comparability are displayed in Table 2.

In Table 2 we present comparison of EU SILC variables in time for the years 2005 and 2006.
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<tbody>
<tr>
<td></td>
<td></td>
<td>Totals in EUR</td>
<td>% number of recipients/month</td>
<td>%</td>
<td>average per month</td>
<td>%</td>
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<tr>
<td>4</td>
<td>SP1011: Gross wage from main occupation</td>
<td>356 780 908 364</td>
<td>373 665 575 906</td>
<td>985</td>
<td>1 948 560</td>
<td>1 931 471</td>
<td>100.15</td>
<td>15 359</td>
<td>15 358</td>
<td>164.50</td>
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<tr>
<td>5</td>
<td>SP1012: Gross wage from secondary occupation</td>
<td>1 606 798 053</td>
<td>1 601 893 172</td>
<td>155</td>
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<tr>
<td>6</td>
<td>SP1013: Current gross monthly wage</td>
<td>29 513 289 909</td>
<td>29 669 509 638</td>
<td>192</td>
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<tr>
<td>7</td>
<td>SP1014: Gross non-cash employee income</td>
<td>2 144 844 768</td>
<td>3 474 554 902</td>
<td>1 471</td>
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<tr>
<td>8</td>
<td>PY1005: Unemployment benefits</td>
<td>3 675 259 666</td>
<td>3 477 662 568</td>
<td>87</td>
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<tr>
<td>9</td>
<td>SP1016: Unemployment benefit</td>
<td>3 574 849 228</td>
<td>1 972 304 407</td>
<td>95</td>
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<tr>
<td>10</td>
<td>PY1006: Old-age benefits</td>
<td>70 629 241 920</td>
<td>80 249 282 228</td>
<td>133</td>
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<tr>
<td>11</td>
<td>SP1017: Old-age pension</td>
<td>71 475 265 743</td>
<td>71 601 982 840</td>
<td>134</td>
<td>899 444</td>
<td>1 083 855</td>
<td>113.87</td>
<td>6 785</td>
<td>7 901</td>
<td>117.66</td>
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<tr>
<td>12</td>
<td>SP1018: Early old-age pension</td>
<td>518 817 711</td>
<td>519 399 643</td>
<td>275</td>
<td>6 777</td>
<td>7 090</td>
<td>103.26</td>
<td>6 762</td>
<td>7 956</td>
<td>115.40</td>
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<tr>
<td>13</td>
<td>SP1019: Pension for extended employment</td>
<td>2 765 809 159</td>
<td>2 468 229 759</td>
<td>89</td>
<td>14 829</td>
<td>14 862</td>
<td>100.36</td>
<td>15 202</td>
<td>13 485</td>
<td>84.71</td>
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<td>14</td>
<td>PY1007: Survivor’s benefits</td>
<td>8 563 724 952</td>
<td>11 463 700 342</td>
<td>134</td>
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<tr>
<td>15</td>
<td>SP1020: Orphan’s pension</td>
<td>666 766 293</td>
<td>663 586 175</td>
<td>114</td>
<td>27 189</td>
<td>29 429</td>
<td>109.79</td>
<td>2 630</td>
<td>2 980</td>
<td>116.05</td>
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<tr>
<td>16</td>
<td>SP1021: Widow’s and widower’s pension</td>
<td>7 148 387 040</td>
<td>10 182 819 500</td>
<td>136</td>
<td>2 972 022</td>
<td>2 999 828</td>
<td>122.80</td>
<td>2 913</td>
<td>2 993</td>
<td>101.73</td>
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<tr>
<td>17</td>
<td>SP1011: Funeral allowance</td>
<td>14 187 842 185</td>
<td>14 174 088 245</td>
<td>112</td>
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<tr>
<td>18</td>
<td>SP1015: Other peridental cash survivor’s benefits</td>
<td>59 486 298</td>
<td>46 199 876</td>
<td>79</td>
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<tr>
<td>19</td>
<td>PY1020: Sickness benefits</td>
<td>1 867 969 273</td>
<td>1 662 350 664</td>
<td>87</td>
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<td>20</td>
<td>SP1021: Sickness benefit</td>
<td>1 148 199 328</td>
<td>1 148 299 637</td>
<td>109</td>
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<tr>
<td>21</td>
<td>SP1022: Allowance for care of family member</td>
<td>51 303 783</td>
<td>73 309 567</td>
<td>143</td>
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<tr>
<td>22</td>
<td>PY1009: Disability benefits</td>
<td>14 183 922 479</td>
<td>14 171 200 285</td>
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<td>23</td>
<td>SP1011: Disability pension</td>
<td>11 775 329 873</td>
<td>12 171 769 179</td>
<td>103</td>
<td>182 568</td>
<td>175 889</td>
<td>96.35</td>
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<tr>
<td>24</td>
<td>SP/0031: Nursing allowance</td>
<td>1 566 722 178</td>
<td>1 540 019 716</td>
<td>98</td>
<td>23 254</td>
<td>27 630</td>
<td>113.83</td>
<td>5 729</td>
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<td>25</td>
<td>SP/0031: Family/children related allowances</td>
<td>21 427 005 222</td>
<td>15 624 939 968</td>
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<tr>
<td>26</td>
<td>SP/0031: Child allowance</td>
<td>8 644 826 508</td>
<td>9 511 969 803</td>
<td>100</td>
<td>886 826</td>
<td>735 401</td>
<td>85.63</td>
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<td>27</td>
<td>SP/0031: Parental allowance</td>
<td>4 949 351 353</td>
<td>3 865 789 156</td>
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<tr>
<td>28</td>
<td>SP/0031: Maternity allowance</td>
<td>1 172 543 882</td>
<td>1 753 303 927</td>
<td>96</td>
<td>19 005</td>
<td>20 500</td>
<td>107.60</td>
<td>7 467</td>
<td>7 468</td>
<td>101.90</td>
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<tr>
<td>29</td>
<td>SP/0031: Maintenance benefit for soldier’s family</td>
<td>67 925 647</td>
<td>13 859 112</td>
<td>19</td>
<td>214</td>
<td>945</td>
<td>72.81</td>
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<tr>
<td>30</td>
<td>SP/0031: Equalising contribution</td>
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<tr>
<td>31</td>
<td>SP/0031: Child-birth contribution</td>
<td>159 668 512</td>
<td>155 555 899</td>
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<tr>
<td>32</td>
<td>SP/0031: Tax credits</td>
<td>4 173 757 747</td>
<td>6 290 250 414</td>
<td>102</td>
<td>708 682</td>
<td>708 682</td>
<td>100.00</td>
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<tr>
<td>33</td>
<td>SP/0031: Regular foster care benefits*</td>
<td>127 819 069</td>
<td>1 165 823 791</td>
<td>98</td>
<td>6 210</td>
<td>2 357</td>
<td>104.67</td>
<td>5 495</td>
<td>4 773</td>
<td>87.13</td>
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<tr>
<td>34</td>
<td>SP/0031: Lump-sum foster care benefits*</td>
<td>2 013 809 800</td>
<td>4 106 303 800</td>
<td>60</td>
<td></td>
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<td>35</td>
<td>SP/0031: Social exclusion payments not elsewhere classified</td>
<td>6 234 808 400</td>
<td>4 106 303 800</td>
<td>60</td>
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<tr>
<td>36</td>
<td>SP/0031: Material need assistance (including allowances)</td>
<td>5 738 699 100</td>
<td>1 159 304 833</td>
<td>79</td>
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*Components were collected together within EU SILC 2005

LEX: Lex
LEX: Lex
LEX: Lex
From data mentioned above relatively the most significant change (increase, decrease) of values of variables occurred:

- **Gross wage from secondary occupation**
- **Gross non-cash employee income and also other income variables, which represent**
- **Social policy tools**

These variables and their significant changes could be divided into two groups. **Changes in values of variables** in the first group have their origin directly in economic dynamics and they reflect also increase between years (variables related to category of wages primary, it means to economic increase). **Second group of changes is indirect consequence of economic dynamics and direct consequence of changing legislative rules in area of social and health assurance of population** (old-age pensions, social and health contributions and others).

In verification of quality and consistence of data from EU SILC project and relevant administrative sources we investigated information sources, which represent similar or analogical variables. By this reason we were especially interested in variables, which reflect income situation of households and which come from alternative administrative sources (overview of these sources is listed in Table 1).

Considering large extend of disposable information in comparison of variables we aim at following key and simply controllable variables:

- **Total volume of paid income components**
- **Number of persons receiving income components**
- **Average monthly values of paid income components.**

We also compare these values in term of time series (changes between years), i.e. we compare values between years 2005 and 2006. Results of comparison are content of Tables 3 and 4. From displayed results it is clear that the biggest differences in values of collected variables are in tools of social policy (widower’s pension, funeral allowance, sickness benefit, allowance for care of family member, disability pension, child allowance, maintenance benefit for soldier’s family and others).
According to our finding, more significant quantitative differences in reported results are consequence of following:

- different definition of collected variables
- differences in definition of reference period, or
- different period of validity of regulations.

In term of information mentioned above, direct comparison of alternative administrative sources and EU SILC sources and drawing conclusions about EU SILC data quality on the base of disposable information involves methodically sensitive solution. We can support this assertion (see Table 3) through values of variables such as maintenance benefit for soldier’s family and some others. These instruments came under principal and relatively rapid changes in consequence of political decisions and their reflexion in EU SILC data does not have definitional and time comparable information category.
Consequences of different values in total variables also confirms Table 4, which comprises of calculated average values of collected variables. In this table we also display brief reference to relevant alternative administrative source. Detailed reference information is part of Table 4a.
In Tables 2, 3 and 4 we mark with colour those values of variables, which are considerably different in administrative sources and EU SILC sources. With blue colour we mark those variables, which are considerably different in consequence of unequal content or legislative definition. With red colour we draw attention to variables, whose differences are extra high.
On the base of available information we can note that majority of collected relevant variables of EU SILC project correspond with values of adequate variables, which generally provide available or some specific administrative sources.
In file of variables, whose values is necessary to re-evaluate in details, in term of volume of provided benefits and also in term of number of registered recipients, we display *Gross wage from main occupation and all variables expressing additional household income components (social benefits, allowances and foster care benefits and others).*

Also in case, if values of these variables collected within EU SILC project and through administrative data sources do not differ significantly each other, *income variable constructed on the base of them is decisive variable for estimation of theoretical income variable distribution and its small skew could lead to relatively high inaccuracy in estimation of derived indicators of social exclusion.* Into group of variables, whose concrete values or their definitions is necessary to analyse, are included:

- Unemployment benefit
- Old-age pension
- Early old-age pension
- Orphan´s pension
- Widow’s and widower’s pension
- Sickness benefits
- Allowance for care of family member
- Disability pension
- Parental allowance
- Maintenance benefit for soldier’s family
- Equalising contribution
- Child-birth contribution
- Regular foster care benefits
- Social exclusion payments not elsewhere classified

With regard to character of these variables, it is almost sure that different values arise also from time discord between data collection of EU SILC variables and practical implementation of some legislative regulations in field of social care.
Conclusion

Statistics on income and living conditions (EU SILC) in households of the Slovak Republic is the project implemented in accordance with regulations and recommendations of Eurostat. This survey provides data accepted to the database of the EU member states. However representativeness of survey results and quality of micro data and outputs is necessary to be supported by information from other sources.

Analysis of comparability of implementation of EU SILC survey and its outputs with other data sources providing comparable outputs should confirm or disprove representativeness and quality of this survey.

Analysis was mainly aimed at comparison of data with outputs from other statistical household surveys and also with outputs from administrative sources.

On the base of results of analysis described in this study, EU SILC project provides data comparable with outputs from other data sources. Quantified differences are explained through certain differences in variable definitions, differences in methodology of collected data and also through differences in method of estimation of compared variables. Differences in most variables are statistically insignificant.

More significant differences were quantified between outputs from EU SILC project and macro data variables. In comparison of outputs from micro data with macro data variables there is important to accept the fact that micro data are always only one base for construction of macro data variables.

Other important result of analysis – in term of its next utilizabibility – is comparability of EU SILC data with other statistical household surveys. Outputs are base for construction of such system of sampling household surveys, which would allow connecting of data according to selected variables from each household survey.

We analysed following differences in implementation of individual household surveys:

– determination of minimum effective sample size
− sampling network construction
− timetable of individual surveys
− methodology of formation of annual database
− methodology of data collection
− methodology of processing of collected data, especially methods used for imputation and choice of calibration variables for weighting including method for weighting
− differences in definitions of variables.

Creation of system of sample household surveys resides in harmonization of methods used in data collection and data processing of individual households surveys. Creation of this system would allow rationalization in obtaining of data quality and comparable data for population.
REFERENCES


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II. Alternative approaches to evaluation of data comparability and data quality

Introduction

New member states of European Union undergoes extremely significant economic and also serious socio-political changes in period of two decades. Positive result of these changes is unprecedented economic growth. In most new member states parameters of this economic growth between years represent 5-10% in the long term. Simultaneously with this economic growth unemployment rate of employable population significantly decreases, it leads to change in structure of national economics. Clear positive changes in economic growth in relation to old member states of the European Union could be identified by observation of convergent procedures (beta and sigma convergences) using exact methods.

In spite of these positive macro economic signals, many negative consequences of this rapid economic growth persist, actually they are presented more significantly. We include here for example persistent or increasing regional disparity. As example we can mention Slovakia, which was able to approach to average of the European Union in years 1998-2007 through GDB per person from 51,4% in 1997 to 69,7% in 2008. Continuously with this situation in the same time inter-regional disparity of GDP per person increased significantly from amount 28,8% to almost 34%. As logical consequence of this development could be persistent regional disproportion of employment of population, income and also social situation of population. Relatively large groups of population became more socially vulnerable (threatened by risk of social exclusion). Existing results of the EU SILC project in Slovakia prove these doubts in extenso.

In this situation task of social network and its supporting programmes is extra important. In the case of the Slovak Republic there are alarming facts, which Eurostat mentions about position of Slovakia among states of the European Union in relation to parameters of poor-relief in member states of the European Union (i). According to this source expenditures on poor-relief in Slovakia represent 16,9% of GDP, while in average of the European Union this proportion represents 27,2%. In Denmark,
France and Switzerland this proportion is higher than 30 %. Lower indicators than in Slovakia are only in Baltic countries.

With regard to obtained information on income differentiation and social situation of Slovak population it is possible to state that **positive economic growth is not sufficient condition for which we could be able to evaluate positively all its direct and indirect consequences.**

In connection with idea mentioned above it is useful to remind that issue of measurement of results of economic growth and its impacts on social development of society is not new subject of socio-economic analyses. Creators of indicators GDP and GDP per person (Kuznets,\(^1\)), but also social analysts (Kahneman,\(^ii\)) had warned already that this indicator measures in simple way only power of economic system through output, it means extent of output expressed by value. By this reason **indicator GDP or its calculated values per person could not be only one criterion in evaluation of successfullness of economic and social development of society** and in coordination of other economic growth of society. On the base of economic theory and history it is known that these applications of macroeconomic aggregates are not only unsuitable but often misleading. On the base of their construction it is obvious that these indicators do not have such information value to be useful in qualified evaluation of social development of society.

Not only scientific economic society warn about this facts, but also many official, national and international organizations are aimed at solution of this issues intensively. As significant step in this connection was conference of the European Union **Beyond GDP** held in November 2007 in Brussels. There were definite standpoints presented by top representatives of the European Union (Barroso, Beres, Almunia, and others), who accepted **indefensibility of indicator GDP as only one criterion for evaluation of successfullness of economic growth.** These ones, but also other participants supported ideas and requirements related to need to form new composite indicator, which would be more dimensional compared to existing indicator GDP and which would also reflect results of social development of society.
Special task in formation of new indicator will be observation of income differentiation of population and thus to notice social situation. Many examples have existed in this connection already. Composite indicators such as HDI (human development indicator) or HPI (happy planet index) and especially GPI (genuine progress indicator) indicate that solution is possible and vast application involves special effort of all participants interested in this issue. We can assume that results of EU SILC project should impressed as confirmatory in term of methodology and content.

1 Targets of EU SILC project and its realization in conditions of the Slovak Republic

In connection with suggestions mentioned about we consider EU SILC project as *extra important and useful not only for member states, but also for concerned bodies of the European Union*. Project EU SILC has important role not only in structure of Programme of State Statistical Surveys, but outputs from EU SILC also enter to field of formation of social policy instruments of the European Union and separately also of member states. In term of suggestions mentioned above it is obvious that project outputs have to meet large-scale spectrum of qualitative criteria. It is in interest of all participated parties (statistical institutions, government and political institutions, scientific organizations, public corporations, representatives of media, an others) *whether results of EU SILC project will contribute to consistent objective knowledge and detailed study of social situation of Slovak population from aspect of economic development of country.*

On the base of suggestions mentioned above it is obvious that qualitative parameters of EU SILC project have to meet closely technically known criteria of quality, but through final qualitative outputs it is possible to speak to and convince general public about characters of events and procedures, which reflect these outputs.

As the most important step in study and comparative analysis of social situation of population we consider orientation of EU SILC project on field of income situation of households in relation to collection of some selected information on living
conditions of population. This progress in evaluation of actual situation of social
development in country is in accordance with critical evaluation related to indicator
GDP an GDP per person, which is listed in introduction of the part II.

Observation of income situation allows qualified monitoring of real situation and
conditions, in which individual groups of population are situated an in which
population, cultural and social potention of our country is reproduced. It is absolutely
necessary to know this situation in order to right navigation not only for socially
oriented programmes, but also as a stimulus for strategic leading of economic growth
by supporting politics of state. We mean mainly supporting the business activities in
areas with relatively low incomes and mostly higher unemployment rate.

As high-positive fact we consider transition from *indicators of average wage
to indicators of median value of household incomes* and consequently to other
significant value – at-risk-of poverty threshold (threshold of social exclusion), which
represents *60 % value of median income variable*. Consequently processing of
information in relation to these basic parameters gives real picture about income
situation of households in Slovakia.

In these report we express our obtained results from EU SILC project in term
of data quality and especially in term of their international comparison. Our *primary
goal is to verify or confirm accuracy of obtained key values of EU SILC project
and to compare data with variables, which come from other official
administrative information sources, but also from other statistical sources
realised out of EU SILC project.*

Sense of this comparison consists in the fact that all officially published outputs
are used by wide range of users and these outputs influence on their confidence in
these data. In this connection only *contentual and value consistent outputs can
impress as positive and supporting for creation of tools for social politics.*
*Correlative inexplicable discordance of statistical data* from other sources
invokes unbelief and no confidence of users in presented outputs.
Before we evaluate data quality, which were collected within EU SILC project, we mention basic attributes of quality of statistical outputs in a way, as they are generally recognized in systems of collection and processing of statistical information.

2 Dimensions of EU SILC output quality and creation of output in national conditions

Term quality of statistical information, primary and secondary, has multidimensional character. Quality as evaluated phenomenon is not definitive completed and thus it is possible to update it or add other collected and evaluated attributes. Standard and the most often evaluated characteristics of statistical data quality are:

- Importance and extent of usefulness of data and their derived information products
- Timeliness and content consistence
- Harmonization in content of data with their definitions and their accuracy
- Harmonization with definitions of other relevant statistical data
- Accessibility to data and uniform definitions
- Comparability with adequate data from other institutions or for other reference period.

In conditions of concrete countries and especially on regional level it is necessary to evaluate as an one important qualitative parameter of statistical products also possibility of data availability to wide range of public. As public we understand laic and also scientific society, representatives of political parties and staff working for media. Basic technical outputs of EU SILC project, which reflect generally known social events and procedures should be interpreted plainly in term of definitions and values.

As example we can mention term average amount (wage, income, living costs, and others). These indicators are in case of laic public, but also political parties, sensitively accepted and thus it is necessary to aim adequate attention to definition of these indicators.
In specific cases it is possible to define other criterion dimensions of quality in such a way that they would be able to evaluate obtained data in relation to other relevant characteristics and situations.

In evaluation of outputs from EU SILC project in conditions of the Slovak Republic, *importance and extent of using primary data* as also indicators derived from these data is expressly confirmed. Interest in preliminary data from EU SILC project have not only academic and scientific society, but also wide range of persons of public organizations interested in these issues, staff working for media and naturally interested politicians. As current users of these data are bodies of state administrations and importance of these outputs are also confirmed by other consequential projects with aim at analysing of social fields and social exclusion.

We might accept that higher data reliability and data processing on-time will lead to increase of their utility value. But it is also in interest of statistical offices whether these products will be available for the widest range of professionally qualified and laic users. By this reason the Statistical Office of the Slovak Republic provides complete databases of EU SILC data per individual years to all persons from universities and researches institutes, who are interested in this issue. The Statistical Office of the Slovak Republic welcomes each creative contribution in form of qualified analysis and presentations of current outputs from EU SILC project.

The Statistical Office of the Slovak Republic provides large open space for publishing for all scientists, who are interested in analysing of EU SILC outputs through periodical scientific publication of the Statistical Office – Slovak Statistics and Demography.

In spite of strengths mentioned above we suppose that systematical analysis and presentation of its outputs should became permanent research space for academic workplaces. In order to carry this point would be suitable to define relevant tasks such as topics of research tasks, which are managed and financed by Agency for Science, Ministry of Education of the Slovak Republic.

*Timeliness and content consistence* of obtained data is confirmed by current data processing on time, public presentation of these data and consequent comparative analysis for individual social groups and geographic structure within the
Slovak Republic (male, female, employed persons, unemployed persons, children, retired persons, regional reviews (by regions). We can assume that final summarization of EU SILC outputs, prepared for this calendar year, allows objective and complex evaluation of timelines and content importance of collected data.

Special seminar for main experts in area of production and using of statistical data and outputs of EU SILC project will refer to importance of these data and also all positives and interpretative and application limits in content, but also in timeliness of data.

_Accord of content of collected data with their definitions_ and data accuracy is verified by qualified evaluation of experts, who are responsible for primary data collection and logical and content accuracy of data. According to obtained experience we can say that in verification of data accuracy there are not occurred intentional input skew caused by respondents. In order to eliminate possible occurrence of them there are realized regular special _evaluation of quality of input data_ in relation to strict definitions.

Special sophistication of data collection, data processing and presentation of outputs from EU SILC project involves clarification that outputs are _in accordance with other relevant statistical data concerning content and time_. Thus this attribute of quality belongs to the most important quality attributes and it is verified, as it is shown in whole this report, through indirect or other administrative reported information on income situation of households and individuals. Especially well-tried is method of comparability with sample surveys, which are carried out by numerous agencies for private sector needs. In verification of accord we take into account information sources, which come under other central bodies of civil service or their specialized institutions.

Often discussed quality dimension of statistical data is _data accessibility for final users and their uniform definitions_. We could note that the Statistical Office of the Slovak Republic seeks to provide collected data in the largest extent to scientific and laic society as soon as possible. Especially it is necessary to appreciate accessibility of collected data to academic community. In this connection it would be involved more initiative and erudition of these institutions in complex and comparative analysis of obtained primary data and also derived indicators.
One of these ways how to stimulate higher interest of academic and scientific society in outputs of EU SILC project and other data analysis is availability of data to be on-line on website of the Statistical Office with helpful programme help. Especially we mean flexible content of collected variables, creation of tables and charts as well as selective inclusion of required indicators. As for example it is possible to mention programme help for statistical databases of Eurostat.

Comparability and consistence with adequate data for other institutions or for other reference period could be in the case of data from EU SILC project considered as the most important qualitative parameter of project output and in term of fact that these data are used for direct comparison of social situation of population in various countries of the European Union or for regional units within countries and consequently tasks or requirements connected with social network are quantified on the base of these data. On national or regional indicators social sensibility of these outputs is very high.

It is shown that it is necessary to coordinate information outputs of the project and other information outputs, which provide the same outputs at the first side (numbers of respondents, volume of paid benefits, average amount of these benefits, estimations of numbers and structure of unemployed persons and others) already in process of task solution of EU SILC project and especially in process of data presentation. We aimed at this issue in detailed in next parts of this study.

3 Measurement of income situation and social exclusion of population

Still increasing differences in results of economic development in advanced industrialized countries and developing countries stimulate consideration of need of qualified objectification of measurement of these results. In economic theory there have been finding answers for a long time to question about relation between economic growth, whose indicator is mainly GDP per person, and real living standard of population in individual countries and regions. We result from initial construction and function of indicator GDP. According to Kuznets this indicator is not appropriate for this measurement.

Deducting of conclusions about results of economic growth and social development only on the base of indicators GDP per person could lead to
conclusions that do not take into account real dynamics of improvement or slump of social development of population and thus also living standard of population. Through indicators GDP per person it is practically impossible to analyse social status of individual groups of population. These tasks treat other system of „softer” indicators.

The European system of social indicators, as is listed in official documents of the European Union, and consequently also application oriented national publications (iii, iv, v) create large area for selection of appropriate tools for evaluation of results of socio-economic development. Most of these indicators is derived from income situation of population and shows that key information for creation of standard and international comparability system of indicators are data on household incomes.

In studying of these information I have a goal to analyse and quantify income differences between households or individual members. It is known that income differentiation belongs to basic attributes of society, working on the base of market direct economic system. Payment of population members is generally based on results of works of individuals, it expresses participation in formation of society utilities. Naturally individual members of society contribute to results of economic growth in differentiated ways, which reflect their contribution to process of formation of economic values. Role of economic and social politics of countries is to form such business and working environment in order to provide that differentiated performance results would be adequate evaluated and thus they stimulate other activity and improve intensity of labour of all society members. Any efforts to achieve unique remuneration or effort to minimize income differences in society would disserve from the view of whole society and perspective view and they affect against interests of vulgar social politics. Certain level of income inequality is thus not only acceptable but also desirable and on the base of this situation it is necessary to observe and interpret also obtained income differences within EU SILC project.

The aim of statistical analysis is studying of attributes of data files of variables, which describe these situations and looking for variables, which could give the most qualified answers in interpretation. To basic tools belongs one, which give us occasion to answer in total to questions related to occurrence of income inequality in statistical data files, it is Gini coefficient as indicator of total income inequality. Its theoretical aspects and practical applications are used in a large-scale and they are
generally known. Gini coefficient is standard presented also as output from EU SILC project in Slovak conditions. It is possible to note that analyses of its values for individual information sub files offer additional information on scope, income inequality and so it offers also possibilities of more concrete subject analysis of sources of this inequality or qualified interpretation (desirable, acceptable, undesirable, discriminatory, stimulative and others).

Application possibilities of Gini coefficient are relatively limited and for interpretation of Gini coefficient it is necessary to pay regard to this fact. Especially it is needed to realize that indicator *expresses total income inequality in follow-up file* and it is without specifying of position or share of individual income components in value of this indicator. Through exemplificative pictures we could show that in the same value of Gini coefficient there could be significantly different distribution of income groups (see Picture 1) in follow-up data file.

In the first case (G1) we register significant income concentration in upper deciles, while in the second case (G2) there are significantly concerned especially lower income groups of population. Gini as the total indicator of income differentiation does not have any information on sources or localization of this inequality within follow-up file. In term of quality of information, whose holder is Gini coefficient, we can compare it with indicators of mean value in other statistical files.

![Picture 1. Illustration of characteristics of Gini coefficient](image)
In examination of income differentiation the highest interest is oriented on income groups with lowest income. This observation is caused by need to record possible extreme cases, where individuals and households could occurred in situation, they are not able to face up to their life situation and requirements to cover basic financial needs in normal way (food, clothes, accommodation, etc.) and thus they fall to poverty.

Term poverty is in literature largely discussed and its clear worldwide acceptable definition has not existed. In general it is possible to mention that basic methodological approaches to study poverty are based on poverty thresholds. To the best known of them belongs poverty threshold in accordance to definition of the World Bank, i.e. one dollar per person and day. Practically in case of developed countries, poverty threshold has often identical definition with definition of living wage threshold, e.g. in statistical survey in USA.

Within EU SILC project there are practically all relevant indicators related to poverty derived from parameters of statistical distribution of sample population, which is subject for study of income situation in individual member states of the European Union and thus also within Slovakia. List of indicators, which are applied in Slovak conditions, we can briefly characterize as: their initial information base is knowledge of theoretical distribution of income variable. For purposes of our analyses we result from application of log-normal distribution, which allows to estimate proportion of income vulnerable population (threatened by poverty) in dependence on explanatory parameters of distribution, such as median, or 0,6 median value (see Picture 2).

![Picture 2 Theoretical distribution of income variable](image-url)
In this case share of income vulnerable households (threatened by poverty) (PPOD) is generally expressed by value:

$$PPOD = \int_{0}^{0.6 Med} \frac{1}{\sigma \sqrt{2\pi}} \exp\left\{ \frac{\ln x - \mu}{\sigma} \right\}^2 x dx$$

where $x$ is income variable, $\mu$ is its median value and parameter $\sigma$ expresses variability of follow-up file. Indicator PPOD is key indicator for analysis of income differentiation of population and for study of income characteristics of selected groups.

For more detailed studies of structure of income vulnerable households (threatened by poverty) the total indicators are calculated according to type division of households – according to age and sex, social activity, type of household in connection with number and age of household members, according to geographic division and etc.

In all cases mentioned above as characteristics of income vulnerability there is probabilistic indicator expressing risk that relevant group of households is occurred in income situation below critical income value (0.6 median).

Probabilistic characteristics is in content very simple and it does not have another, richer gnoseological sense than is probabilistic profile of relevant income group of population. According to values of this characteristics we can identify households (individuals), who belong to income vulnerable group.

### 4 Characteristics of comparative type

Other group of characteristics, which describes income situation of households, is that one based on comparison of two or several subgroups of follow-up population. The most often used approach is comparison of decile income groups. Practically the most often applied method is comparison of income of lower and upper income percentile (S100/S1), decile (S90/S10) or income of lower and upper quintile (S80/S20) and it is applied before and after social transfers. For
special reasons there is also applied comparison of other compositions of income groups, such as upper and lower income group (S50/S50).

In application of these indicators it is necessary to pay regard that income variables for larger income groups to a large extent cause decrease in „sharpness“ of differences in income differences of households. **Quintile indicator** is relatively frequently used, but it is slightly rough indicator and for measurement of income dynamics in shorter time period is unsuitable. For these reasons it could be supplemented by decile indicator. For observation of income contrasts there is sometimes used percentile indicator. In construction of percentile indicator it is necessary to make reckoning of accuracy of initial data. Because small inaccuracies could cause big distortions of final indicator of income inequality.

Comparison of income characteristics for selected income groups has its deeper foundation especially in situations, where comparative indicator for various time period, various types of statistical surveys or international comparison is applied. **In Table 5** (Deciles income comparison) we show comparison of income characteristics in several decile groups and for two different statistical surveys. The aim of this information is also to show the fact, how accuracy of follow-up variables of income differentiation is loosing by data aggregation. While decile share for income inequality according to data from EU SILC 2005 gives an amount 5,927, relevant quintile indicator gives 3,569.

<table>
<thead>
<tr>
<th>Compared Deciles (groups of deciles)</th>
<th>Statistical survey</th>
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<tr>
<td></td>
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<tr>
<td>10:1</td>
<td>5,939</td>
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<tr>
<td>(10+9) : (1+2)</td>
<td>3,660</td>
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<td>(10+9+8):(1+2+3)</td>
<td>2,672</td>
</tr>
<tr>
<td>(10+9+8+7):(1+2+3+4)</td>
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</tr>
<tr>
<td>(10+9+8+7+6):(1+2+3+4+5)</td>
<td>2,069</td>
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Source: Calculated by author himself
In order to improve value of notice of comparative indicators, application of these indicators in multi-level data files is appropriate (income groups by geographic or social stratification). In the case of EU SILC project for Slovakia this approach was applied in studying and evaluating of income situation of population by regions and social groups.

For studying and interpretation of dynamics of changes in income situation of population/households for illustrate purposes there is appropriate to use **indicator of income disparity**, expressed as **cosine of direction angle alpha** between trend lines of decile distribution of population and income distribution. Illustration of this indicator is displayed in Picture 3.

In measurement of social situation of households and population, practically are used not only income variables, but also supplementary **Laeken indicators**. These indicators reflect indirect attributes of living standard on the base of which it is possible to derive additional conclusions about social situation of households and life quality of them. As examples of these indicators are indicators of (un)employment of population, especially data on long-term unemployment, information on numbers of households with long-term unemployed members, information on numbers of children, who do not finish school attendance standardly.
To important follow-up indicators belongs life expectancy or health life expectancy at birth. In EU SILC project respondents answer several questions, which allow to make qualified estimation of their social situation, which could be expressed through non-cash indicators. In analysing and interpretation of such obtained results (with strong reflection of self-estimation) it is necessary to proceed carefully, especially in potential international comparison. As illustrative example (without any reflection and explanation) we show comparison of results of respondents’ answers, divided by income deciles, in projects EU SILC in Slovakia and in Belgium (see Picture 4).

Specifically we show only structure of answers to questions related to capacity of households to afford paying for one week annual holiday away from home, capacity to afford meal with meat, chicken, fish every second day and capacity to face unexpected financial expenses. According to obtained results it is shown that respondents in Belgium evaluate their situations much more critical (more pessimistic) than respondents in Slovakia. As explanation of this situation it is possible to take into account the fact that definition of selected questions or general understanding of these categories is not understanding standardly. In different countries there is different content as well as different meaning.

We come to similar conclusions and differences in results of EU SILC project and in attempts to do international comparisons also in evaluation of other parameters and comparisons with other EU states.

Picture 4
Selected Laeken indicators are often used also for other processing and calculation of composite indicators. As example we can also mention Human Development Index (HDI) \(^1\), which is widely applied in projects of the World Bank.

Laeken indicators can be used, in addition to their basic information determination, for qualitative analysis of evaluation of quality and reliability of primary data. There is question for example, if household with average monthly income per one household member in amount over 15 600 SKK (the highest income decile) has recorded that reason for which this household does not possess computer is they cannot afford it (not affordable for them).

In concrete situation of Slovak households, explanation made in this way impresses untrustworthy. Similarly we could also evaluate other answers or answers in some lower income deciles.

Considering actual experience with application of objective indicators it is possible to note that information reaction to non-financial indicators is slightly large in term of scientific and laic public. It is gladsome that these results are in interest of representatives of political parties and government institutions. By this reason primary construction and interpretation of these results involves much more attention.

5 Additional variables of identifications and evaluation of income differentiation

Implementation of methodological tools and variables into analytic and mainly interpretative process in addition to variables of total income differentiation (Gini coefficient) is convenient in effort to enrich and improve monitoring of income situation of population and individual groups. This requirement results from the fact that in many cases extensive file, which is divided into some linear or hierarchical structured sub files, is a subject of monitoring income situation. In calculation of variables of income differentiation, there is appeared natural question about impact of differentiation deputed from inside of individual sub files on total income differentiation and what is the impact of this differentiation on total income differentiation.

\(^1\) Composition of information on GDP per person, life expectancy and literacy of adult population
In cases, which are followed within EU SILC project it is related to study of total income differentiation for Slovakia together with observation of impacts of income differentiation, which has „source“ in individual regions or inside of follow-up social groups (working, unemployed, in retirement, others). For example Gini coefficient is not able to provide answer on these questions. For these purposes Theil index $^v$ is recommended to go over. By calculation of this index, but also in interpretation we will proceed according to formulas mentioned below:

$$T = \sum_{k=1}^{m} s_k T_k + \sum_{k=1}^{m} s_k \ln \frac{x_k}{x}$$

We calculate Theil index for file, which is divided into several sub files (regional dividing, dividing to social groups, income groups and others), where for calculation of relevant Theil index $T_k$ this formula is applied:

$$T_k = \frac{1}{N} \sum_{i=1}^{n} \left( \frac{x_{ik}}{x_k} \ln \frac{x_{ik}}{x_k} \right)$$

median for these sub files is marked by symbol $x_k$, where

$$x_k = \frac{1}{n} \sum_{i=1}^{n} x_{ik}$$

Application of Theil index has allowed decomposition of final income differentiation into individual subjects, which create autonomy, possibly quasi-autonomy subject of follow-up file. In formulas mentioned above $x_{ik}$ is i-income variable in k-sub file. $X_k$ is median of this variable, $s_k$ is share of k-sub file in total income of whole data file.

With regard to information mentioned above we can express schematically value of Theil index in compliance with the first scheme as $T = A + B$. 
In interpretative sphere it means that we can decompose total value of Theil index, which expresses total income inequality in follow-up file or files, into two basic components:
- Income differentiation, which has genesis in income differentiation inside of sub file and
- Income differentiation, by which relevant sub file affects (contribute to) total income inequality in whole file. Application and interpretation of Theil index we will show on the base of data from EU SILC 2006 database.

In concrete case of EU SILC in Slovakia it is interesting and useful to study decomposition of total income difference in meaning of Theil index in Slovakia into its regional components. Basic calculation of Theil index is listed in Table 6 and 7. Graphic illustration of decomposition of total index is shown in successive steps in Pictures 5 and 6.

Calculation of Theil index by region is shown in Table 6 (Theil index and its composition to source of inequality). Its total value is 0.1207. From table and graphic interpretation is evident that amount and structure of income in Bratislava region is the most important stake into income inequality in Slovakia. Theil index for this sub file gives an amount 0.1956, what markedly exceeds all other variables of rate of income inequality. The lowest values of Theil index we can seen in Trenčiansky region, Nitriansky region and Prešovský region.

As we mentioned above, in calculation of total index of income inequality we use calculation structure of Theil index and we decompose it into component A and B, which represent intra-group (regional) income inequality and „benefit“ of relevant territorial unit to total value of income inequality within whole follow-up data file (SR). From table it is obvious that Bratislava region is in this conversion also the strongest contributor to total income differentiation in Slovakia. It contributes to the total value of index approximately 62%. Regions Nitra and Prešov increase total income inequality by decreasing of achieved income level within Slovakia.
Table 6. Theil Index and its decomposition to sources of inequality

<table>
<thead>
<tr>
<th>Region</th>
<th>Tk</th>
<th>Xk</th>
<th>Sk</th>
<th>A</th>
<th>Xk/X</th>
<th>B</th>
<th>Theil</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA</td>
<td>0,196</td>
<td>14 047</td>
<td>0,153</td>
<td>0,030</td>
<td>1,344</td>
<td>0,045</td>
<td>0,075</td>
</tr>
<tr>
<td>TT</td>
<td>0,051</td>
<td>10 891</td>
<td>0,109</td>
<td>0,006</td>
<td>1,042</td>
<td>0,005</td>
<td>0,010</td>
</tr>
<tr>
<td>TN</td>
<td>0,110</td>
<td>10 288</td>
<td>0,113</td>
<td>0,012</td>
<td>0,985</td>
<td>-0,002</td>
<td>0,011</td>
</tr>
<tr>
<td>NT</td>
<td>0,093</td>
<td>9 310</td>
<td>0,117</td>
<td>0,011</td>
<td>0,891</td>
<td>-0,014</td>
<td>-0,003</td>
</tr>
<tr>
<td>ZA</td>
<td>0,110</td>
<td>10 321</td>
<td>0,124</td>
<td>0,014</td>
<td>0,988</td>
<td>-0,002</td>
<td>0,012</td>
</tr>
<tr>
<td>BB</td>
<td>0,105</td>
<td>10 267</td>
<td>0,123</td>
<td>0,013</td>
<td>0,983</td>
<td>-0,002</td>
<td>0,011</td>
</tr>
<tr>
<td>PO</td>
<td>0,093</td>
<td>8 735</td>
<td>0,122</td>
<td>0,011</td>
<td>0,836</td>
<td>-0,022</td>
<td>-0,010</td>
</tr>
<tr>
<td>KE</td>
<td>0,106</td>
<td>10 466</td>
<td>0,139</td>
<td>0,015</td>
<td>1,002</td>
<td>0,000</td>
<td>0,015</td>
</tr>
<tr>
<td>SR</td>
<td>1,000</td>
<td></td>
<td>0,111</td>
<td>8,071</td>
<td>0,009</td>
<td></td>
<td>0,121</td>
</tr>
<tr>
<td>In %</td>
<td>100,000</td>
<td>92,306</td>
<td>7,694</td>
<td>100,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is obvious that income inequality in Slovakia is not only result of single explanatory factor – regional structure. Analogue individual social groups can be considered for resources of income inequality. In our case it means groups – working, unemployed, in retirement and other economically inactive persons (inactive groups of people). In calculation of total Theil index we have obtained value 0,1252, which is close to previous result. Small differences in resultant value are caused by rounding.

Group of working represents the highest share in sources of income inequality, as we have accepted. Share of them in total value of Theil index is more than 90%.

On the base of this calculation there is interesting that group of economically inactive persons (inactive) contributes to increasing of total income inequality more than group of unemployed and in retirement in connection with this calculation.

Table 7. Theil index calculation and decomposition

<table>
<thead>
<tr>
<th>Social group</th>
<th>Tk</th>
<th>Sk</th>
<th>A</th>
<th>Xk/X</th>
<th>B</th>
<th>Theil</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Working</td>
<td>848,32</td>
<td>0,498</td>
<td>0,062</td>
<td>1,126</td>
<td>0,059</td>
<td>0,121</td>
</tr>
<tr>
<td>2-Unemployed</td>
<td>128,98</td>
<td>0,048</td>
<td>0,006</td>
<td>0,741</td>
<td>-0,014</td>
<td>-0,008</td>
</tr>
<tr>
<td>3-In retirement</td>
<td>279,61</td>
<td>0,194</td>
<td>0,017</td>
<td>0,930</td>
<td>-0,014</td>
<td>0,003</td>
</tr>
<tr>
<td>4-Inactive</td>
<td>569,40</td>
<td>0,259</td>
<td>0,034</td>
<td>0,915</td>
<td>-0,023</td>
<td>0,011</td>
</tr>
<tr>
<td>SR-Theil index</td>
<td></td>
<td></td>
<td>0,119</td>
<td></td>
<td>0,007</td>
<td>0,126</td>
</tr>
<tr>
<td>In %</td>
<td>94,187</td>
<td></td>
<td></td>
<td>5,813</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>
Overall expressed income differentiation using Theil index is parallel of measurement by Gini coefficient, where its individual components TK express share of individual sub files in total value of Theil index.

In the Picture 5a we illustrate decomposition of Theil index into resources of inequality by individual regions.

In the Picture 5b we illustrate decomposition of Theil index into resources of inequality by individual regions.
Picture 5c illustrates structure of resultant components of Theil index by individual regions.

In Pictures 6a-6c decomposition of Theil index into its basic components by social groups analogue with former procedure is shown.
Using Theil index we have often met with problem of its simple interpretation. Value of this variable is not limited by interval 0-1, or 0%-100%. There is possibility of standardization of this indicator in effort to deal with this deficit in literature by formula:
\[ T_{\text{normat}} = 1 - e^{-T} \] (2).

By standardization of values of Theil index we have obtained variables, which vary in range from 0 to 0.632. Transformational formula is shown in Table 5 (Theil index transformation).

<table>
<thead>
<tr>
<th>( T )</th>
<th>0</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>( T_{\text{norm}} )</td>
<td>0</td>
<td>0.0895</td>
<td>0.181</td>
<td>0.259</td>
<td>0.330</td>
<td>0.393</td>
<td>0.451</td>
<td>0.503</td>
<td>0.551</td>
<td>0.593</td>
<td>0.632</td>
</tr>
<tr>
<td>( T_{\text{norm}} % )</td>
<td>0</td>
<td>15.1</td>
<td>28.7</td>
<td>41.8</td>
<td>52.2</td>
<td>62.2</td>
<td>71.4</td>
<td>79.6</td>
<td>87.4</td>
<td>93.9</td>
<td>100</td>
</tr>
</tbody>
</table>

We can note that in spite of standardization, interpretation of values of Theil index requires higher erudition in work with mathematic-statistics tools than in case of simple variables such as Gini coefficient.

In spite of fact mentioned above, application of Theil index has one’s place especially in situations, when there is necessary to quantify influence of several sources of income differentiation (geographical units, social groups and etc.). Project EU SILC has made extra suitable information background and it would be appropriate to integrate it into standard tools of its analytic and demonstrate tools.

In connection with applications of other variables of evaluation of income inequality there is useful to note that implementation of these tools is meaningful only if content uncleanness in interpretation of income inequality involves it, or problems in its decomposition into sources of this inequality involves it. As alternative tools of measurement can be considered:

- Atkinson index and
- Index of Robin Hood (Hoower Index).

**Robin Hood Index** is calculated by this formula:

\[
I_{\text{RH}} = \frac{1}{2} \sum_{i=1}^{k} \left| \frac{E_i}{E_t} - \frac{A_i}{A_t} \right|
\]

where

- \( k \) is number of quintile groups
Ei is share in income structure for i-quintile group, where Et is total income in data file. Value Ai is number of members in i-income quintile, At is total number of members in follow-up data file.

In term of content interpretation of this index it is appropriate to mention that RH is total indicator of relative income volume, which is necessary for secondary income redistribution. Result of this redistribution would be ideal level of income distribution. It is obvious that application of index is rather simple supplement or refreshing contribution to analysis and interpretation of income inequality. We cannot see its functional importance for EU SILC project.

Atkinson index

It is additional potential tool for income inequality measurement. It results from concept of equitable average income distribution and it respects different income levels between income groups, but it assumes income equality inside the groups.

Equitable income Ye is calculated by formula:

\[ Y_e = \left( \frac{1}{2} \cdot \sum y_i^{1-\text{eps}} \right)^{\frac{1}{1-\text{eps}}} \]

where quantify eps represents theoretical aversion towards income inequality in follow-up data file.

6 Analysis of poverty – Sen’s coefficients

Observation and evaluation of income inequality within EU SILC project is a tool for identification of income population groups, which are threatened by poverty and consequently by social exclusion.

Meaningful methodological and also objective contribution to study in connection with this issue brought Amartya Sen (holder of the Nobel Prize for economy in 1998). Sen significantly distinguished definition of poverty and introduced into theory terms such as absolute and relative poverty (\(vii\)). As remarkable contribution to practical study of this issue is regarded introduction of term poverty line and poverty gap. Application of them is helpful mainly in connection with
requirements of countries with extremely low incomes of population. In most cases they represent countries of developing world or some countries with economics in transformation process.

In application of Sen´s methodology we proceed according to scheme mentioned below:

Poverty line $A$ is defined explicitly on the base of knowledge of income and expenditure situation of population in concrete society or is derived from exact parameters of follow-up statistical data file. (In our statistical practice term Poverty line has not been used in such large extent, but in content it is close to criterion 0.6 median, which is used by us).

*Proportion of population below poverty threshold* is defined by relative (%) indicator POPHCH. Value $a$ is represented by average income of household, which are situated in whole income area below threshold 0.6 median.

Value $(A-a)$ is called *indicator of poverty gap* and it is displayed by the scheme below:

![Diagram](https://via.placeholder.com/150)

Value $(A-a)$ represents income deficit of household, which is situated in group of income vulnerable households. This value expresses theoretic volume of sources, which are needed for increasing of income standard of this household to get to value of poverty threshold or above poverty threshold.

Relative indicator $(A-a)/A$ is known as Sen´s *coefficient of poverty*. It is relative indicator of poverty gap and its value falls to interval 0-1, where value 0 means slightly poverty, values close to value 1 mean significant poverty.
Calculation of social income deficit is done according to following procedure. Mark total number of population as **CPO**. Volume of financial resources, which is needed to move income position of the poorest groups of population from level **a** to level **A**, we mark this volume as **social income deficit (SPD)**. For whole follow-up population it is calculated according to following formula:

\[
SPD = POPCH \times CPO \times (A-a)
\]

Monitoring of income differentiation and income inadequacy and subsequent social exclusion cannot stay in position of statistical variables and abstract constatation. It is task of relevant executive administrations to use these indicators and statistical findings in a full scale and thus to contribute to solution of this situation. Goal of the Statistical Office is to present obtained variables in a way in order they would be expressly clear for executive administrations and in order expected steps of these authorities would be indicated.

In respect of information mentioned above we show **illustrative** procedure of application of Sen´s coefficients methodology and calculation of income deficit for case 1, 5 and 10 % proportion of income vulnerable population (threatened by poverty). As poverty threshold we used values 0.6 median value of relevant income variable. Example is shown in **Table 6** (Sen´s poverty indicators with social deficit calculation).

<table>
<thead>
<tr>
<th>Population</th>
<th>Poverty</th>
<th>Poverty Indicators</th>
<th>Income deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Threshold</td>
<td>Mean</td>
<td>Share in %</td>
</tr>
<tr>
<td>Total</td>
<td>Below poverty threshold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 384 822</td>
<td>53 848</td>
<td>3 972</td>
<td>2 443</td>
</tr>
<tr>
<td>5 384 822</td>
<td>269 240</td>
<td>3 972</td>
<td>2 443</td>
</tr>
<tr>
<td>5 384 822</td>
<td>538 480</td>
<td>3 972</td>
<td>2 443</td>
</tr>
</tbody>
</table>

Volume of deficit expresses theoretical quantity of financial resources which are needed for movement of the poorest social classes of population with income below poverty threshold to poverty threshold. This procedure is suitable for simulation of different social politics and their financial costingness.
7 Analysis of reliability of primary EU SILC data – Bedford’s law

Problems of quality and reliability of information, which are used in EU SILC project is cardinal question that is needed to be solved not only in analysing, but also in phase of planning data collection. For verification of accuracy of initial information there is implemented a lot of methodological procedures in statistical practise. Common denominator for them is mostly testing of logical accuracy of provided data.

As distribution criteria are introduced logical filters to minimum or maximum values or other logical limits. Also EU SILC project in Slovakia works with these tools and we can observe that their influence on data quality is evident.

For checking of statistical data quality, recently there are more often used non-standard mathematic-statistical approaches. One of them is Benford’s law \((viii, ix, x, xi)\). This law expresses probabilities of occurrence of the first digit \(d\) \((d=1,2,3,4,5,6,7,8,9)\) in arbitrary adequately large data file with probability:

\[
P(d) = \log_{10}(d+1) - \log_{10}d = \log_{10}\left(\frac{d+1}{d}\right).
\]

For digits of decimal system it means that their occurrence in the first place is probably following:

<table>
<thead>
<tr>
<th>Table 7. Benford’s probability of the first digit occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d)</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>(P(d))</td>
</tr>
</tbody>
</table>

On base of validity of Benford’s law there is possibility to test „reality“ of any data file, whose values can give values without specific limiting. In case of real numeric values, frequency of occurrence of figures of decimal system in the first place (in case of adequately large data file) has to meet probabilistic parameters according to Benford’s law and values displayed in Table 7 (Benford’s probability of the first digit occurrence).

This procedure was also used for verifying of accuracy of initial data of EU SILC project in Slovakia. From values for the year 2006 we obtained following probabilistic distribution of data files for these variables:
• Housing allowance
• Gross household income
• Disposable income
• Income before social transfers
• Income after social transfers

Graphic comparison of probabilistic characteristics of EU SILC data and relevant Benford’s values mentioned above is shown in Picture 7a.

In evaluation of input data it is primarily necessary to mention that follow-up numeric data files are relatively small and that is why conditions of validity of Benford’s law are not fully met. In spite of this information it is evident that majority of provided data has also theoretically confirmed „accuracy“. Partial discrepancy between Benford’s values and characteristic of empiric values is indicated only in two groups of variables – housing allowance and income after social transfers. But also this discrepancy has a relatively clear explanation. Housing allowances and social transfers mostly reflect social state politics and they follow regulations. They do not give arbitrary values as Benford’s law involves.

We obtain certain „improvement“ of quality of follow-up data after exclusion of regulated variables (housing allowance), see Picture 7b.
We notice further improvement of quality after exclusion of variables, which are impacted by regulative intervention of social state politics (income after social transfers), see Picture 7c. We can note that probabilistic characteristics of these variables confirm their real statistical reliability and quality of content.

View on data files EU SILC 2005 and 2006 years have offered interesting finding. Graphic comparison of EU SILC data (variable HY020 – disposable income) and Benford´s values is shown in Pictures 8a and 8b.
About high reliability of EU SILC data and probabilistic „closeness” of Benford’s values and empirically collected input data tell also values of correlation analysis between these data files. Results are shown in Table 8.

<table>
<thead>
<tr>
<th>Income variable in EU SILC 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Income</td>
</tr>
<tr>
<td>Disposable income</td>
</tr>
<tr>
<td>Before soc. transfers</td>
</tr>
<tr>
<td>After soc. transfers</td>
</tr>
<tr>
<td>Property tax</td>
</tr>
<tr>
<td>Income tax</td>
</tr>
<tr>
<td>0,953</td>
</tr>
<tr>
<td>0,95</td>
</tr>
<tr>
<td>0,958</td>
</tr>
<tr>
<td>0,932</td>
</tr>
<tr>
<td>0,935</td>
</tr>
<tr>
<td>0,976</td>
</tr>
</tbody>
</table>

Table 8. Correlation analysis of empirical and Benford’s values
Also from these results high reliability of initial EU SILC data is evident in these groups, where influence of „legislative regulated” inputs into value of collected variable is excluded but it is minimal. We can evaluate general reliability of arbitrary follow-up variable with correlation coefficient in relation to normative Benford´s values. In all groups of variables mentioned above this coefficient achieves values, which enable us to have an expectation of almost 95 % reliability of initial data. This result is in accordance with methodology for data collection and expected data reliability.
Conclusion

Expanding and integrating economic and social environment of the European Union and efforts to manage other harmonized and social development involves permanent observation of its internal homogeneity and stability. Monitoring of state and quality of social environment belongs to the most important tasks of the European Union and member states. To important tools, which should contribute to achieve these tasks, belongs EU SILC project, aimed at monitoring of income situation and living conditions of households within European Union. Results of this statistical survey belong to the most important tool for evaluation of achieved level of social situation within European Union and among individual member states. Special attention is oriented on groups of population, whose income situation leads to social marginating or social exclusion. On the base of the statistical survey special social programs are elaborated for groups of population mentioned above. With regard to importance of these surveys it is necessary to manage maximum credibility of initial data and verify data consistency with other data for the same economic and social environment.

In accordance with information mentioned above within project „Comparability of implementation of EU SILC survey and its outputs with other data sources providing comparable outputs” we defined following basic goals of the project:

• verifying credibility and consistency of alternative information sources, which allow to estimate parameters of social situation of households in Slovakia
• completing and improvement of tools for measurement of income differentiation of household
• elaboration and completing methodology for measurement of social deficit of society compared with income vulnerable households (threatened by poverty)
• elaboration of methodology for verifying of quantitative accuracy of input data of the EU SILC project on the base of Bedford’s law
Goals mentioned above were realized in extenso and we can mention following conclusions:

- By comparison of large scale data file of alternative information sources was confirmed that **administrative data are basically consistent with data of the EU SILC project. Differences**, which were found in values of analogical variables **could be clarified through ambiguity in definition in both groups of follow-up variables.** Other sources of differences, which were found in evaluation of differences, represented **consequences of legislative arrangement in area of social tools,** which came into force in period of data collection for EU SILC project. With regard to information mentioned above, possible differences in values of collected variables are understandable and thus we cannot evaluate them negatively.

- Actual experience with using results of EU SILC project show that these ones do not have such large social and scientific reaction as they would deserve in relation to their importance. One reason is partly ambiguous formulation of results and less helpfulness to not so capable users. For this group of users we elaborated **new, additional tools for measurement of income differentiation, which allow to do more qualified presentation of this differentiation.**

- In accordance with social efforts of the European Union and its member states it is necessary to observe and **quantify social situation of income vulnerable groups (threatened by poverty)** by calculating of volume of resources, which are (at least theoretically) needed for solution or reduction of their social exclusion. We present these indicators on the base of measurement of poverty gap and its total gap below poverty threshold. Consequently **we also show the way of calculation of volume of social (income) deficit.**

- For qualified examination of reliability of initial data there are lately applied in a large extend more sophisticated mathematic-statistical methods of evaluation of primary data quality. Among these methods there is methodology based on **Bedford’s law,** which has significant
application. Using this method we confirmed EU SILC data reliability mentioned above.

We suppose that solution of this task will be helpful in process of further improvement of data collection, data processing, presentation and application of results from EU SILC project in next years.
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