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EFFECTS OF CHANGES IN TAX-TRANSFER SYSTEM ON HOUSEHOLDS INCOME DISTRIBUTION IN BULGARIA: SIMULATION ANALYSIS USING EUROMOD FOR 2011-2015

The paper presents some empirical results about the assessment of the effects from tax-transfer policies on incomes of Bulgarian households for the period 2011-2015 obtained by EUROMOD – the tax-transfer simulation model of the EU – utilizing data from EU SILC survey. The simulation analysis was performed by tracking the changes in household income distribution for any year from the period where the policy parameters from the base year (2011) were replaced by those enacted for each year, holding the population structure and gross household market incomes fixed at the base year. The results show that the changes in the policies brought in income increments mainly for the households in the lowest income groups. Poverty rate decreases by 1.3-2.9 percentage points (depending on several levels experimented for the poverty threshold). Nevertheless, the poverty level in Bulgaria is among the highest in EU and special measures should be launched in order to enhance the living standard of Bulgarian households.[1]

JEL: D31; H23; I38

Empirical studies of income distribution, economic inequality and poverty in Bulgaria are of special interest during the long years of market transition due to the deep social problems that originated from the prompt impoverishment of a majority of Bulgarian population. Even though the country experienced stabilization and growth in the period of EU integration these issues have not lost their importance – as far as the inequality and polarization problem has not just stayed unresolved but has deepened after the emergence of the global economic crisis of 2008-2009. In the same time, the availability of systematically conducted sample surveys of household budgets during the last 20 years provides a significant information basis for analyzing income inequality and poverty in Bulgaria – and such analyses were published many times.

Bulgaria is one of the EU member states with the highest poverty rates – for example, in 2013 the share of persons exposed to risk of poverty and social exclusion reached 48% followed by Romania (40.4%), Greece (35.7%), Latvia (35.1%), etc., with an EU-28 average of 24.6% (Eurostat, 2016). In the same time, the impact of social transfers on the reduction of poverty level in Bulgaria is among the lowest in EU (53% reduction in at-poverty-risk, with EU average of 61%).

[1] The authors of this article are grateful for the contribution of all former and current members of the EUROMOD consortium for its creation and development, especially for the establishment of its Bulgarian section. The process of enhancement and upgrade of EUROMOD is supported financially by grants from the General Directorate „Employment, Social Affairs, and Inclusion“ of the European Commission (Progress Grant No.VS/2011/0445). The empirical results here are derived by version G2.75 of EUROMOD implemented for the processing of EU-SILC-2012 User Database provided by Eurostat (Agreement 59/2013-EU-SILC-LFS). The authors are the only responsible for any possible errors in calculation or interpretation of the presented empirical results.

Various results from a long-term study of the dynamics of income inequality in Bulgaria are provided by Tsanov & Bogdanov (2012).

Due to their high social significance the topics of inequality and poverty along with the policies targeted in their restraint takes a special place in the Annual Report of the Economic Research Institute at the Bulgarian Academy of Sciences for 2014 considering the economic development of Bulgaria (Tsanov, 2014). According to one of the main conclusions of this Report the social transfers (as a direct tool of income policy) have the most notable effect for reducing the income inequality. Nevertheless, relatively persistent levels of poverty and inequality in Bulgaria are observed in the long run. A conclusion is made that the factors of this phenomenon are „structural and deeply rooted in our society" so a radical change in this respect would be a considerable challenge for the society (IME, 2015).

This paper aims to suggest some results from a detailed study with a set of goals related to the empirical assessment of the effects from changes in the policies on incomes of persons and households in Bulgaria for the period 2011-2015. The main research questions are targeted to the measurement of shifts in income distribution and poverty rates carried out in the years of this period as a result of changes in the policies on incomes, social insurance and social transfers. These results have been obtained by the utilization of the Bulgarian section in EUROMOD – pan-European simulation model for analysis of tax-transfer intervention on household incomes in EU countries (a detailed presentation of EUROMOD functions and capabilities can be found in: Sutherland & Figari, 2013; De Agostini et al., 2015).

EUROMOD as a simulation model provides numerous options for quantitative assessment of the effects of various policies concerning personal incomes and income taxation as well as the justification of needs for reforms in these policies. The empirical results obtained by EUROMOD facilitate the assessment of various policies for social insurance and assistance with the respective revenues and expenditures (De Agostini et al., 2015) as well as the potential effects from the so called "budgetary neutral" reforms (Tasseva, 2016). The empirical results about the changes in inequality and poverty indicators in EU countries derived by EUROMOD are constantly revised – the policy changes are updated each year and the statistical dataset – biannually (EUROMOD, 2016).

In a multicountry study which applies EUROMOD some results about the Bulgarian tax-transfer system are obtained using data for 2001-2011 period (Hills et al., 2014). This study evaluates the effects of policy changes on households' disposable income in each country as a result of various changes in different components of their tax-transfer systems. Along with this, De Agostini et al. (2015) presents additional results about the effects of policy changes for 2008-2014 period in EU countries, including Bulgaria. These effects are found to have a real positive impact on the level of disposable income (due to a real growth of pensions as compared to remuneration levels) and are progressive in fact. However, this analysis utilizes an older set of micro data whereas the current paper provides estimates of quantitative effects based on a more up-to-date sample information.

The article suggests new analytical results for each year from the period 2011-2015 about the effects of changes in direct taxes, social insurance contributions entitled to employee, employer and self-employed as well as about the following group of social transfers: personal and survivor pensions, social assistance with income test and without income test. These results are obtained using data from the European sample survey „Statistics on Income and Living Conditions“ (EU-SILC) conducted in 2002 when income components are recorded for the first year of the study period: 2011. The analysis shows that for the total period 2011-2015 a positive effect of about +3% is observed for the change in disposable income for all households due to income and social insurance policy changes introduced in this period. The most significant effect is estimated for the first 3 decile groups (+6-7%) where the main source of this effect is the uprate of pension levels. As a result from this, income policy changes had a generally positive effect on the relative share of population at-risk-of-poverty for 2011-2015.

Main changes in taxation, social insurance, and social legislation in Bulgaria for the period 2011-2015

During the period from 2011 to 2015 there were no changes in taxation, social insurance and social legislation aiming at achieving a significant influence on the household disposable income formation and dynamics. The personal income taxation remained almost the same – the 10-percent proportional tax rate, without the so-called “non-taxable income”, was preserved. No changes were introduced in the scope of income components included in the tax base.

Taxation policy and social insurance contributions. The only one exclusion is the tax relief introduced in 2014 for incomes not exceeding the minimum wage for the country (entering into force as of January 1st, 2014), but it was abolished in the beginning of the next 2015 year (Council of Ministers, 2014). For the whole period social and health insurance contribution rates remained the same, including the split between the insurer, insured person, and the state. The minimum contributory income for the self-insured people remained unchanged (between BGN 420 and BGN 550) and the maximum contributory income (for all categories of insured) gradually increased from BGN 2000 per month in 2011 and 2012, to BGN 2200 in 2013, BGN 2400 in 2014 reaching BGN 2600 in 2015 (National Insurance Institute, 2015; Law on the State Public Insurance Budget for 2015). The increase in the minimum insurance thresholds per economic activities and main occupational groups also had an influence on the household disposable income, but taking into account the overall effect on social insurance contributions revenues of the state public insurance, this influence was not so significant.[2]

[2] For example, according to the motives accompanying the approved by the Council of Ministers Law on State Public Insurance for 2015, only BGN 35,4 mln. of the total increase in revenues (excluding transfers) of over BGN 153 mln. will be due to the increase in the minimum social insurance thresholds by 4,4% compared to 2014 (Council of Ministers, 2015).

As far as social legislation is concerned, there were no significant changes as well. For the whole period no large-scale changes for regulating the access to social benefits and their adequacy could be mentioned. Some initiatives for keeping the purchasing power of some benefits, for example public pensions, were implemented. For the largest part of the payments, however, the trend was towards achieving reduction in the number of recipients and preventing the aggregate expenditures from increasing.

Public pensions. Public pensions are the most important source of income for the households, reaching about 27% of the total income per person in the period 2011-2015 (National Statistical Institute, 2016). In 2011 and 2012, due to budgetary restrictions, pension indexation was not implemented. In the next 2013, pensions were uprated in such a way to compensate the whole accrued information since the moment of their last indexation (July 2009). In 2014 and 2015, the so-called "Swiss rule" was applied and pensions were indexed as of July 1st by 2.7% and 1.9% accordingly. The changes in pension amounts had a positive impact on their real purchasing power and the average pension (for all types of pensions) rose from little above BGN 263 per month in 2010 to about BGN 267 per month in 2011 and reached BGN 310 per month in 2014, which is a real increase of above 10% for the 2010-2014 period[3].

Family allowances. The approach towards the other social benefits, among which are the family allowances, was rather different. Family allowances are among the most widely distributed social benefits. The prevailing part of them is granted after a means-test based on the average family income per family member for the last 12 months. For the whole period under scrutiny, this "threshold" remained unchanged (BGN 350 per month) and at the same time there was an increase in the total nominal household incomes. As a result, the access to family allowances became more difficult and these benefits were targeted at the groups with the lowest incomes. The number of children receiving family benefits was decreasing as well – from about 821 thousand children in 2011 to little less than 778 thousand in 2014 (MLSP, 2012; 2013; 2014; 2015).

There are few changes resulting in higher amounts of monthly family allowances. Their amount remained BGN 35 per child per month (150% of that amount for twins and 200% - for a permanently disabled child) for the period 2011-2013. In 2014, the monthly amount of the allowance for the second child rose to BGN 50 per month, leading to higher benefit amounts for twins and disabled children. The amount of the allowance for the first child remained unchanged. This was the case of the other types of family allowances (lump sum and monthly allowances) among which is the birth grant lump sum allowance.

Contributory short-term periodic benefits. Apart from public pensions, the course towards other widely distributed social benefits, namely contributory short-

[3] Besides, in the period 2013-2015 the practice of ad-hoc targeted lump sum pension supplements (between BGN 40 and BGN 50) to the pensions of the pensioners with the lowest pension amounts was restored; however, this is not taken into account in the EUROMOD simulations used for the current paper.

term period benefits paid by the state public social insurance (for example – pregnancy and childbirth benefit, benefit for raising a small child, unemployment benefit, etc.), resulted in lower benefit amounts. This was possible due to two types of policy changes. Firstly, by increasing the income reference period. Examples are the contributory benefits for general sickness, pregnancy and childbirth benefit and unemployment benefit[4]. Longer income reference period resulted in income "smoothing" over the employment career, higher income differences become eliminated, and, in the majority of cases – in a lower average income which is applied for the purposes of benefit calculation.

Secondly, by holding back the increase of expenditure on these benefits which amounts are determined by the law. For example, the amount of the monthly cash benefit for raising a small child up to 2 years of age was not changed for a long period of time. In the period from January 1st, 2011 to June 30th, 2013 it was BGN 240. In the second half of 2013 it was BGN 310, and from the beginning of 2014 it has been fixed at BGN 340.

The approach towards social assistance benefits was particularly conservative. Besides means-testing, the eligibility to most of these benefits is determined after an assessment of claimant's property, family and health status, etc. For example, the right to monthly social assistance benefits arises for those individuals and families, whose incomes for the preceding month is lower than the so-called "differentiated minimum income" (determined per different categories of individuals and families). This income is a percentage of the so-called "guaranteed minimum income", which amount is fixed by the Council of Ministers. Actually, the access to monthly social assistance benefits will become easier, if: *firstly*, the amount of the guaranteed minimum income is higher, and *secondly*, if the normatively set percentages for determining the differentiated minimum income for the different categories of individuals and families are higher. However, none of these two circumstances became a reality – for the whole period from 2011 to 2015, the guaranteed minimum income amount stood at BGN 65 per month. The percentages used for determining the differentiated minimum income did not increase as well. Thus, it became more difficult to "enter" the social assistance system, an illustration of which is the fact that in the 2011-2014 period the number of monthly social assistance benefits varied from 47,8 thousand to 52,5 thousand (MLSP, 2012; 2013; 2014; 2015).

Assessment of the effects using the tax-transfer microsimulation model EUROMOD: methodology and data

The method of microsimulation has been applied in order to assess the effects of the aforementioned changes in the policies on taxation, social insurance and social protection on the household disposable income during the suggested

[4] These changes have not been taken into account in the EUROMOD simulations as the EU-SILC data does not contain information on the contributory income of the respondents for past periods. At this stage it is not possible to assess how the findings will change if these policy changes are included in the simulations.

period. This method assumes processing the data for Bulgarian households provided by the „European Statistics on Income and Living Conditions" (EU-SILC) survey conducted by NSI in 2012 during which a set of variables for the incomes of persons and households have been recorded for year 2011. Microsimulation methods provide opportunities for a quantitative assessment, on aggregate level, of redistribution and other fiscal effects of tax-transfer policy shifts conducted in Bulgaria between 2011 and 2015, however, after the changes are measured at the individual level of each person and household in the sample. Income tax, insurance, and social policies are simulated by the tools of EUROMOD – the European tax-transfer microsimulation model – particularly its Bulgarian section.

Tax-transfer model EUROMOD

EUROMOD uses data from nationally representative household sample survey EU-SILC-2012 which contains variables for the gross market incomes, labour market status, and other characteristics of the individuals and households. This data is processed by the rules specified in the policies on income taxation and social protection as defined at June 30th of the respective year[5]. Variables for direct taxes, social insurance contributions, monetary social transfers and finally the disposable income are calculated at person level (where appropriate) and then at household level. Due to individual data limitations in EU-SILC survey (e.g. lack of information about the "labour history" and related social contributions of the individual in the past) EUROMOD is not prepared to simulate the eligibility rules and the amounts of specific social transfers, for example, pensions for old age or disability benefits. In this case EUROMOD utilizes the variables containing data for the respective income components which is recorded during the SILC survey (i.e. monetary amounts reported by the households).

One of the basic advantages of EUROMOD (and microsimulation models as a whole) is that it can simulate the process of determination of eligibility right of an individual or a household to receive a specific social benefit as well as the individual duty for social insurance or income tax – in a situation of altering tax-transfer scenarios. The model integrates the complex interactions between tax-transfer rules, individuals and household characteristics, and the available information about their material status. This provides an opportunity to estimate the direct effects of changes in policies on the shifts in income distributions, inequality and poverty indicators. Due to its vast potential for supporting detailed empirical analyses EUROMOD is widely applicable in EU countries in the framework of various empirical studies in the area of social policies, tax-transfer systems, etc. (see Sutherland & Figari (2013) for an overall review and basic applications of the model).

Nevertheless, EUROMOD model (and microsimulation models as a whole) operates under some limitations. For example, it cannot take into account any behavioral reactions of the households related to decisions to participate in the

[5] This leads to interpretation of results for year 2013 as pinpointed at 30/06/2013.

labour market or involvement in shadow economy activities which requires specific information and complex modeling (even though, the uncertainty level of the outcomes stays high). Along with this, the model does not account for in-kind social benefits as well as indirect taxation (VAT and excise taxes) which does not allow their inclusion in the scope of current analysis. The results derived by EUROMOD are however validated – both at individual household level (through checks for valid data entries) and aggregate level – by comparisons with summary indicators published at national level from administrative sources, e.g. number of beneficiaries, number of employed and self-employed, number of contributors, sum of contributory social assistance revenues, etc. (for a more detailed description of the Bulgarian section in EUROMOD see Boshnakov et al., 2014; Tosheva et al., 2015).

Data provision

As noted above, the current analysis uses data from the EU survey „European Statistics on Income and Living Conditions" (EU-SILC) conducted in 2012 with income components recorded for the preceding 2011 (defined as income reference year). The sample contains 5,679 households with 14,487 persons (22 children born after the end of the income reference period and 28/92 households/persons with missing information have been removed from the original sample). This survey contains a considerable amount of information about the socio-economic characteristics and financial status of the individuals and households in Bulgaria. EU-SILC is the main source of data about the official indicators for inequality and poverty in Bulgaria published regularly by the NSI and Eurostat data platform.

In order to take into account the shifts in the nominal level of incomes from the reference (base) year 2011 to the years studied by our analysis (2012 to 2015) specific coefficients have been estimated for each income component called "uprating factors". For example, employment income (wages and salaries) are uprated by the annual rate of growth of mean monthly income form hired labour in the country. The benefits for unemployment, old age pensions, and some minor social benefits that cannot be simulated on the basis of the available EU-SILC information are also uprated following the rules for indexation (including the compulsory indexation rules and some occasional changes). The changes in labor market status of individuals, the composition of any household, and the related demographic characteristics are also kept intact for any year from the studies period.

Methodology of the study

A new element of the development of EUROMOD as a tax-transfer simulation model is the introduction of the PET analytical tool (namely, Policy Effect Tool) following the method of Bargain & Callan (2010). It has been integrated into EUROMOD in 2015 with the main goal to derive estimates for various effects originating from policy changes regarding taxation, social insurance and social protection on the formation of the disposable household income and on the income distribution (for the population as a whole or for a specifically defined sub-group) as well as on inequality and poverty indicators. The estimated difference between the

disposable income of a household for one year compared to a former year may be due to various reasons, e.g. changes in tax/insurance policies and social policy as a whole, changes in the market incomes, changes in the household composition, etc. The PET module is applied by researchers to obtain an estimate for a specific effect: a shift in the household disposable income due to *shifts only in policies* regarding taxation, social insurance, and social protection.[6] This way an opportunity is provided to researcher to evaluate quantitatively how changes in one or more parameters of the existing policies – or introduction of new, or elimination of existing ones – have a reflection on the incomes and living standard of the population. This effect can be estimated in both nominal and real terms through elimination of actual price level shifts – this is done in the Bulgarian section of EUROMOD using the harmonized index of consumer prices provided by the NSI.

The specific research question which we try to answer by the results from PET implementation is "what could be the disposable income of the households in Bulgaria in a particular base year (period 1) if we enact the policies on income taxation, social insurance, and social protection as defined for the comparison year (period 2).[7] The changes in taxation, social insurance, and social protection policies between two periods can induce changes in the household disposable income by 2 main channels: first, through a *„direct"* effect which can be calculated for each household taking into account its characteristics and market incomes recorded during the survey; second, through an *„indirect"* effect as a result from behavioral reactions of household members to particular policy impulses (e.g. a decision for temporary withdrawal from the labour force, or a shift from employee to self-employed status). The subject of the current analysis is *only* the „direct effect" of policy changes, i.e. an assessment is derived about the changes in disposable incomes reflecting *only the changes in one policy parameter or another*. One should always have in mind another basic assumption of this simulation analysis – the population structure by any socio-demographic characteristic is kept fixed at the status recorded by 2012 EU-SILC sample survey in Bulgaria.

In order to derive quantitative assessment in respect of the research question raised above the policies on income taxation, social insurance, and social protection defined separately for the two periods are implemented by the data for the households and their market income components *for the base period.* This way, we can assess the effect of policy changes by monitoring the shifts in household disposable income as well as changes in specific aggregate indicators for population welfare (e.g. poverty rates or Gini inequality coefficient). Formally, the characteristics of the individuals and

[6] This analytical approach is based on juxtaposing actual to conditional results obtained under the principle „what-if", i.e. what results could be obtained if one parameter is altered on purpose but all other system characteristics are kept constant (also known as "counterfactual" research design). For more details see Bargain and Callan (2010).

[7] The question can be reformulated also from the point of view of period 2. In this case, we need micro-data for the actual characteristics of the population and incomes for period 2. During the finalization of the current analysis the authors had access only to data for the base period (2011).

households as well as their market incomes for period "t" can be denoted by vector y, the monetary parameters of taxation, insurance, and social policies by vector p (e.g. the size of a fixed social benefit, income thresholds, ceiling for contributory insurance base), the non-monetary parameters by vector s (e.g. tax and insurance rates, the order of birth of a child; the minimum age for social pension); and the rules for implementing the policies by function d (e.g. rule for income taxation: progressive or proportional). Then the disposable household income can be defined by the function $d_t(p_t, s_t, y_t)$ where the policy rules transform the market income of the household to disposable income applying the set of enacted policy parameters and socio-demographic characteristics. The indicators for household welfare (e.g. poverty level or Gini inequality) can be defined by a function $I[d_t(p_t, s_t, y_t)]$. Using the PET module the effect of changes in policies on a particular welfare indicator calculated on the basis of a given dataset (individuals and households with their income components) for period 1 can be defined as:

$$\Delta I = I\left[d_2\left(\frac{1}{\alpha}p_2, s_2, y_1\right)\right] - I[d_1(p_1, s_1, y_1)],$$

where α is a coefficient by which some monetary values of period 2 are adjusted to the base period (see De Agostini et al., 2015). The „alpha" coefficient can receive a value of (i) 1 or (ii) HICP (Harmonised Index of Consumer Prices)[8] which provides separate estimates for the direct policy effect in (i) nominal or (ii) real terms.

Results

Applying the method described above the effects of changes in the basic policies in Bulgaria for 2015 compared to the base period (2011) have been estimated along with the annual chain-based effects (each year compared to the previous one). These effects have been traced for the overall (summary) policy changes after taking into consideration the following groups of social insurance and income components: personal and survivor pensions from the state funds; income tested benefits; non-means tested benefits; direct tax on income; social insurance due to the insured person, insurer and self-insured persons. The changes in disposable income are traced for the population of households in aggregate, for each income decile group, and for some target household groups. The effect of policy changes on the shifts of poverty lines and poverty rates have been also estimated.

For the period 2011-2012 a negative effect of policy changes is found which amounts to *-0.54%* in real terms (Figure 1). The main reason for this is the lack of pension indexation and annual inflation of about 2.3%.[9] The reduction is approximately by 0.5% for all households, however, the largest impact is observed in the second and third decile – a drop of about 1%. This is the only sub-period where we find a *regressive effect of policy changes* – the major reduction in disposable income is observed in the first decile groups. The other instruments have an insignificant effect in

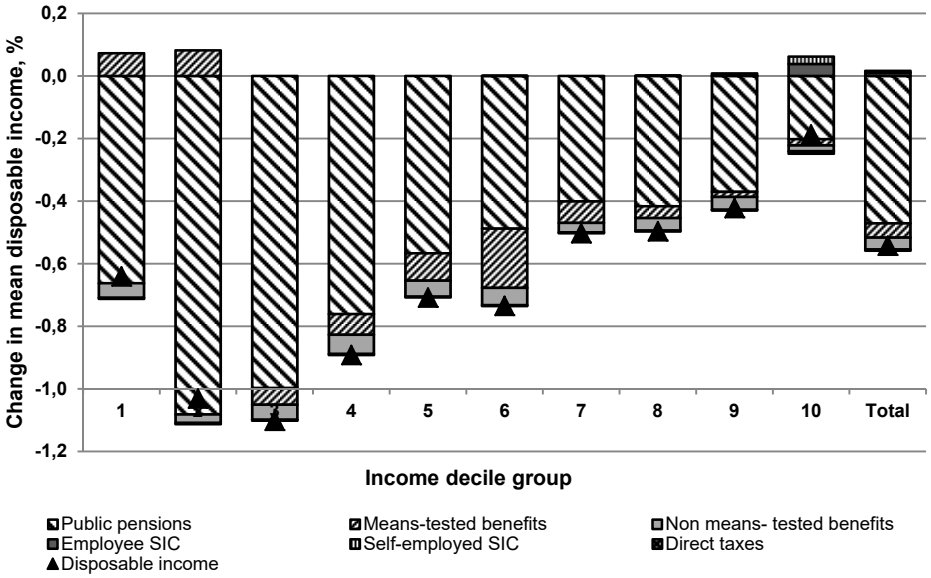
[8] HICP (Harmonized Index of Consumer Prices) is derived by EUROMOD from the Eurostat database.

[9] In nominal terms, any effect of changes in pensions has not been expected.

real terms (total and by most decile groups: less than 0.05%). In nominal terms, a positive effect is estimated for the income-tested social assistance located at the poorest households (first and second decile: 1% and 0.3% respectively) which can be attributed to some increments in the targeted benefit for heating. The additional analysis by types of households shows that a negative real effect is obtained for any household type. As expected, most affected are the single-person households with a person of age above 65 as well as households with persons of age above 65 – the reduction of disposable income here is about 2%.

Figure 1[10]

Effects of policy changes on the mean disposable income: 2011-2012



A positive effect on the disposable income is estimated *for the period 2012-2013* as a result of the policy changes which is predominantly due to the notable uprating of public pensions since 01/04/2013. In nominal terms the increase is estimated at 1.8% and in real terms in 1.7%. The effect is stronger for the first to the fourth decile group (over 2.7%) where particularly for the second group it reaches 4.3% in real terms (Figure 2). Pensions' uprating affects mostly the households with one or more members aged over 65 where the real positive effect reaches 7%.

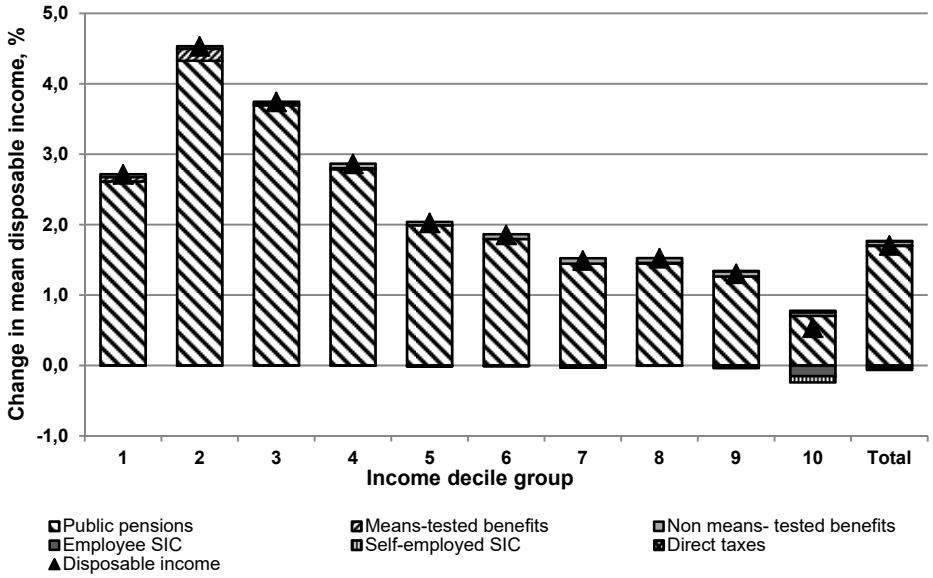
For this period a raise in the insurance threshold (maximum contributory income for social insurance purposes) has been introduced from 2000 BGN in 2012 to 2200 BGN in 2013 which resulted in increased social insurance revenues. Even though, this

[10] The diagrams present numerical results from authors' calculations obtained through EUROMOD on the basis of EU-SILC 2012. Decile groups of households are formed by their income in the base year.

policy effect on the tenth decile group is insignificant – most likely this is due to the fact that only about 1% of the persons in the sample report incomes exceeding this threshold. As compared to the previous period, in 2012-2013 the changes in policies have a clear progressive effect where the largest increments in disposable income (over 2%) is estimated for the first four decile groups.

Figure 2

Effects of policy changes on the mean disposable income: 2012-2013



The disposable income slightly increases *in the period 2013-2014* – nominally by 0.37% for the total population – however, the increment in real terms is much larger (0.79% for all decile groups) as far as the CPI for this period is below 1%. The rise of real income is 2.9% for the households in the first decile and 1.8% for those in the second decile; these increments in the second part of the distribution (the last 5 deciles) are below 1% (Figure 3).

The lowest income households experience the expected effect due to some adjustments in social assistance policies. In particular, the disposable income increases at the expense of the means tested benefits provided to the lowest decile groups – 2% for the first and 0.7% for the second decile. As expected, no substantial differences are observed in the increments of disposable income by decile groups attributed to the non-means tested benefits (about 0.28% in real terms). This is mainly due to the increased monetary benefit for raising a child up to age 2 (240 BGN monthly for the period 01/01/2013-30/06/2013; 310 BGN for 01/07/2013-31/12/2013; 340 BGN since 01/01/2014). Similar extent of the contribution of the public pensions to disposable income growth is observed – even

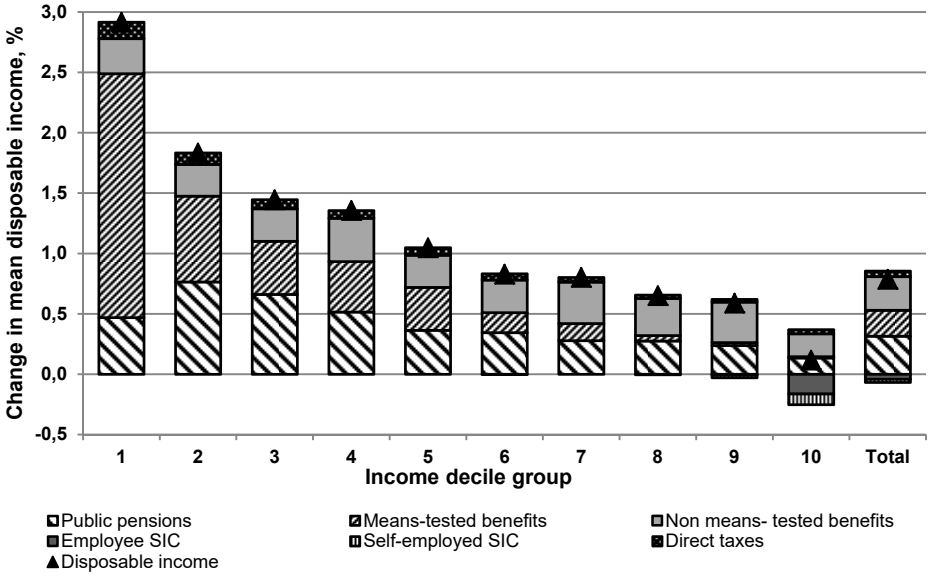
though the pensions have not been uprated nominally during the period 01/07/2013 - 30/06/2014 – which can be explained by a deflation effect.

In year 2014 a tax relief was introduced for incomes not exceeding the minimum monthly salary/wage which resulted in a very slight positive effect of tax policy changes on disposable income in the first and second decile groups (about 0.1%). Minor decrease of the disposable income in the tenth decile can be attributed to the increase in the maximum insurance income from 2200 BGN (2013) to 2400 BGN in 2014. The deflation has a positive effect on the disposable income on the account of the public pensions (0.3% for all households) where the highest value is estimated for the second decile households reaching 0.77%.

For the period of concern the policy changes in also affect the households with one, two, and three or more children where the positive effect for the latter is almost 2% increase in the mean disposable income. Of particular interest are the following findings: for the households with 1 child the positive effect is mainly due to the non-means tested social assistance; for those with 2 children and those with lone parents the effect is relatively balanced between benefits with and without income test; finally, for those with 3 or more children the effect is almost entirely due to the income tested benefits.

Figure 3

Effects of policy changes on the mean disposable income: 2013-2014

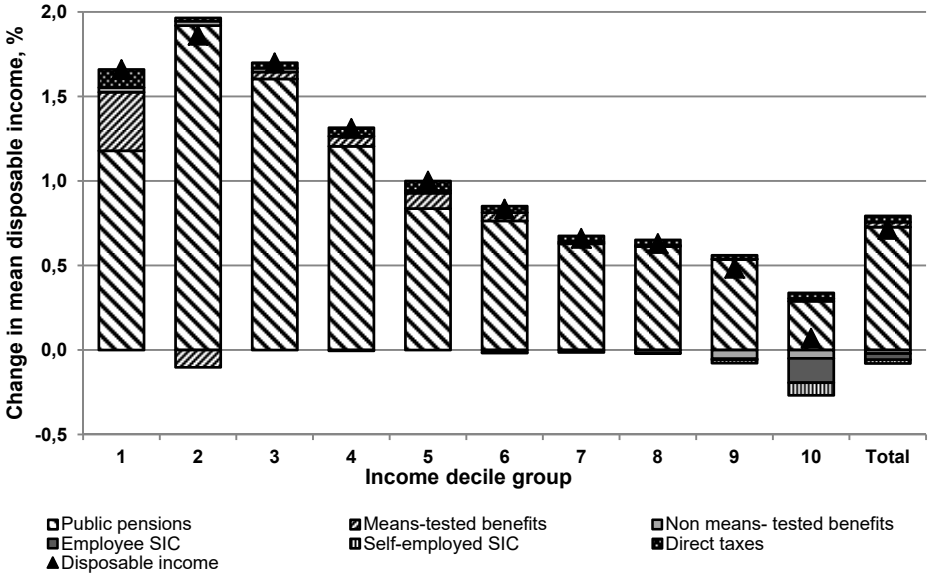


For the last 1-year period (2014-2015) the total effect of policy changes on the mean disposable income of all households is estimated to +0.42% in nominal and +0.71% in real terms (Figure 4). The largest effect is estimated for the second

decile (+1.86%). In real terms the strongest impact is observed for the public pensions' component (+0.73%) due to their uprating since 01/07/2014 where the largest values are estimated expectedly for second and third decile group (+1.9% and +1.6%). In relation to this, the largest positive effect of pensions uprating (about 3%) is found for the subgroup of households having one or more members aged above 65.

Figure 4

Effects of policy changes on the mean disposable income: 2014-2015.



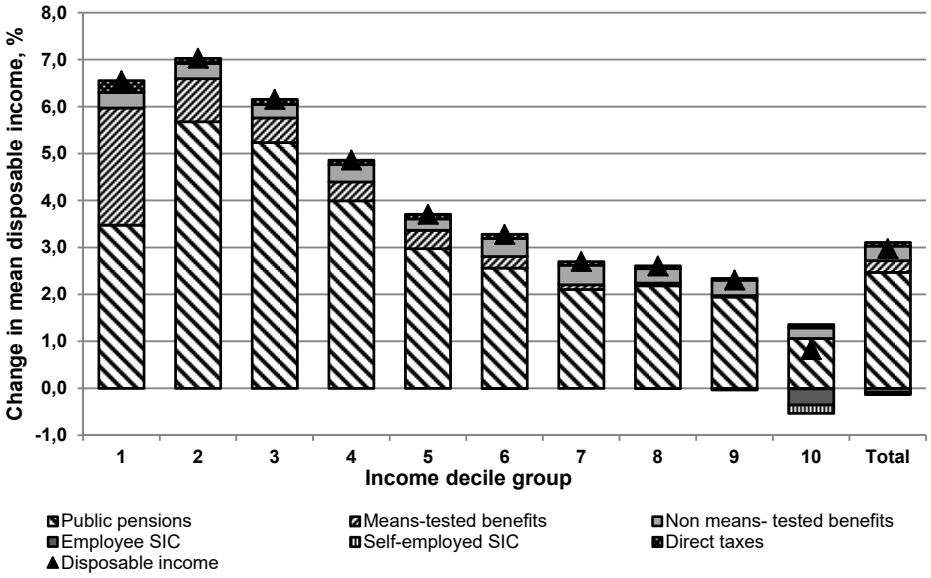
Another positive effect on the disposable income of the first few decile groups could be attributed to the unchanged nominal levels of the social benefits combined with some deflation. Similarly to the preceding period, the lift of the upper threshold for the insurance income contributory base from 2400 BGN (2014) to 2600 BGN for 2015 – and respectively the increased social insurance contributions – negatively affect (albeit in a minor extent) the income level in the tenth decile.

The abolishment of the tax relief introduced in 2014 for the incomes not exceeding the minimum wage level in 2015 was expected to induce a negative effect on all decile groups. At the same time, since year 2015 some minor deductions from the tax base were introduced for families with children which was also expected to have some positive effect on the disposable income. However, the summary effect of the two policy changes amounts to a negligible increment in the mean income for all households (0.04%), its amount appears notable only for the subgroup of households with children – expectedly, the largest effect with those having 3 or more children as well as with the lone parent families.

The overall policy changes effect for the *whole period of study 2011-2015* is estimated at +3% increment of the mean disposable real income for all Bulgarian households (Figure 5). The most significant effect is observed for the first three decile groups of households (+6-7%) whereas the summary effect for the tenths decile is below +1%. The main source of this shift is the uprating of public pensions (about 2.5% for all households), however, in the second and third decile this contribution amounts to over 5 percentage points. The effect is estimated separately by various household types, for example, it amounts to almost 10 percentage points for the single-person households with a member aged above 65 as well as households having one or more such members.

Figure 5

Effects of policy changes on the mean disposable income: 2011-2015

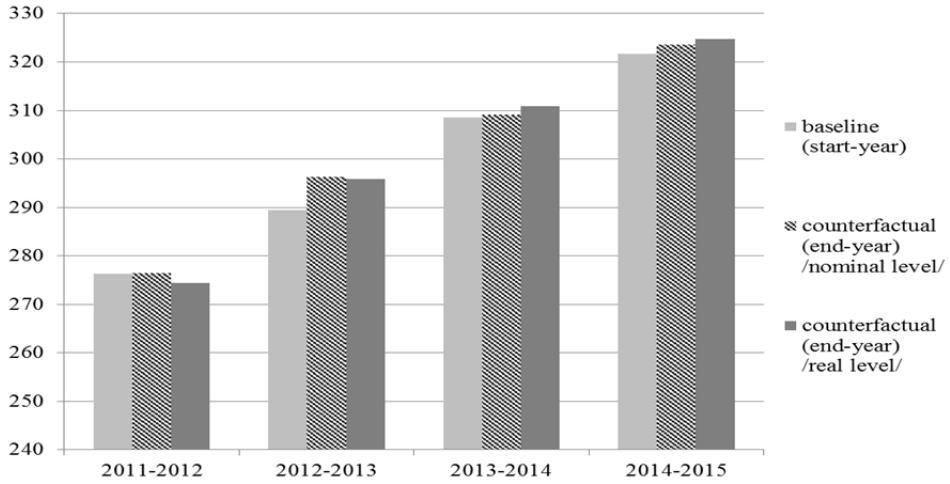


The changes in social assistance policies have induced a positive effect in view of the means tested benefits (+0.25% for all households). As expected, the largest effect is estimated for the first decile group (about +2.5%) where the target households for these policies are predominantly located. The effect attributed to social assistance provided without income test is also positive but much weaker (+0.3%) and any notable variation of its level is not observed across the decile groups. Clear positive effect due to such social assistance is found with households having 2 children as well as those having 3 or more children (about +2.5%) – among the first type of households the assistance policy effects is split almost equally between benefits with and without income test whereas among the second type this effect is mainly due to the income tested benefits. The raise in the maximum level of the contributory income for social

insurance purposes (i.e. the insurance income ceiling) – three times during the studied period – affected negatively but negligibly the disposable income of the tenth decile households – the reduction due to increased social insurance duties for insured and self-insured amounts to –0.14% in this decile. As noted above, this minor effect can be explained by the rare cases of persons in the sample who have reported incomes at or above these thresholds.

Figure 6

Poverty lines (BGN)



Of specific interest for the current study is the assessment of the overall impact of the changes in policies for income taxation, social insurance and social protection on the indicators for poverty (total and for particular groups of households). Figure 6 presents the values of poverty lines estimated under two distinct conditions:

1. Baseline – on the basis of population structure in 2011 (estimated by EU-SILC 2012), market incomes for the start year and policy parameters for the *same (start) year*;

2. Counterfactual – on the basis of population structure in 2011 (EU-SILC 2012), market incomes for the start year and policy parameters for the *end year*.

The relative share of the population at-risk-of-poverty (Table 1) is thus estimated assuming the population structure fixed at the base year (data for 2011) and the following conditions:

1. The baseline – refers to the income distribution in the start-year of any evaluated period (i.e. based on the tax-benefit rules in this year applied on the market incomes from the same year: SILC 2012 market incomes uprated);

2. The counterfactual – refers to the income distribution in the end-year of the period, including poverty lines from this year (i.e. based on the tax-benefit rules in this year but applied on the uprated market incomes *from the start-year*);

3. The counterfactual with "anchored" poverty line – refers to the income distribution in the end-year of the period (i.e. based on the tax-benefit rules in this year applied on the uprated market incomes from the start-year), and *poverty lines from the start-year*.

The comparison between the series of indicators enables the analysis to reveal at what extent the isolated (partial) effect of policy changes has affected the inequality and poverty in Bulgaria for the studied period.

Table 1

Changes in the relative poverty rates due to policy changes in the years from the period 2012-2015

Period	Baseline (start-year)	Relative poverty line				Anchored poverty line			
		Nominal policy effect		Real policy effect		Nominal policy effect		Real policy effect	
		Counter-factual (end-year)	Change	Counter-factual (end-year)	Change	Counter-factual (end-year)	Change	Counter-factual (end-year)	Change
1.1. Total population									
2011-2012	20.0	20.0	0.0 (0.03)	20.3	0.3 *** (0.09)	20.0	0.0 (0.03)	20.6	0.5 *** (0.09)
2012-2013	20.6	19.8	-0.9 *** (0.21)	19.8	-0.8 *** (0.21)	18.7	-1.9 *** (0.19)	18.7	-1.9 *** (0.19)
2013-2014	20.4	20.0	-0.4 *** (0.12)	19.9	-0.5 *** (0.12)	20.0	-0.4 *** (0.12)	19.5	-0.9 *** (0.17)
2014-2015	21.1	20.8	-0.3 *** (0.10)	20.6	-0.5 *** (0.12)	20.4	-0.6 *** (0.12)	20.0	-1.0 *** (0.16)
2011-2015	20.0	18.9	-1.1 *** (0.23)	18.9	-1.1 *** (0.23)	17.5	-2.5 *** (0.23)	17.5	-2.5 *** (0.23)
1.2. Women									
2011-2012	21.7	21.7	0.0 (0.04)	22.1	0.3 *** (0.08)	21.7	0.0 (0.04)	22.3	0.6 *** (0.09)
2012-2013	22.4	21.4	-1.1 *** (0.23)	21.4	-1.0 *** (0.23)	20.3	-2.2 *** (0.21)	20.3	-2.1 *** (0.21)
2013-2014	22.2	21.8	-0.4 *** (0.14)	21.6	-0.6 *** (0.15)	21.7	-0.4 *** (0.14)	21.2	-1.0 *** (0.19)
2014-2015	23.0	22.6	-0.4 *** (0.11)	22.4	-0.6 *** (0.13)	22.3	-0.7 *** (0.13)	21.8	-1.2 *** (0.18)
2011-2015	21.7	20.4	-1.3 *** (0.25)	20.4	-1.3 *** (0.25)	18.8	-2.9 *** (0.26)	18.8	-2.9 *** (0.26)
1.3. Children									
2011-2012	25.0	25.0	0.0 *** (0.00)	25.1	0.0 (0.03)	25.0	0.0 *** (0.00)	25.1	0.1 * (0.06)
2012-2013	25.0	25.6	0.6 ** (0.24)	25.6	0.6 ** (0.24)	24.6	-0.3 ** (0.13)	24.6	-0.3 ** (0.13)
2013-2014	25.6	24.8	-0.8 ** (0.35)	24.8	-0.8 ** (0.35)	24.8	-0.8 ** (0.35)	24.8	-0.8 ** (0.35)
2014-2015	25.4	25.3	-0.1 (0.15)	25.3	-0.1 (0.15)	25.2	-0.3 * (0.15)	25.1	-0.4 ** (0.17)
2011-2015	25.0	24.6	-0.5 (0.36)	24.6	-0.5 (0.36)	23.4	-1.7 *** (0.41)	23.4	-1.7 *** (0.41)

*Note: Asymptotic standard errors shown in parentheses; * p<0.1, ** p<0.05, *** p<0.01.*

Source. Own calculations using EUROMOD.

In view of the data provided in Table 1 we should specify as follows:

- "Baseline" refers to the income distribution in the start-year of the period, i.e. it is based on the tax-benefit rules in the given year applied on market incomes from the same year (fixed SILC 2012 population; market incomes uprated).
- "Counterfactual" refers to the income distribution in the end-year of the period, i.e. it is based on the tax-benefit rules in the given year but applied on the market incomes from the start-year.
- The relative poverty line is equal to 60% of the median equivalised household disposable income in the respective scenario.
- The anchored poverty line is equal to 60% of the median equivalised household disposable income as assessed in the baseline.

For the 2011-2012 period a change in the nominal level of the poverty line is not observed, however, the lack of changes in the policies on social protection and the emergence of inflation is reflected by a *decrease in the poverty line in real terms by about 2 BGN* (Figure 6). The negative effect from the absence of pension uprating accompanied by some inflation affects mainly the relative share of women in poverty – from 21.7% it grows to 22.3% (Table 1.2). The total increment in the relative share of the population at-risk-of poverty is from 20.0 to 20.6% (Table 1.1).

The period 2012-2013 is characterized mainly by the conducted uprating of the public pensions due to which the poverty line rises by 6.4 BGN (Figure 6). When comparing the indicator „relative share of the population at-risk-of poverty" estimated at market incomes for 2012, policy parameters of 2013 and poverty line for 2012 (baseline anchor) with the one estimated by policy parameters of 2012, a drop is found by 1.9 percentage points: from 20.6 to 18.7% (Table 1.1). As expected, the most notable decline is found for the women at-risk-of poverty: from 22.4 to 21.3% (Table 1.2).

The next period (2013-2014) results show that when comparing the two indicators estimated in real terms we find that policy changes had an overall positive effect according to which the poverty line has increased by 2.4 BGN. Policy changes have been reflected also by a shrinkage in the relative share of population at-risk-of poverty by 0.9% (estimated at real terms, anchored poverty line for 2013 – Table 1.1). The positive impact of the changes in the family social assistance implemented in this period relate to a decrease in the relative share of children at-risk-of poverty by 0,8 percentage points (Table 1.3) and of the share of women at-risk-of poverty by 1 percentage points (Table 1.2).

During the last single period of study (2014-2015) the main policy tool, namely the indexation of public pensions, induced an increment in the real poverty line by 3.1 BGN (Figure 6) and the respective reduction in the relative share of population at-risk-of poverty by 1 percentage point (Table 1.1). Expectedly, the most notable effect is found regarding the share of women at-risk-of poverty which shrinks from 23% (evaluated by market incomes at 2014, policy parameters of 2014 and poverty lines from the same baseline: 2014) to 21.8% (market incomes at 2014, policy parameters of 2015 and poverty lines anchored to the baseline: 2014).

For the total period of study (2011-2015) we can sum up that the changes in the policies for income taxation, social insurance, and social protection *induce an overall positive effect* on the relative share of population at-risk-of poverty. This indicator estimated at market incomes from 2011, policy parameters of 2011 and poverty lines from 2011 – compared to its conditional value obtained at market incomes from 2011, *policy parameters of 2015* and poverty lines anchored at 2011 *– reveals a decrease for the five years period amounting to 2.5 percentage points:* from 20.0% to 17.5% (Table 1.1). The major reduction is estimated for the poverty rate estimated separately for the women (–2.8 percentage points) as well as for the children (–1.7 percentage points).

Conclusions

The issues of empirical study of household income distribution – and the indicators for income inequality and poverty intrinsically related to it – are especially relevant to the goals set in the EU Strategy 2020 for achieving „intelligent and sustainable“ growth which in the same time should also be „inclusive“ – having a strong emphasis on jobs creation and poverty reduction. From this point of view any detailed studies of the changes in inequality and poverty indicators – for the total population and for specific vulnerable target groups – are of particular importance if striving to explain the impacts of policies on incomes and social protection. The results presented in the current study provide a clarification of the shifts in these indicators, i.e. what has been achieved by the policy changes implemented during the 2011-2015 period in Bulgaria, based on the specific method for assessment of the “counterfactual” policy effects.

The article suggests a variety of empirical results about the effects of changes in the policies concerning income taxation and social benefits provision (personal and survivor pensions, and social assistance subjected to means testing or not) on the disposable income and poverty risks for 2011-2015. During this period substantial changes have not taken place in respect of personal income taxation, social insurance, and social policy legislation which could enforce a significant impact on the formation and dynamics of Bulgarian households’ disposable income. Mostly the changes in social protection policies induce a particular overall positive effect, albeit in the scope of 2-3% increment of the real disposable income of all households; additionally to this, an increment between 3 and 6% is estimated for the lower income decile groups where these policies are typically targeted. Basically, this effect can be explained by some increments in the pension transfers as well as in the social transfer subjected to means testing. We should note however that the estimate of the effects in real terms is slightly overrated due to very low shifts in the price level during the period (even negative for 2013-2015). The current analysis provides new analytical information about the effects of tax-transfer policies – the results show that these policies (albeit showing some positive impacts) are far not enough to induce a substantial shift in the living standards of Bulgarian population which requires additional targeted measures.

The empirical results about the effects of policy changes evaluated in this article are obtained by the utilization of the considerable potential of EUROMOD – pan-European microsimulation model designed for analysis of tax-transfer interventions on personal and household incomes in the EU countries. The model provides research infrastructure which allows formulation of tasks and derivation of results by isolating effects attributed *only to changes in particular policies* for the defined period of time. Along with this, the information basis of the empirical analysis through EUROMOD originating from the annual large sample representative survey of household income components in the EU countries (EU-SILC) ensures a high reliability and validity of the achieved results. This particularly provides ground to the application of EUROMOD as a main tool for deriving analytical information for monitoring of „Social situation in EU" by DG-EMPL (for example, see Leventi et al., 2013). The capacities of EUROMOD for evaluation of specific indicators that can inform the decision making about tax-transfer policies are substantial but still underexploited. This is much more valid for Bulgaria where this considerable potential has not yet been applied for empirical analyses targeted to supporting the processes of formulating, planning, and monitoring of the realization of socio-economic policies.

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