SOCIAL PROTECTION & JOBS

DISCUSSION PAPER

No. 2005 | JULY 2020

Assessing the Targeting System in Georgia: Proposed Reform Options

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Project 41595

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Abstract

This paper investigates reasons of Georgian Targeted Social Assistance (TSA)'s declining performance and proposes a new PMT model estimated on the most recent household income and expenditure survey data (2018).The paper finds that the proposed updated formula performs better in terms of its ranking property, coverage of the poor and benefit incidence among the poor. The updated PMT formula would improve the coverage of the poorest decile by raising it from 69% to 77% and the benefit incidence in the poorest decile from 60 to 65 percent. The analysis also finds that most of the "winners" are in the poorest quintile while the losers in the top quintiles. In the medium term, the paper highlights the potential benefits of moving to a hybrid targeting approach, whereby reported income is used as a first-stage exclusion criterion before a PMT assessment.

JEL Codes: I32, I38, O12, O15, R28

[1] The authors are grateful for extensive discussions with Tamila Barkalaya (Deputy Minister, Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health, and Social Affairs), the technical team at the Social Services Agency (SSA), and Tinatim Baum (UNICEF) who helped shape the analysis presented in this paper. The team is thankful for guidance provided by Sebastian-A Molineus (Country Director, World Bank), Lire Ersado (Program Leader, World Bank), and Cem Mete (Practice Manager, World Bank). Matteo Morgandi and Alan Fuchs provided valuable advice and served as peer reviewers. Alicia Marguerie provided valuable comments and advice particularly on the technical analysis. Amiran Dateshidze contributed a thorough review of the evolution of the legislation and SSA implementation standards and procedures. Any remaining errors are the sole responsibility of the authors.

Acronyms

CPI	Consumer Price Index
EU	European Union
Geostat	National Statistics Office of Georgia
HIES	Household Income and Expenditure Survey
MoILHSA	Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health, and Social Affairs
OLS	Ordinary Least Squares
PMT	Proxy Means Test
SM	Subsistence Minimum
SSA	Social Services Agency
SVHD	Socially Vulnerable Household Database
TSA	Targeted Social Assistance

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1. Introduction

The Georgian Targeted Social Assistance (TSA), managed and administered by the Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health, and Social Affairs (MoILHSA), has been a successful program in reaching poor households. The TSA was established in 2005 and it has since provided monthly cash transfers to poor households identified based on a proxy means test (PMT) assessment.[2] In 2015, the government reformed the TSA to implement more stringent and objective eligibility criteria,[3] introduce a scheme of differentiated levels of benefits for the TSA, and introduce a Child Benefit Program. As of March 2020, the TSA covered about 129,000 households or 12.3 percent of Georgia's population[4] and provided benefits to approximately 148,000 children, equivalent to almost 21 percent of all children in the country.

The PMT formula is also used to determine eligibility to local benefits for socially vulnerable households administered by municipalities, such as utilities and transport subsidies, education fee waivers, free meals, and disability- and health-related benefits. An inventory of local benefits based on the TSA formula compiled by the World Bank between April and May 2019 shows that different eligibility thresholds are set to determine such local benefits.[5] Despite the overall good targeting performance of the TSA program, which is among the best in the region, the government has requested the World Bank to update the estimation of the PMT model to minimize the inclusion and exclusion errors associated with the TSA program in light of the changing economy and structural changes in the living conditions since 2013 (year of the data used to estimate the current PMT model)[6]. In addition, while there has been some improvement in the last couple of years, the TSA coverage of the poor deteriorated since 2013 due to both design and implementation aspects related to the scoring PMT formula. The actual coverage of the bottom quintile was 46 percent in 2013 and 36 percent in 2018; the benefit incidence in the poorest quintile was 75 percent in 2013 and 70 in 2018.[7] Acknowledging the importance of building a solid and accurate targeting system, the government requested World Bank support to update the estimation of the model and, as a next step, to improve the implementation processes. The COVID pandemic added urgency to the request, as it also

[22] The score resulting from the PMT assessment first introduced in 2005 is used to determine eligibility, not only to the TSA but also to child allowances and various programs administered at the local level. The eligibility PMT score threshold is 65,000 for TSA transfers, whereas 100,000 is the eligibility score threshold for child benefits. The TSA benefit amount varies according to the number of household members and the score interval for households with score below 65,000. Since January 1, 2019, the child benefit amount is equal to GEL 50 per child for all households with score less than 100,000 (up from GEL 10 per child, in place until 2018 since 2015, when it was introduced).

[3] The TSA uses a PMT to identify beneficiaries. In the 2015 reform, the PMT for the program was revised to capture more objective information to measure income and assets. To do this, most variables provided by households to the Social Services Agency (SSA) are cross-verified against various databases from several sources including the Ministry of the Interior (car registration), gas and electricity companies, revenue service, and customs control.

[4] Information on the number of beneficiaries is updated every month on the SSA website: http://ssa.gov.ge/index.php?lang_id=GEO&sec_id=1477.

[5] Eligibility thresholds for local benefits range between 70,000 and 200,000 in the Tbilisi municipal area.

[6] Baum, Mshvidobadze, and Posadas 2016. The 2013 PMT update was aimed to (a) remove from the PMT formula easily concealable durable goods, as social agents were reporting that households had adopted this practice; (b) include new easily verifiable and potentially income-generating items; (c) reduce the total number of variables used in the PMT formula to simplify it; and (d) remove from the PMT formula the subjective assessment of the social agents.

[7] Based on the consumption distribution net of **all** social assistance transfers, as per the World Bank ASPIRE/SPEED methodology for overtime and cross-country comparisons. It has to be noted that the comparison between 2013 and 2018 accounts for differences in the two different data sources. While the methodology to estimate the two performance indicators is the same, the data source is different: the Welfare Monitoring Survey for 2013 and the Household Income and Expenditure Survey (HIES) for 2018.

became critical to ensure that the newly adopted emergency benefits are not only well targeted but also administered quickly and efficiently.

The implementation of the PMT in Georgia rests on a dynamic social registry linked with other administrative databases through common identifiers. Different from PMT targeting systems based on census data collection such as in many Latin American countries, the dynamic registry in Georgia allows the computation of the PMT score as frequently as certain households characteristics change such as income, social benefit receipt, and asset ownership. The full recertification of the households is due every four years.

The government is also strongly committed to link TSA beneficiaries with employment activation services as a means of putting TSA beneficiaries on a path to self-sufficiency. Since January 1, 2019, an income disregard was introduced to gradually phase out of the program those TSA beneficiaries who find employment. According to the reform, the labor income from a new job is disregarded when determining eligibility, allowing TSA beneficiaries to remain in the TSA program for up to a year to ensure they have a stable income source.

This paper first reviews the performance of the current targeting system and recommends improvements to the existing PMT formula. One implementation issue we identified is the inconsistency in how monetary and nonmonetary values are treated when calculating the PMT score. The practice has been to calculate the score based on monetary variables (income, social benefits package, and utility expenditures) at current nominal prices, which have inevitably inflated the predicted consumption. As the PMT formula was estimated at 2013 prices, the recommendation to correctly implement the current PMT formula would be to deflate all monetary variables to 2013 prices. Second, to further improve the poverty targeting accuracy, the paper presents the updated PMT model estimation and discusses the benefits and cost of transitioning to the new PMT formula. The empirical analysis is based on the 2018 HIES collected by the National Statistics Office of Georgia (Geostat), the latest available to the team at the time of the analysis. The remainder of this note is organized as follows. Section 2 looks at the performance of the current PMT model to identify key areas of possible improvements. Section 3 develops alternative estimates and proposes a new PMT formula, comparing its theoretical performance with that of the current one. This is followed by a discussion of the implementation of the formula in the following years to avoid problems encountered with the current approach. Section 4 goes further to make a more radical proposal to consider moving to an ‘hybrid’ approach combining an income test with the PMT, highlighting the advantages of the approach and the steps needed for its development and implementation. A final section provides a summary of key recommendations for the immediate, short, and medium term.

2. Review of the current targeting approach

As of May 2020, the Socially Vulnerable Household Database (SVHD), the national social registry, contained information about 308,000 households, about 30 percent of the nationwide total. To register and apply to the TSA (and other benefits and services), households need to go to the local office of the Social Service Agency. The initial application is submitted via the social agent at the reception desk of the local SSA office. The application includes basic information on the household, as well as consent information that the applicants sign to acknowledge their rights and responsibilities regarding data use, access, protection, and so forth. Subsequently, the local social agent conducts a home visit to the applicant’s home to gather further information, needed for the complete household declaration that forms the basis of the eligibility to social assistance.

Information collected in the declaration form reflects what is required according to the Government Resolution No. 758 of 2014 to calculate the household PMT score along with information curated from other government administrative systems. The PMT estimation methodology, grounded on 2013 household survey data, identified a relationship between households' consumption expenditure levels and households' characteristics, including agricultural property, durable assets and revenues, expenditure for utilities, household demographics, education and employment of household members, geographical characteristics, dwelling characteristics, and other real estate ownership.

The PMT formula generates a household score (welfare index), which represents an estimate of the household's welfare: the higher the score, the better are the estimated living standards. The welfare index has two elements: (a) the household's consumption expenditure estimate and (b) the household needs. The score is the transformation of a welfare estimate obtained by dividing the consumption expenditure estimate by the household's needs. If a household receives TSA, however, the monetary value of received transfers is subtracted from the consumption expenditure estimate. The formula can be written as follows:

$$Welfare\ index = \frac{\text{Consumption estimate} - \text{TSA}}{\text{Household Needs} \times \text{Subsistence Minimum}}.$$

The monthly Subsistence Minimum (SM) at the time of the formula estimation was GEL 149.6. Annex A details the construction of the score in the current model.

This paper focuses exclusively on reviewing the 'consumption estimate' part of the index, holding constant the current rules and formula (established in Government Resolution No. 758 of 2014) for the measurement of needs—essentially an assessment of equivalence scales that allow to evaluate a household's consumption needs based on the household's size and composition. Further work will need to be done to update the needs index.[8]

The use of the SM level in the PMT formula does not affect the ranking of households. However, once thresholds are set, changing the SM level does influence the number of households that fall under a certain threshold: holding other things constant, increasing the SM increases the number of households falling below a fixed threshold. Conversely, decreasing the SM level reduces the number of households falling below a fixed eligibility threshold.

More importantly, the SM influences the needs index by estimating specific equivalence scales. For example, assigning a disproportionate weight to food expenditure reduces the equivalence scale of those groups who have a lower daily calorie intake requirement (children and the elderly). Therefore, it would be important to review the way the needs index is computed to ensure that equivalence scales reflect the current needs and consumption patterns. Nevertheless, for the way the formula is estimated, the needs index revision can be done independently from the consumption model. Hence, the current performance assessment is independent of the way equivalence scales are determined, which are taken as given and applied both to the true and estimated consumption levels.

We reviewed both the 'actual' performance (based on its implementation) and the 'theoretical' performance (based on simulations) of the current targeting PMT formula.

[8] The current needs index suffers from some apparent shortcomings when compared to the most recent data. Most importantly, it overstates the share of budget that is spent on food and assumes it to be at 70 percent, far above the value estimated on HIES 2018 data (50 percent on average, no more than 60 percent among the poorest, ECAPOV). The implication of the overestimated food share is in terms of the calculation of equivalence scales. The equivalent scales are different if we consider food compared to other expenses.

The 'actual' targeting performance is assessed based on the actual receipt (and benefit amounts) of TSA and child benefits as reported in the HIES data. It reflects both old (before the 2015 reform) and new entitlements. In fact, it took three years to complete the household reassessment and provision of new entitlements.

Table 1 reports the distribution of TSA beneficiaries across consumption deciles (beneficiary incidence) as well as the percentage of TSA beneficiaries within each decile (coverage). The consumption deciles are computed for the 'pre-transfer' consumption distribution, that is, subtracting from the total household consumption the TSA benefit amount reported by the households in the survey.[9] The analysis is done for 2016 and 2018. While overall targeting is good in both years, results for 2018 are significantly better with high coverage in the bottom deciles. The targeting performance results in Table 1 reflect both the design of the existing PMT formula and the way the legislation has been implemented in practice, with potential shortcomings due to low take-up, errors in the application form, and administrative mistakes.[10]

Table 1: TSA coverage of the poor and beneficiary incidence in 2016 and 2018

	2016		2018	
	Beneficiary incidence	Coverage	Beneficiary incidence	Coverage
	Distribution of TSA beneficiaries	% of TSA beneficiaries	Distribution of TSA beneficiaries	% of TSA beneficiaries
Poorest decile	60.5	57.9	67.0	70.1
2nd decile	17.0	16.3	18.1	18.9
3rd decile	8.7	8.3	6.8	7.1
4th and higher deciles	13.8	1.9	8.2	1.2
Total population	100.0	9.6	100.0	10.5

Source: Authors' analysis based on 2016 and 2018 HIES data.
Note: Deciles are defined based on the observed adult equivalent consumption net of the TSA benefit received (inclusive of the child benefit). TSA beneficiaries are those households who report having received TSA and child benefits.

Table 1 does not tell us directly whether and to what extent the PMT formula design deteriorated over time, as it reflects both the performance of the formula and that of the administrative process. The 'theoretical' performance of the current PMT model can be judged by comparing the 'estimated welfare' (through a simulated PMT score) with the 'true welfare' (based on the observed consumption).[11] To simulate the PMT score assigned by the current formula to each household observed in the HIES 2018, the assumption needed is that the information reported in the HIES is the same as the information provided in the declaration form. The HIES includes most of the variables in the PMT formula (reported in Table A1.1), which are hence used to reproduce the calculation of the household PMT score.[12] The resulting distribution of the simulated

[9] To move from household- to population-level deciles, we have divided household consumption by the household needs index using the equivalence scale and cohabitation index provided in the Government Resolution No. 758/2014.
[10] The 2016 indicators also reflect the PMT design before the 2015 reform as it took about three years to roll out nationally the 2015 reforms (World Bank 2020 forthcoming).
[11] The 'true welfare' is the observed measure of household consumption as estimated based on a nationally representative household survey (HIES 2018 in our case). The observed consumption aggregate, net of the TSA benefit, provides a 'true measure': a benchmark measure of welfare against which we assess the accuracy of the PMT targeting formula.
[12] Limitations to the precision of this simulation exercise are documented in Annex D. Briefly, the HIES does not have information on the following variables currently included in the formula: mountainous location (highland settlements), soviet type of cars, and

PMT score is reported in Figure A1.1 (Annex D describes the limitations of the HIES data to reproduce the PMT score). When the distribution of eligible beneficiaries based on the simulated score[13] is compared with the distribution of beneficiaries in the administrative data, the number of households in the administrative data is larger than in the HIES simulations for scores lower than 57,000 (poorer), and vice versa for scores above 57,000 (Table 2).[14] This is to be expected because (a) the relatively better-off do not have an incentive to apply and register in the SVHD and (b) households often underreport in the application forms their actual conditions, to qualify for TSA (evidence of underreporting is also common in means tested programs such as the Romania Guaranteed Minimum Income and means tested programs in Tomsk region in Russia[15]). It is worth noting that while HIES-based estimates are based on countrywide projections of data obtained from a nationally representative survey, administrative data are relative to the self-selected pool of households who registered with the SSA.

Table 2: Number of households by score range in administrative and HIES data, 2016 and 2018

Score range	2016		2018		
	HIES	SVHD	HIES (Until May 2018)	HIES (From June 2018)	SVHD
<30,000	20,360	42,710	25,362	33,709	38,447
30001-57000	40,616	83,099	37,695	57,225	61,303
57001-60000	8,436	6,151	5,859	10,767	8,761
60001-65000	12,519	10,734	11,561	19,742	15,505
65001-70000	19,582	9,824	12,214	25,595	9,273
70001-100000	153,198	73,282	133,325	215,204	53,564
100001-200000	553,774	140,656	564,081	555,355	117,671
>200000	220,331	16,494	266,645	139,143	13,252
Total	1,028,817	382,950	1,056,741	1,056,741	317,796

Source: Authors' analysis of 2016 and 2018 HIES data and SSA data.
Note: The eligibility score threshold is 65,000 for TSA transfers, whereas 100,000 is the eligibility score threshold for child benefits. PMT score simulations for 2018 are constructed under the formula in place until May 2018 and under the formula in place from June 2018. The difference between the two formulas is twofold: the coefficient for utility expenditures was revised downward, and the SM used in the calculation of the needs index was revised upward from GEL 149.6 to GEL 175.

ownership of certain built structures (workshop, cattle shed, storage hut, basement, and commercial area). However, these variables are likely to affect relatively few cases. The main limitation faced in the replication of the TSA score in the HIES data is that some specific categories (and therefore components of subindexes) cannot be identified in the available data and have been indirectly inferred from correlated variables for the analysis: this happened, for example, for the identification in the data of single mothers, breastfeeding and pregnant women, and specific categories of people with disabilities. A final large limitation of the simulation is that HIES data on income do not allow to draw a distinction between formal and informal labor income. In the analysis, we assume that all the labor income reported in HIES is the same as the income self-declared in the Family Declaration Form, but this is likely to overstate income reported by informal workers. A comparison of the HIES dataset with administrative data will therefore be necessary to validate the analysis of the performance of the current and the proposed new formula.

[13] In this simulation, we assume that all assessments are done in the same year. Moreover, for 2018 we conduct the calculation using the SM of both 149.6 and 175 as the change in the SM was adopted in the middle of the year. Naturally, using the higher SM increases the estimated number of households falling in the lower ranges of the PMT distribution, bringing it closer to that observed in administrative data (up to a score of 65,000).

[14] The comparison of HIES and SVHD data in 2016 is problematic because in 2016 many people were still receiving TSA based on the system before the reform and the new PMT formula.

[15] Tesliuc et al. 2014.

To assess the 'theoretical' performance of the current PMT model, we refer to the following three performance metrics: (a) the beneficiary incidence, or share of eligible applicants belonging to the poorest decile; (b) the PMT formula's ability to identify the poorest 10 percent of the population based on a certain threshold score (for example, 65,000 as the current TSA eligibility threshold); and (c) the PMT ranking property, or the relative ability to rank households consistently with the consumption aggregate ranking (for example, by comparing the overlap between the simulated PMT and the true welfare distributions).[16]

The beneficiary incidence of the current PMT model is relatively good. Table 3 shows the distribution of people with a score below the 65,000 and 100,000 thresholds who are in different consumption deciles. Depending on which formula is used to simulate households' scores, we find that 54.1–65.4 percent of the population with a score below 65,000 (eligible beneficiaries) falls in the poorest decile of the pre-transfer consumption distribution. Similarly, between 25.4 percent and 36.8 percent of the population with a score below 100,000 falls in the poorest decile. The table differentiates between the beneficiary incidence before and after the formula adjustment introduced on June 1, 2018, which consisted of an increase in the SM from GEL 149.6 to GEL 175 and a decrease in the coefficient for utilities expenditures—both changes introduced with the goal of compensating for inflation. As can be seen in the table, this update to the formula worsened the distribution of beneficiaries skewing it away from the poorest quintile. Therefore, ad hoc adjustments of the SM, while increasing coverage, distort the ability of the formula to detect the poorest households and give rise to inclusion errors.

Table 3: Distribution of eligible population, by consumption decile in 2018

	Until May 2018		From June 2018	
	Distribution of people with score<=65,000	Distribution of people with score<=100,000	Distribution of people with score<=65,000	Distribution of people with score<=100,000
Poorest decile	65.4	36.8	54.1	25.4
2nd decile	14.8	20.7	18.4	18.8
3rd decile	7.9	13.3	9.5	15.2
4th and higher deciles	12.0	29.2	18.0	40.6
Total population	100.0	100.0	100.0	100.0
% of population	9.5	23.8	13.8	37.3

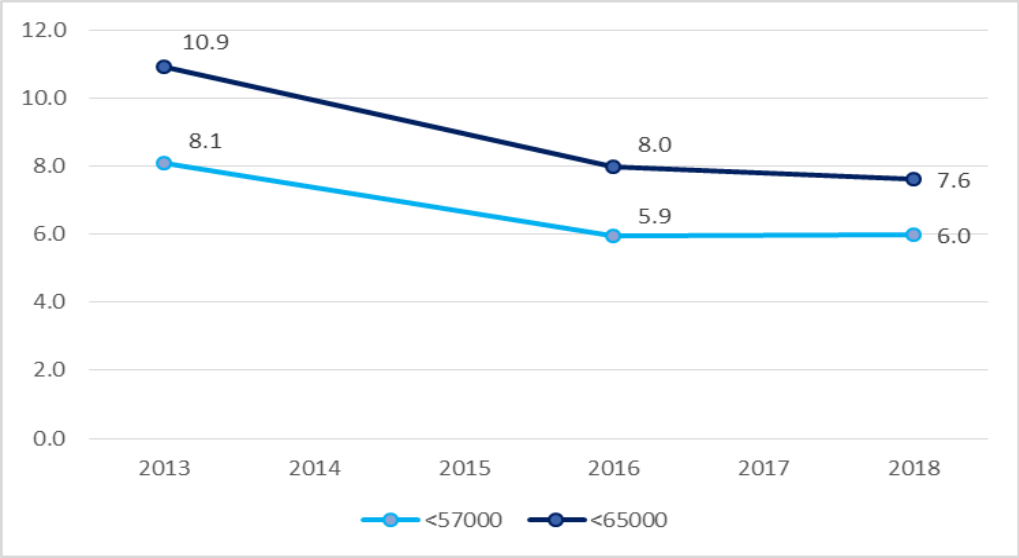
Source: Authors' analysis of 2018 HIES data.
Note: Deciles are defined based on the observed adult equivalent consumption net of the TSA benefit received (inclusive of the child benefit). PMT scores in 2018 are simulated based on the coefficients in place until May 31, 2018. The difference between the PMT formulas before and after June 2018 is twofold: the coefficient for utility expenditures was revised downward, and the SM used in the calculation of the needs index was revised upward from GEL 149.6 to GEL 175.

Despite the relatively good performance, the capacity of the PMT formula to reach the bottom decile declined significantly between 2013 and 2018. Figure 1 shows the percentage of total households with simulated score below 65,000 and 57,000 between 2013 and 2018. In 2018, the number of households under the 65,000 threshold declined by 30 percent compared to 2013.[17] While part of the change could be due to

[16] That is, the share of households in the bottom 10 percent of the true welfare (consumption) distribution who fall in the bottom 10 percent of the simulated PMT distribution.
[17] This simulation differs from what actually happened in terms of household registration because it assumes that in each year all households are fully assessed, whereas in real data households entered into the system at different points in time. Moreover, some of the variables used for the assessment enter with a lag, while the simulations rely on an average of the last three months of revenue and expenditure variables.

improvements in the living conditions, there are other reasons for such deterioration that can be attributable to both design and implementation issues. From the design point of view, the PMT formula may be updated to better reflect the evolving economy and living conditions of the population. From the implementation point of view, the formula has been wrongly implemented: the monetary variables have entered the formula in nominal prices, as opposed to 2013-adjusted prices which were used to estimate the formula coefficients, hence inflating the value of the score compared to the threshold fixed based on the 2013 distribution. If we compute the household score by deflating all monetary variables at 2013 prices, we find that the percentage of households below the 65,000 threshold in 2018 would be 8.7 percent and the share of households below the 57,000 threshold would be 6.9 percent. Hence, we estimate that about two-thirds of the overall decline in the coverage of eligible households is due to changes in the living conditions and one-third to the incorrect use of monetary values in the formula.

Figure 1: Percentage of households with score below 57,000 and 65,000, 2013–2018



Sources: Estimates for 2013 are based on the third quarter of the Integrated Household Survey and information from an additional ad hoc module (Baum, Mshvidobadze, and Posadas 2016, 13). Estimates for 2016 and 2018 are based on the HIES. Scores in 2018 are simulated based on the coefficients and the SM of 149.6 in place until May 31, 2018, which were the same as those in force in 2016.

The rigidity of the model to monetary variables has caused households in need to move out of the TSA. Simulating the effect of a 10.13 percent price increase between 2018 and 2020 (based on Geostat's Consumer Price Index [CPI]) would artificially raise the score of households, erroneously moving out of TSA 6.4 percent, who are eligible households (with score below 65,000) for purely computational reasons that are totally unrelated to any improvement in living conditions.

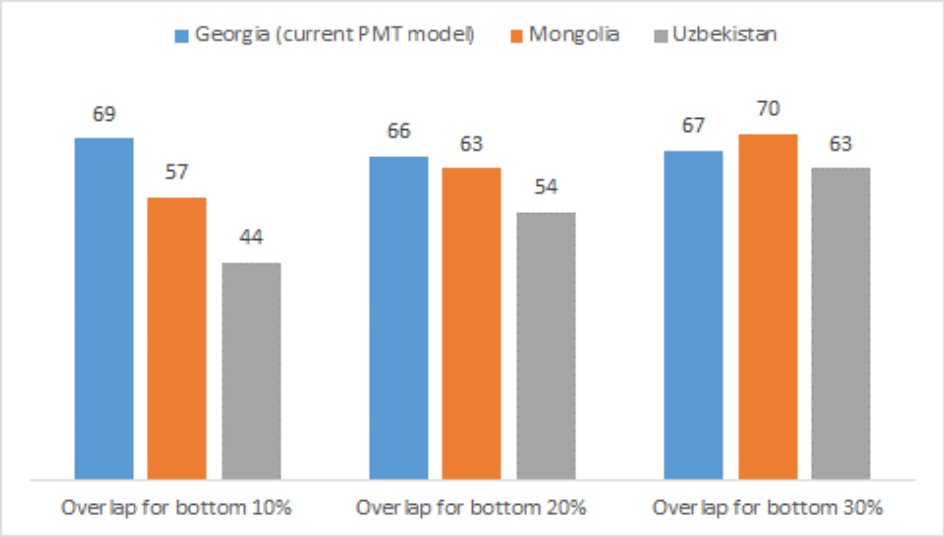
An alternative assessment of the theoretical performance of the scoring formula consists of comparing the ranking of households based on the formula and the ranking of households by their 'true' welfare based on the observed consumption (for example, by checking to what extent the bottom decile or quintile of the two distributions identifies the same households/people).[18] This is a 'relative' assessment in the sense that we compare the relative distribution of the true and estimated welfare regardless of a specific score value. The

[18] For this second exercise, we worked only with a subsample of the available observations of HIES 2018. More specifically, based on the HIES interview schedule from October 2017 to December 2018, we identified households that had been interviewed twice in a row, thus allowing to have a longer recall period for consumption expenditure and therefore a more reliable estimate of households' welfare.

higher the overlap, the more accurate is the scoring formula. Figure 2 shows the overlap between the 'true' welfare distribution and the estimated welfare based on the current PMT formula in the bottom 10 percent, 20 percent, and 30 percent of the total population.

International comparisons show that the performance of the predicted welfare through the PMT formula in Georgia is relatively high, especially for the bottom decile (Figure 2). Usually the overlap is lower in the bottom decile and increases as we consider a larger percentage of the population. The level of overlap depends on the design of the formula and on the quality of the household survey data and ultimately on the conditions of the country and the underlying causes of poverty. In Georgia, the high level of overlap in the bottom decile could be the result of the large coverage of TSA in this group.

Figure 2: Percentage of population overlap between 'true' and estimated welfare within the bottom 10 percent, 20 percent, and 30 percent of population



Source: Authors' analysis of the 2018 HIES, Uzbekistan Listen to Citizens of Uzbekistan (L2CU) 2018, and 2014 HIES in Mongolia. The 'true welfare' is based on the observed household consumption aggregate, net of transfer amount (where this exists). In the three countries, the 'estimated welfare' is the one estimated through the theoretical PMT formulae in each of the respective countries.

Overall, the performance of the current PMT model is good compared to what is achieved in other countries. However, the performance has been declining over time due to both design issues and implementation challenges.

One implementation issue we identified is the inconsistency in how monetary and nonmonetary values are treated when calculating the PMT score. The coefficients of the current formula reflect the relationship between consumption expenditure and monetary/nonmonetary households' characteristics at 2013 prices. If we re-estimate the same relationship after prices have increased, the coefficients will inevitably change. The practice since 2013 has been to calculate the score based on monetary variables (income, revenues, and utility expenditures) at current nominal prices, which have inevitably inflated the predicted consumption. While the estimation was conducted at 2013 prices, there was no mechanism in place to adapt the formula to price changes.

The lack of such adjustment mechanism turned out to be problematic, especially in the context of significant inflation, leading to an overestimation of the 'consumption' part of the formula, inflating the final household

PMT scores. For example, the consumption price index increased by 25 percent between 2013 and 2019,[19] resulting in higher 'estimated consumption' through the impact of all monetary variables in the formula. This problem was indirectly addressed in June 2018 by increasing the value of the SM used to calculate the needs index from GEL 149.6 to GEL 175. However, this adjustment represents only a partial (and unsatisfactory) attempt to address the issue since it does not correct for the coefficients of nonmonetary variables.[20] Furthermore, such an indirect across-the-board change in subsistence needs increases the potential for inclusion error. Table 3 shows, for instance, that a larger share of eligible households come from higher deciles of the welfare distribution (and should not, therefore, be eligible) as a result of the update of the SM. As the PMT formula was estimated at 2013 prices, a more correct approach would be to deflate all monetary variables[21] to 2013 prices, the level of prices in which the relationship was estimated, leaving the SM level fixed at the 2013 level.[22] This change in the implementation of the current model would have important implications for the performance of the current PMT formula.

From the design point of view, the current PMT formula has a built-in degree of accuracy: utility expenditures were in fact entering the estimation of the formula on both the left-hand side and the right-hand side, since they were both part of the consumption aggregate to be estimated as an outcome, and a component of the explanatory variables on the right-hand side The underlying assumption was that the estimation of utility expenditure in the declaration form is equivalent to the procedures adopted in the household survey. However, this is not the case in practice as the administrative data rely on direct measurements of utility expenditure, while the household survey data suffer from some limitations when it comes to recalling utility expenditures for the past three months. This can create a misalignment between the values observed in the household survey and the administrative data used by the SSA to estimate the PMT score, particularly related to seasonal expenditures such as gas. The model therefore excludes items of utility expenditure that are less reliably estimated from the set of explanatory variables.

3. The estimation of a new PMT formula

Using the HIES 2018, we constructed a robust measure of 'true' welfare based on household consumption expenditure calculated using the HIES data.[23] We detracted from our consumption expenditures indicator utility expenditures (for electricity, natural gas, water, and cleaning), as data on such expenditures can be easily obtained from administrative data.[24] Therefore, the model will try to estimate household consumption without such utility expenditure, which will be added to the estimated consumption before computing the household score.

To identify the proxies and their coefficients, we regressed the measure of consumption against a number of explanatory variables (household characteristics). Among the possible explanatory variables, we have

[19] Based on the CPI produced by Geostat (https://www.geostat.ge/en/modules/categories/26/cpi-inflation).
[20] Moreover, the adjustment of the SM only occurred in the middle of 2018, so up until then there was a clear underestimation of needs. In 2019 the average SM increased to 188 GEL and in April it was 200 GEL (see Geostat at https://www.geostat.ge/en/modules/categories/49/subsistence-minimum).
[21] This applies to incomes variables, including the social package and minimum pension, and utility expenditures.
[22] The same applies to other social transfers (social package and social pension) that should be maintained at levels present at the time of the estimation of the formula.
[23] This has been constructed using a subsample of households for whom we have two consecutive observations. This results in strengthening the measure of welfare since for some categories of consumption we obtain information on expenditure for six rather than three months, allowing for a longer recall period, but then transforming expenditure on a monthly basis.
[24] Utility expenditures are removed from the dependent variable (aggregate consumption) because they can be measured directly through administrative sources, and hence there is no need to proxy/estimate that part of the aggregate consumption.

tested new variables and those that are already in the current formula related to household demographic characteristics, income sources, housing, electricity expenditure,[25] assets, and geographical location. Separate models are estimated for four different types of settlements: Tbilisi, large cities, other urban areas, and villages.

We considered different possibilities to improve the current model. First, rather than pooling all income sources in one 'revenue' index, as in the current formula, we separated income sources as separate variables as follows: income from wage employment, income from self-employment in nonagriculture, sale of agricultural products, property income, and other income (remittances and so on). This was done because such variables are a mixture of actual incomes and revenues (not profits) and it is to be expected that their amount will be related to consumption in different ways. Second, we constructed a synthetic livestock index by combining cows, bulls, sheep, goats, and pigs. For this, we used a standard weighting counting cows and bulls as one, while sheep, goats, and pigs count one-tenth of cows and bulls.[26] Such index reflects the productive value of different livestock.

In terms of households demographic characteristics, we not only considered not only the share of household members with higher education but also interacted such variables based on the age of the person (capturing either a trajectory of different productivity based on the age of the person or a difference in the quality of higher education). We introduced dummy variables to capture nonlinearities in the effect of household size: the number of household members whose employer pays for social insurance contributions; whether there are household members with disabilities of category 1 or 2; whether the household has independent systems for heating or hot water; and whether the household has certain assets (car, fridge, washing machine, and satellite dish) considering the interaction with households of elderly members—as a proxy for old items.

Variables with the potential to create implementation complications have purposively been excluded, including (a) the gender of the household head, since this information is likely to be collected differently in the HIES and in the declaration form; (b) the number of poultry units, as this could vary significantly from year to year and is not easily reported; and (c) IT-related assets, since we want to avoid indirectly giving wrong incentives in the investment on such technology.

Different estimation techniques have been tried to estimate the model (using weighted least squares, as well as quantile regression and two-step estimation techniques).[27] The benchmark model was estimated expressing the welfare measure in logarithmic terms, while in other models the welfare was expressed in nominal values. Different models have been estimated for the four different settlement and one for the whole country. All these models were assessed for their relative performance: the overlap between true and estimated welfare at different percentages of population while also looking at population subgroups. The model in logarithmic terms and for the four types of settlement provided one of the best results, together with the quantile regression model. Therefore, we decided to maintain this estimation technique with four models, one for each settlement type, which is the same approach used in the current formula.

[25] We have reasons to believe that the HIES does not capture seasonal expenditure well, such as natural gas consumption, and instead among utilities only electricity consumption is likely to be a reliable explanatory variable: HIES and SVHD would have similar values. Electricity expenditure is therefore entered as an explanatory variable to see whether it can predict the rest of 'nonutility consumption expenditure'.

[26] Expressing livestock in standard units is relatively common. For example, within the European Union (EU) there are standard conversion factors (see http://ec.europa.eu/agriculture/rica/reference_en.cfm#bview). These standards have been adapted and simplified.

[27] Cameron and Trivedi 2005; Deaton 1997; Grosh and Baker 1995; IRIS Center 2005; Ravallion 1996.

The variables selected in the proposed model and their positive or negative contributions are reported in Table 4, whereas the full set of variables and coefficients of the proposed new model are reported in Annex B (Table B1.1).

Table 4: Selected variables in proposed formula and coefficient signs

Variables	Tbilisi	Large cities	Other urban	Villages
Demographic variables	• Dummies for household size (+, but nonlinear) • Whether there are disabled members (-) • Higher education by age (<32, 32–49, 50+) (+, nonlinear)	• Dummies for household size (+, but nonlinear) • Higher education by age (<32, 32–49, 50+) (+, nonlinear)	• Dummies for household size (+, but nonlinear) • HH members abroad (+) • Higher education by age (<50, 50+) (+, nonlinear)	• Dummies for household size (+, but nonlinear) • Whether there are disabled members (-) • Higher education (+)
Income related	• Income from hired employment (+), property (+), other income (+) • Number of members working	• Income from hired employment (+), self-employment (+), other income (+)	• Income from hired employment (+), self-employment (+), agriculture (+), other income (+) • No. of HH members working (+) • HH members whose employer pay SI contributions (+)	• Income from hired employment (+), self-employment (+), agriculture (+), property (+), other income (+) • No. of HH members working (+) • HH members whose employer pay SI contributions (+)
Housing	• Individual hot water system[a] (+)	• Electricity expenditure (+) • Individual hot water system[a] (+) • Other dwelling/summer house (+)	• Electricity expenditure (+) • No. of rooms (+) • Parquet floor (+) • Individual hot water system[a] (+) • Other dwelling/summer house (+)	• Electricity expenditure (+) • Individual heating system[a] (+) • Individual hot water system[a] (+) • Dwelling area (+)
Assets	• Car/minibus/truck (+)	• Car/minibus/truck (+) • Satellite[a] (+)	• Car/minibus/truck (+) • Fridge[a] (+) • Washing machine[a]	• Land area owned (+) • Livestock index = cows + buffaloes + young cattle* +

Variables	Tbilisi	Large cities	Other urban	Villages
				horses[a]+ 0.1 (goats[a] +sheep[a] +pigs) (+) • Car/minibus/truck (+) • Fridge[a] (+) • Satellite[a] (+)
Geographical		• Samegrelo/Zemo Svaneti (-)	• Racha Lechkhumi and Zvemo Svaneti (-) • Kakheti (-)	• Guria (-) • Samegrelo/Zemo Svaneti (-) • Racha Lechkhumi and Zvemo Svaneti (-) • Mtskheta-Mtianeti (-)

Source: Authors' analysis of HIES 2018 data.
Note: HH = Household; SI = Social insurance. a. New variables for which there is no information in the declaration form.

The choice of the final model was based on its performance and ability to predict the distribution of the 'true welfare' with a specific focus on the bottom deciles. The model's robustness was further tested by assessing its ability to predict the welfare distribution in different groups (see Annex C) and by comparing its statistical fitness (measured by the R squared) to that observed in comparable contexts. The preferred model for the estimate of the PMT formula has R2 between 0.58 and 0.65 depending on the geographical subset of the sample that is used. This is a good performance compared to Albania (0.47), Bangladesh (0.57),[28] Mongolia (0.50 to 0.69 depending on the subsample used for the estimate), Sri Lanka (0.56),[29] and Pakistan (0.53).[30]

The proposed model was estimated as follows:

$$ln(Household\ consumption - utilities\ expenditure) = \beta X + \varepsilon,$$

where utilities expenditure includes electricity, natural gas, water supply, and cleaning services. X stands for the different explanatory variables, β is the coefficient associated to each explanatory variable, and ε is the error term.

The estimated welfare indicator is the computed as follows:

$$Estimated\ Welfare\ indicator = \frac{e^{\left(\beta X + \frac{\sigma^2}{2}\right)} + utilities\ expenditure - TSA\ allowance}{Household\ needs},$$

where σ^2 is the variance of the error term.

[28] Sharif 2009.
[29] Narayan, Viswanath, and Yoshida 2005.
[30] Hou 2008.

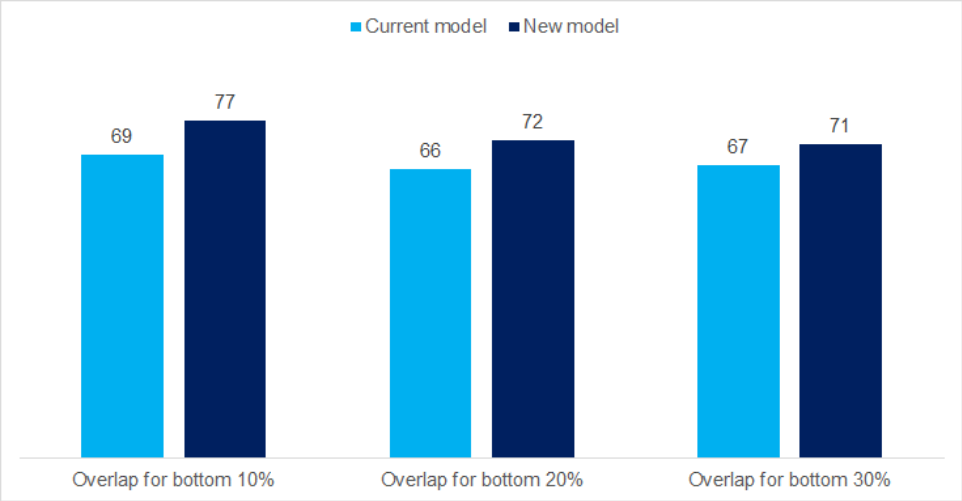
The ‘true welfare’ indicator is also constructed as the observed consumption expenditure minus any received TSA allowance divided by the household needs. Both in the estimated and true welfare indicators, the denominator (household needs index) is the same.

4. Assessing the performance of the new PMT model

We start by reviewing the ranking property of the new model compared to the current one to then assess the ‘theoretical’ performance of the proposed model compared to the current one in a budget neutral scenario. The ranking performance of the new model is higher than the current model, especially in the bottom decile.

Figure 3 shows the overlap between the ‘true’ welfare distribution (based on the consumption observed in the HIES data) and the estimated welfare based on either the current PMT formula or the new model, in the bottom 10 percent, 20 percent, and 30 percent of total population. The overlap for the current model is the same as that presented in Figure 2.

Figure 3: Percentage of population overlap in ‘true’ and estimated welfare within the bottom 10 percent, 20 percent, and 30 percent of population - new versus current formula

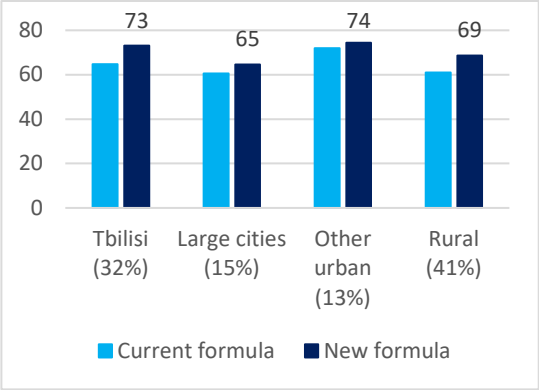


Source: Authors’ analysis of HIES 2018 data.

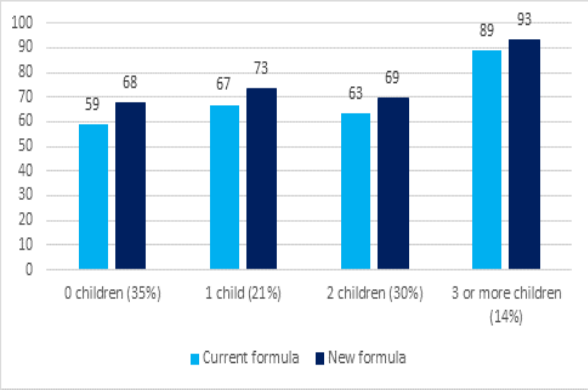
The new model outperforms the current model in terms of ranking property when also looking at the relative distributions by geographical areas and household composition. Figure 4 looks at the population overlap between true and estimated welfare between the current and the new model across different subpopulations. Panel A splits the whole population by type of settlement area: Tbilisi, large cities, other cities, and villages; panel B splits it by number of children in the household. Similar to the disaggregation by settlement, the level of overlap between true and estimated welfare according to the new formula is improved for different household types. While Figure 4 only reports the overlap in the bottom 20 percent of each subpopulation, similar results are obtained when comparing the overlap in the bottom 30 percent as documented in Annex C. Coverage of the poorest according to the new formula is homogeneously good across different typologies of households by composition, as shown in Annex C.

Figure 4: Percentage of population overlap in 'true' and estimated welfare for the bottom 20 percent of respective distributions - new versus current formula

A. By type of settlement



B. By household type

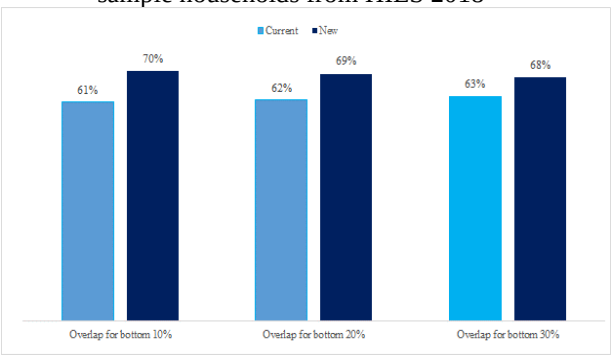


Source: Authors' analysis of HIES 2018 data.
Note: The population overlap is estimated by comparing the households in the bottom 20 percent of the respective settlement/household type's 'true' welfare distribution with households in the bottom 20 percent of respective 'estimated' welfare distribution. The share of each settlement/household-type group with respect to the overall population is reported in parentheses.

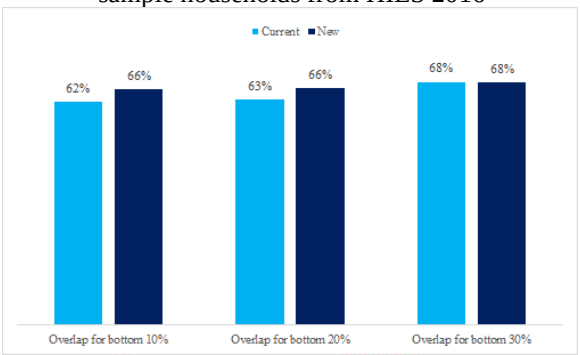
These estimates have been measured in the reduced sample including households who were interviewed twice, which we have used for the estimation of the new model. Therefore, the higher performance of the new model could be partly biased since the high results might only apply to the used sample, rather than the whole population. Indeed, since the new model has been estimated using such data, some improvement in precision is to be expected. As a robustness check, we compared the performance of the current and the new model in two groups of households that are not part of the sample used to estimate the new formula ('out-of-sample groups'): households interviewed in 2018 whose answer to the survey has been excluded from the formula estimation (Figure 5.A) and households interviewed in 2016 (Figure 5.B). In both cases, the updated formula improves in performance. The improvement is more pronounced in 2018 than in 2016, possibly due to the changing relationships between covariates and outcome over the years. To perform the analysis in these two subsamples, the aggregate used to approximate welfare could not be de-seasonalized and is therefore noisier: it is thus not surprising and not highly concerning that the overall performance of the new formula throughout Figure 5 looks lower than that reported in Figure 3.

Figure 5: Percentage of population overlap in 'true' and estimated welfare within the bottom 10 percent, 20 percent, and 30 percent of population - out of sample

A. Percentage of population overlap in out-of-sample households from HIES 2018



B. Percentage of population overlap in out-of-sample households from HIES 2016



Source: HIES 2018 and 2016 data, sample of survey responses excluded from the estimation of the formula.

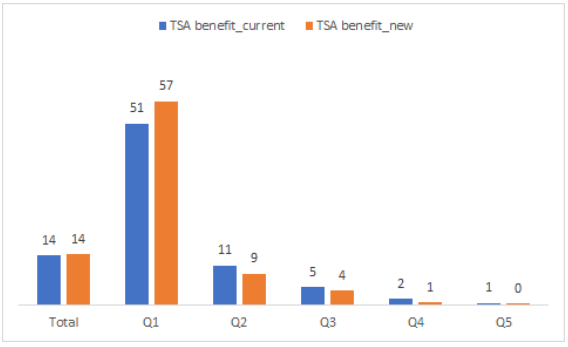
Note: 'True' welfare is measured as aggregate consumption per equivalent adult, net of the seasonal adjustment used for the estimation of the formula.

The theoretical performance of the proposed model is higher than the current model also in terms of coverage of the poor, beneficiary, and benefit incidence. We simulate the coverage of TSA eligible households under the current and new models in a budget neutral scenario. The estimated program expenditure based on the current PMT model would be GEL 403 million and the total coverage of eligible households (with score less than 65,000 as per the existing regulation) under perfect targeting would be 13.9 percent of the population. With the same budget of GEL 403 million, we could afford to increase the eligibility threshold to 66,860 and hence cover more households, about 14.2 percent of the total population (holding the benefit amounts constant according to the benefit formula rules that were enforced in 2018)[31] (Figure 6).

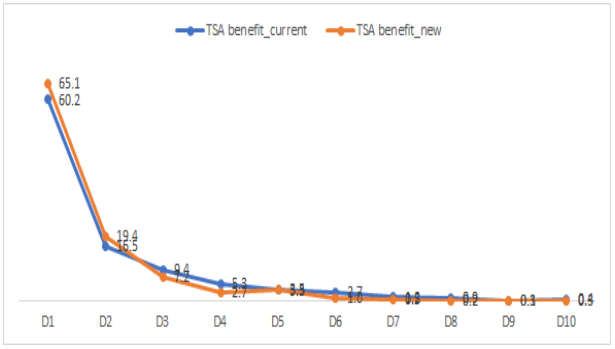
The efficiency gains would come from improvements in coverage of the poorest quintile and marginal improvements in the benefit incidence in bottom deciles. The coverage of the poorest quintile would increase substantially from 51 percent to 57.3 percent, while the coverage of the remaining quintiles (leakage) would decrease. The targeting accuracy measured as the share of budget accruing to the poorest decile in case of perfect targeting would improve from 60 percent to 65 percent: 94.5 of the TSA budget would go to households in the poorest two quintiles based on the new model as opposed to 91.3 as per the current model. It should be noted that that these projections overestimate the actual results since implementation bottlenecks usually decrease targeting efficiency.

Figure 6: Coverage and targeting accuracy under the current and proposed model

A. Coverage



B. Benefit incidence



Source: HIES 2018.

The positive gains in terms of improved coverage of the poor and targeting outcomes should be balanced with the costs of implementing and transitioning to a new PMT formula. The improved targeting outcomes of the proposed new model are mostly due to the better use of the information collected rather than additional new variables. For example, rather than pooling all income sources in one 'revenue' index, as in the current formula, we separated income sources as separate variables. With an eye to reduce the administrative costs we did not consider variables with the potential to create implementation complications

[31] In 2018, each member of households with score < 30,000 would receive GEL 60 and additional GEL 10 per child, each member of households with score between 30,001 and 57,000 would receive GEL 50 and additional GEL 10 per child, each member of households with score between 57,001 and 60,000 would receive GEL 40 and additional GEL 10 per child, each member of households with score between 60,001 and 65,000 would receive GEL 30 and additional GEL 10 per child, and households with score above 100,000 would only receive GEL 10 per child. In January 2019, the child allowance increased from GEL 10 to GEL 50.

or wrong incentives (that is, IT assets). Table 4 marks the variables that are 'new' from an administrative point of view, that is, that would be required to be added in the family declaration form. Only 13 variables are new[32] whereas 19 variables are removed (see Table B1.2 in Annex B for a full summary). For this reason, the declaration form would not need to change much and the administrative cost of storing and verifying the new variables is assessed to be minimal compared to the benefits that would be achieved in terms of reduced exclusion and inclusion errors.

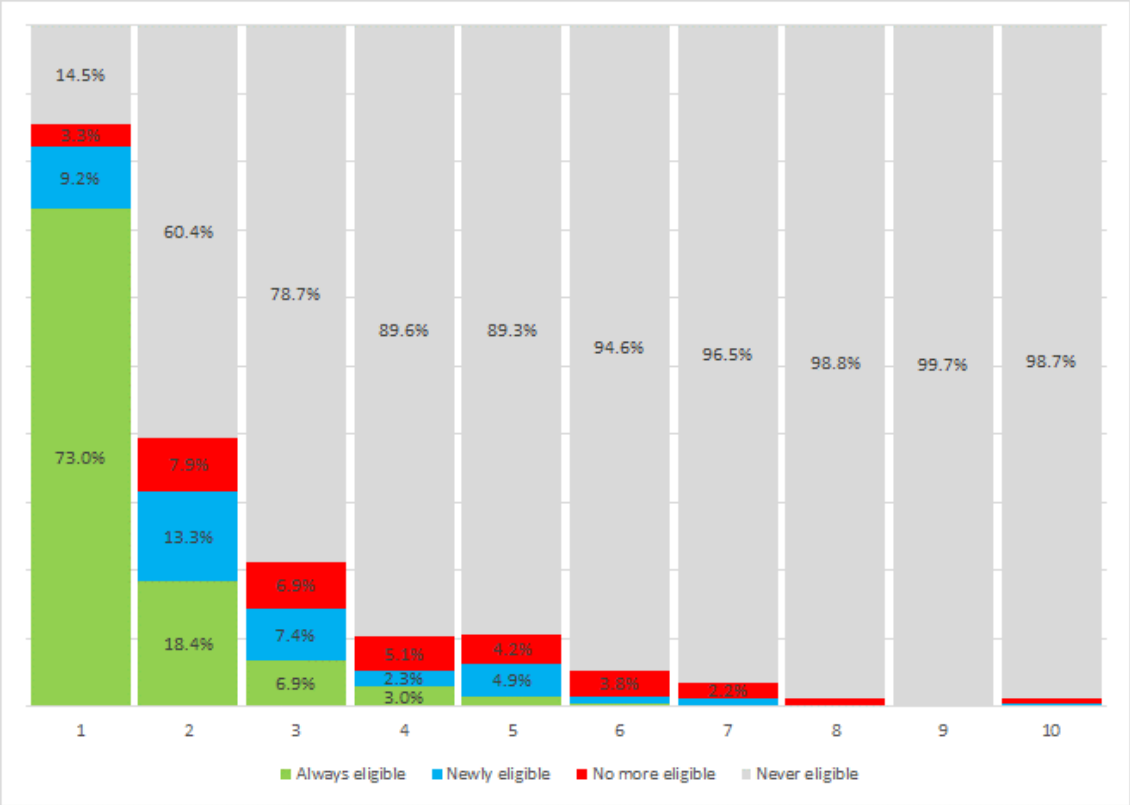
The transition to a new formula would also lead to adjustment costs that will need to be properly managed. There will be some winners and losers resulting from the proposed new PMT, respectively, gaining and losing eligibility to the TSA. Figure 6 shows that with the same allocated budget, the overall the coverage would increase (hence more households would be eligible). For instance, 62,749 new households would be eligible (winners) based on the new PMT, while 28,639 households would lose their eligibility moving to the new PMT formula. The winners will therefore outnumber the losers. Furthermore, targeting will be more equitable, as the winners will be highly concentrated in the poorest quintile and the losers mostly concentrated in the top three quintiles (Figure 7). Importantly, 55 percent (25 percent) of the winners belong to the poorest quintile (decile) while 71 percent of the losers are from households in the upper four quintiles. Further analysis of administrative data (households registered in the SVHD) will allow to learn more about the number and typologies of households gaining and losing eligibility under the proposed new formula.

Adjustment costs will potentially include behavioral responses to the anticipation of possible losses of the TSA benefit: households might, for instance, cut down on consumption (already below subsistence levels) by way of precaution. Changes in coefficients might also modify incentives to the supply of labor and the purchase of movable assets. Previous analysis on Georgian TSA[33] shows that TSA does not distort labor supply. A randomized experiment in Indonesia (Banerjee et al. 2020) further shows that changes to the treatment of asset ownership in the PMT have little or no effect on households' purchasing decisions.

[32] New variables that will need to be considered for the calculation are number of young cattle, number of horses, number of sheep, number of goats, number of pigs, number of members with employer-provided insurance, number of members abroad, number of members who have worked in the past three months, ownership of refrigerators, washing machines, satellite receivers, access to individual system of hot water, and access to individual heating system. Variables that will be removed from the formula are beehives, poultry, tractors, revenues from social package and pensions, presence of children of full age living as independent family, household head's gender, presence of children (age less than 16), possession of garage, cellar/kitchen, unfinished house or structure/workshop, cattle shed, storage hut, basement, commercial area, total area of other owned accommodation (apartment/house), total area of other country houses owned by the household, and whether cars, passenger vehicles, or trucks are of Soviet manufacturing.

[33] Carraro, Honorati, Marguerie 2020.

Figure 7: Winners and losers under the proposed PMT formula



Source: Authors' calculations on HIES 2018.
Note: The percentages indicate the share of people from each decile who keep, gain ('winners'), lose ('losers'), do not gain eligibility status as a result of the proposed PMT formula changes. Winners are people who become covered by TSA as a result of the formula update. Losers are people who lose eligibility for TSA as a result of the update. Beneficiaries after the formula changed are identified assuming budget neutrality from the change: households are ranked according to the new formula and assumed to be covered starting from the poorest, until the projected total cost of TSA transfers under the new formula equates the estimated total cost under the old formula. The relevant threshold is a PMT score of 66,850 up from the 65,000 threshold in the old formula.

5. Recommendations

Overall, the performance of the current TSA targeting approach is good compared to international standards, though there are some issues that could be addressed to improve both the design and implementation of the PMT targeting model. At the request of MoILHSA, the paper estimates and proposes a new model based on the latest data available at the time of analysis. The results are overall promising and show that Georgia can improve the already good targeting system used to determine eligibility of poverty targeted benefits (the TSA, child benefits, and other benefits administered at the local level). Such good performance is partly the result of a relatively advanced system in which direct income variables are included in the PMT.

There are a number of recommendations that can be drawn from the analysis, which we discuss based on their possible implementation timescale such as immediate, short, and medium term.

Immediate term

In the immediate term, the current PMT formula could be better implemented by computing the score by adjusting all monetary variables (income, social benefits package and utility expenditures) to 2013 prices as the PMT formula was estimated at 2013 prices (while according to the current practice monetary variables enter at nominal prices). While adjusting the current formula with the updated SM is improving the coverage of TSA and child benefits, it is only a partial correction. Just replacing the updated value of the SM was not the intended and correct use of the formula at the design stage. It would be preferable to maintain the initial parameters (including the SM) and adjust all monetary variables (incomes and utilities' expenditures) to 2013 prices. This would require deflating the monetary variables in the formula by the index of prices published by Geostat.[34]

Short term

In the short term, the ministry could consider testing, validating, and fine-tuning the updated PMT formula reflecting relationships based on the latest 2018 nationally representative household survey data. The proposed new PMT model is performing significantly better than the current one. However, it should be subject to further scrutiny by the MoILHSA and the SSA. The validity of the model should be tested with administrative data and field-tested on a small scale (as the new model includes few variables not currently captured in the declaration form). A specific analysis of winners and losers of adopting the new model should be undertaken based on real administrative data to understand the possible implications. Based on such analysis, further analysis should be conducted to calibrate the eligibility thresholds and determine transitionary scenarios.

Furthermore, as part of this exercise, it would be recommended to conduct further analysis to update the calculation of the household needs index.

Medium term

In the medium term, it would also be advisable to explore the possibility to move toward a hybrid system. The fact that Georgia already collects and uses some income information and has the possibility to validate

[34] For example, the CPI for March 2020 was equal to 140.3 (with average of 2010 equal to 100). The average CPI for 2013 was 107 and therefore in May 2020 in any application incomes should be divided by 1.31 (140.3/107).

income information opens the possibility to explore further advancements of the targeting system. In particular, other countries at a similar level of development as Georgia have developed hybrid systems, whereby a direct attempt to measure household income is combined with indirect assessment of presumptive (informal) incomes (See example of Moldova in Box 1).

The imputation of hard-to-verify income (presumptive income, usually from occasional work and agriculture activities, land, and livestock) in addition to measuring the easy-to-verify income (from formal employment, public transfers, and rent or lease of some assets) makes the method 'hybrid', an intermediate approach between the PMT and a means test approach. Other hard-to-verify income such as from self-employment in the informal sector, remittances, and informal rent or lease of assets is difficult to impute and would still be self-declared by the applicant. Income from agriculture is the typical hard-to-verify income which is often imputed in many countries in the Eastern Europe and Central Asia[35] because of its seasonality (different reference periods) and the measurement challenge (part of the production is consumed by the household).

In Georgia, such a hybrid system eligibility could be assessed by two tests: (a) an income test of verifiable incomes: the adult equivalent income must be below a fixed eligibility threshold, and (b) a PMT score to verify that the income declaration is correct and broadly reflects the living standards displayed by the household. The PMT household score needs to fall below a certain eligibility threshold and would be required only if the household passes the income test and only to confirm that the household living conditions broadly match the low-income level declared. Nevertheless, information for both the income test and the PMT would be collected as part of the same eligibility determination process as it is now.

Box 1: Targeted social assistance in the Republic of Moldova

The social support benefit (ajutorul social) is a national minimum income benefit, which started to be rolled out at the end of 2008. The benefit is means tested: eligibility is determined based on the level of income and checked through a set of proxies that should verify the low household living standards. The amount of the benefit is given by the difference between the minimum income guarantee (the income threshold) and the actual household income. If household members are unemployed, they should register with the employment agency to demonstrate that they are actively looking for a job. In turn, registration with the employment agency should result in job offers, which if refused would also result in losing the benefit. Moreover, to encourage taking up employment, income disregards are applied to the calculation of income.

The introduction of ajutorul social was considered a major reform aimed at gradually replacing categorical small benefits provided to a large section of the population with a targeted and more substantial help to particularly poor households. Since 2011, using an income threshold higher than that of the social support, the same administration is also used to target a winter heating allowance (winter support) aimed at reaching about 15–20 percent of the population. Beneficiaries of social support and winter support are also entitled to free health insurance. The ultimate aim of social support is to contribute to poverty reduction and 'guarantee equal opportunities to disadvantaged households' and at the same time promoting self-dependency for people able to work.

The advantages of a hybrid approach compared to the PMT would be the following:

- Provide a more transparent assessment of household eligibility to social assistance.
- Develop a more robust assignment of level of support based on income rather than PMT household score.

[35] Armenia, Romania, Ukraine, and Uzbekistan.

- Ensure a more direct link between household members' economic activities and declared income to ensure that unemployed persons are registered to employment offices and linked to relevant active labor market policies.

- Improve the shock responsiveness of the targeting system by relying more heavily on time-variant variables such as monthly income and other verifiable sources of income.

- Increase the efficiency of the targeting system by reducing the number of home visits (those currently required for eligibility verification) only to certain households where indirect assessment is performed.

In the context of Georgia, moving to a hybrid approach would help incentivize the formalization of employment and micro businesses. Measuring income directly would ensure that people with low income could still receive support. There are reasons to believe that if the general assumption of the government is that beneficiaries hide incomes and are not deserving TSA, a direct attempt to account for people's working activities and measure incomes should improve the credibility of the program. Critically, given the recent episode of COVID-19, the ability to ensure that the system is more responsive to shocks is another clear advantage to move toward direct income measures.

From an implementation point of view, the transition to an hybrid model would be smooth since the declaration form already collects information on incomes, and data systems are in place to verify some of the income sources (formal labor income, some small business revenues, utility expenditures, and social protection benefit including pensions). Developing an income test would not require to collect different information from what is currently obtained in the declaration form. However, it would be necessary to develop a separate model for the indirect measurement of agricultural household income. The latter would be based on information on the amount and quality of land owned and rented by the household, the number and type of livestock units owned by the household, and the number of household members working in the farm.

Similarly, information on the type of activity performed could provide some guidance to assess minimum expected levels of income for informal sector workers. Working-age members not declaring any economic activity and not looking after young children/elderly or disabled members in the household need to register with the employment office. There would still be the need for a declaration form where people would be required to report their incomes. In turn, formal incomes could be verified from social insurance contributions, whereas the verification for informal incomes would be indirect (through the agricultural income assessment and some assumed income or, if people do not declare any income at all, through the required registration in the employment office).

The first step in that direction would be to conduct relevant simulations in the HIES to identify a relevant income threshold, agricultural incomes, and other assumed incomes. It would then be possible to use real data from declaration forms to see how the new approach would work. This analysis could be done while the PMT system is still the main determinant of eligibility. In that way, any shifts toward a hybrid model would be well documented. The determination of the income eligibility threshold and simulations of this alternative hybrid model could be done using the HIES. The hybrid approach could be piloted gradually while the current PMT approach remains the basis for eligibility determination. Moving to a hybrid system that relies more heavily on direct measurement of income would allow the possibility for further innovation.

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Annex A: Detailed model description

The current formula

To understand the proposed new model, a full description of the current model is needed.

The current formula, introduced in Res. 758/2014, ranks households based on predicted welfare. It requires the computation of a welfare index equal to

$$Welfare\ index = \frac{Predicted\ monthly\ expenditure\ (GEL) - TSA\ allowance}{Household\ needs}.$$

Predicted expenditure is a function of variables reported by applicants and/or collected and verified by the SSA:

$$Predicted\ expenditure\ (GEL) = exp\left(K_0 + \sum_{j=1}^{J} K_j\, Y_j\right),$$

where K_j is a set of coefficients and Y_j are the J variables collected by the SSA or declared by applicant households. Coefficients are different based on the household residence, classified in one of these four categories: Tbilisi, large cities, other urban areas, and rural areas. The full set of coefficients is reported in Table A1.1.

The household needs index is computed as

$$Household\ needs = \frac{Equivalent\ adults}{(household\ size)^{0.20}}\ SM,$$

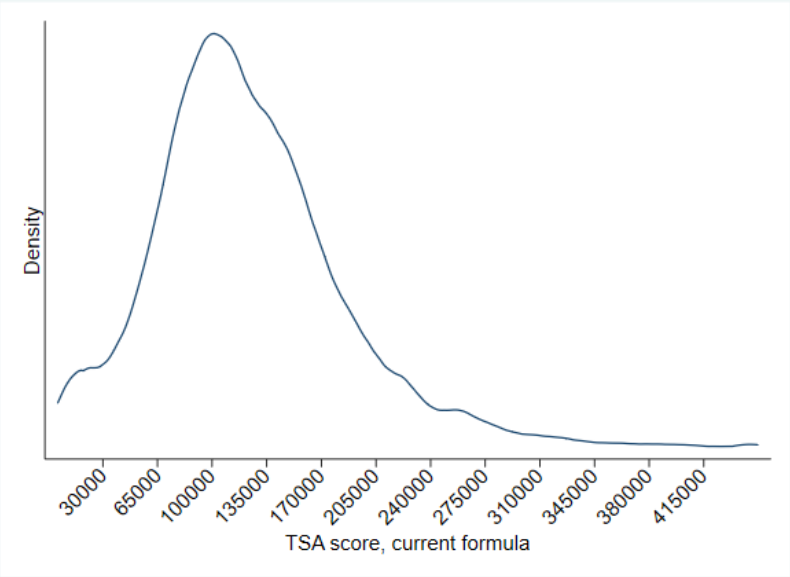
where equivalent adults are computed based on the equivalence scales set out in Res. 758/2014, the denominator is a cohabitation term, and SM is the level of the SM, set at GEL 149.6 until May 31, 2018, and updated to GEL 175 since June 1, 2018.

The welfare index is thus the ratio of predicted pre-social assistance consumption per equivalent adult and the SM. The final PMT score is approximately equal to 100,000 times that share:

$$TSA\ score = max\{10 \cdot int(10{,}000 \cdot Welfare\ Index); 1{,}000\}.$$

A household with a TSA score of 100,000 is thus predicted to have subsistence-level consumption per (cohabitation adjusted) equivalent adult, before social assistance transfers. A household with a TSA score of 65,000 (the eligibility threshold for TSA benefits before child allowance) is thus predicted to consume 65 percent of the SM before social assistance. Figure A1.1 shows the distribution of the simulated PMT score in the population.

Figure A1.1: Distribution of the PMT score in the population, simulated according to the current formula



Source: Authors' calculations based on HIES 2018.

Table A1.1: Coefficients of the current formula as per Res. 758/2014 and subsequent amendments

Variable	Tbilisi	Large cities	Other urban	Rural
Constant	2.306	2.665	3.883	3.713
Ln (1+) Agricultural area used by the household (ha)	0	0	0	0.083
Ln (1+) No. cows and buffaloes	0	0	0	0.229
Ln (1+) No. beehives	0	0	0.272	0.091
Ln (1+) No poultry units	0	0	0.054	0.039
Ln (1+) Automobiles, passenger vehicles or trucks (non-soviet manufacturing)	0.148	0.256	0.442	0.246
Ln (1+) No. tractors (except for mini tractors), combines, and seeding machines	0	0	0	0.344
Ln (1+) Total revenues[a]	0.251	0.196	0.047	0.149
Ln (1+) Amount paid for electricity, natural gas, water supply, and cleaning for the 12 months up to the second-last month before the declaration	0.275	0.302	0.218	0.176
Ln Household size	0.057	0.257	0.409	0.129
Share of household members who are able-bodied and of working age (18–65)	0.122	0.064	0	0
At least one member is a child who is of full age and lives as an independent family (0/1)	0	0	0.172	0.124
Household head is a man (0/1)	0	0.12	0	0.073
At least one member is less than 16 years (0/1)	0	0	0	0.078
Share of household members who have higher education and are ages between 22 and 65	0.176	0.129	0.191	0.206
Shida Kartli (0/1)	0	0	0	−0.121
Samtskhe - Javakheti (0/1)	0	0	0.194	0
Adjara (0/1)	0	0	0.281	0.1
Guria (0/1)	0	0	0	0
Samegrelo - Zemo Svaneti (0/1)	0	0	0.265	0
Imereti (0/1)	0	0	0.143	0.069
Mtskheta - Mtianeti (0/1)	0	0	0.371	−0.082
Racha Lechkhumi or Kvemo Svaneti (0/1)	0	0	0.636	−0.194

Variable	Tbilisi	Large cities	Other urban	Rural
Kakheti (0/1)	0	0	0	0
Kvemo Kartli	0	0	0	−0.247
Highland region as per Res. 671/2015 (0/1)	0	0	−0.281	0
Ln residential area occupied by the household	0.073	0	0	0
Ln number of rooms in accommodation	0	0.148	0	0.109
Floor material is parquet (0/1)	0.127	0	0	0
Household owns other accommodation (0/1)	0	0	0.12	0
=1 if the household does not possess any of the following: garage, cellar/kitchen, unfinished house or structure/workshop, cattle shed, storage hut, basement, commercial area; 0 otherwise	0	0	−0.225	−0.065
Total area of other owned accommodation (apartment/house) in m^2	0.022	0.023	0	0.037
Total area of other country houses owned by the household in m^2	0	0.028	0	0.07

Note: a. Revenue index = Total cash revenues from second-last month, plus 1/12 of other monetary revenues in past 12 months; retirement pension (capped at GEL 180 per recipient) in the second-last month; and welfare transfers (TSA, disability pension, breadwinner loss pension, veterans, and war disability pensions) received in the second-last month by each member, capped at the value of the household's entitlement as of December 31, 2018. Sources: Authors' reconstruction based on Res. 758/2014 and subsequent changes introduced in Amendment January 18, 2019 No. 4; Amendment June 5, 2018 No. 316; Amendment 29 Dec.20160. No. 616; Amendment 9 August 2016 No. 390.

Proposed new formula

The proposed new formula maintains the structure of the previous one as

$$\text{TSA score} = \max\{10 \cdot \text{int}(10{,}000 \cdot \text{Welfare Index}); 1{,}000\},$$

with

$$Welfare\ index = \frac{Predicted\ monthly\ expenditure\ (2018\ GEL) - TSA\ allowance^{36}}{Household\ needs}.$$

A revision of the household needs index is beyond the scope of this work. Throughout this work, the households index is therefore calculated according to the rules set out in Res. 758/2014, with no change to equivalence scales and the use of the SM value of GEL 175 per month[37] for the simulation of the current TSA score. The new formula maintains the calculation of the welfare index before social assistance (that is, detracting social assistance transfers from predicted monthly expenditure).

The proposed new formula instead revises predicted monthly expenditure by

(a) Directly accounting for observable items of expenditure to improve the precision of the prediction;

(b) Updating the variables used to predict expenditure; and

(c) Estimating the associated coefficients and using several models to find the most appropriate estimates.

[36] The subsistence allowance should be computed as it would have been calculated in 2018. For example, the child allowance component should be computed as GEL10 per child regardless of subsequent changes.

[37] The subsistence minimum should be held constant at its value in 2018 GEL, notwithstanding any update to it.

The new formula is thus computed as

$$Predicted\ expenditure\ (2018\ GEL)\ = Utility\ expenditure\ (2018\ GEL)^{38}\ + exp\left(K_0 + \sum_{j=1}^{L} K_j\, Y_j\right).$$

Utility expenditure is chosen as it is currently observed and verified directly by the SSA. The differential treatment between observable and verifiable items of expenditure and unobservable ones increases the precision of coefficient estimates by decreasing potential sources of variation in the error term. Intuitively, the PMT is a model aimed at exploiting available information to predict unobservable household expenditures. At the limit, precision would be maximum if all expenditure were observable. It is then optimal to exploit all observable expenditure and limit prediction to the unobservable component of expenditure.

As far as the estimation of the coefficient is concerned, the regression model to be estimated on the HIES 2018 sample is

$$\log(Actual\ expenditure - Utility\ expenditure) = \widetilde{K_0} + \sum_{j=1}^{L} K_j\, Y_j + \epsilon\,,$$

$$\epsilon|\mathbf{Y} \sim \mathrm{N}(0, \sigma^2)\,.$$

This implies that

$$\mathrm{E}(\text{Actual expenditure} - \text{Utility expenditure}|\mathbf{Y}) \;=\; \exp\left(\widetilde{K_0} + \sum_{j=1}^{L} K_j\, Y_j + \frac{1}{2}\sigma^2\right)$$

$$= exp\left(K_0 + \sum_{j=1}^{L} K_j\, Y_j\right),$$

with $K_0 = \widetilde{K_0} + \frac{1}{2}\sigma^2$.

Coefficients were estimated using an ordinary least squares (OLS) regression model within each of the four groups identified by the type of settlement (Tbilisi, large cities, other urban, rural). An OLS regression is a simple and clearly justifiable model choice and it fares well in comparison with several other models when measuring the overlap in the distributions of predicted and actual welfare. The alternative estimation models considered and then discarded are as follows:

1. Models with a linear outcome variable, of the form

   $(Actual\ expenditure - Utility\ expenditure) = \widetilde{K_0} + \sum_{j=1}^{L} K_j\, Y_j + \epsilon$

2. Models that are not differentiated by type of settlement, with the same coefficients applying to all households
3. Models of quantile regression at the 30th and 50th percentile

4. Two-step models whereby a first step predicts welfare and a second step excludes observation with predicted welfare in the top quantiles (specifically, in the top two quintiles) from the sample before running an OLS regression. Such models are used to improve precision in the presence of heteroscedasticity.

Variable selection was based on the following steps:

(a) Identification of verifiable potential predictors of expenditure

(b) Application of backward stepwise regression methods to exclude the least significant ones

(c) Ad hoc refinements to the set of variables to ensure consistency of coefficients, allow for heterogeneous effects, and prevent the creation of perverse incentives.

The main variable changes are the following:

- **Income and revenue sources** have been separated and have different coefficients. This has two main advantages. First, it allows to account for the fact that revenues, different from properly said income, are associated with unobservable costs. This, for instance, explains the finding that revenues from self-employment have generally lower coefficients than revenues from wage labor. Second, different sources of revenues might be correlated with higher poverty. It is found, for instance, that higher revenues from social assistance (including TSA, disability and retirement pension, breadwinner loss pension) are not correlated with higher consumption. There are therefore clear gains from separating out the different sources of revenues.

- **Utility expenditure** is now limited to electricity expenditure. Although utility expenditures are not part of the outcome of the regressions, electricity expenditure is still highly correlated with nonutility expenditure and is thus a good predictor of households' welfare.

- **Employment variables.** Different from the previous formula, the proposed formula accounts for variables related to the productive potential of household members, namely, whether they have employer-provided insurance (a proxy for employment and job security), employment status of household members, and the presence of household members living abroad, who could support the household by sending remittances.

- **Movable properties are included.** In addition to vehicles that already appear in the current formula, the new formula accounts for ownership of domestic appliances such as refrigerators, washing machines, and satellite receivers.

- **Dwelling conditions.** In addition to currently measured variables on dwelling conditions, some are added to account for the facilities that the dwelling benefits from, such as hot water and individual heating systems. The presence of a kitchen, garage, or cellar, which was a variable in the previous formula, is not found to have a significant effect in the 2018 data.

- **Education.** High education, in some groups, has different effects depending on when it was acquired and whether the skills that it conferred have become obsolete. For these reasons, the proposed formula accounts for the age of household members with higher education and, in some of the settlements considered, allows for different effects of education on welfare depending on age of household members.

- **Household size.** While the existing formula assumes a parametric relationship between household size and welfare, the current formula allows for nonlinearities by separately estimating coefficients for household in different size groups. The estimated relation between household size and expenditure is confirmed by the estimates to be more complex than would appear from a linear model: past a certain household size, aggregate consumption decreases, reflecting the fact that poorer households tend to be larger. Figure A1.2 exemplifies the relationship by plotting the values inferred from the estimates in Tbilisi and in large cities.

- **Agriculture.** A first innovation was studied by differentiating the size of agricultural land by ownership type. However, land is predominantly owned in the sample and only a small minority of households are renting it. Although data show that land rented is more strongly associated with high consumption than owned land, the number of land renters in the sample is too small to draw precise estimates of the coefficient. It has thus been preferred to uniformly apply the same coefficient to all lands used by the household, regardless of ownership status.

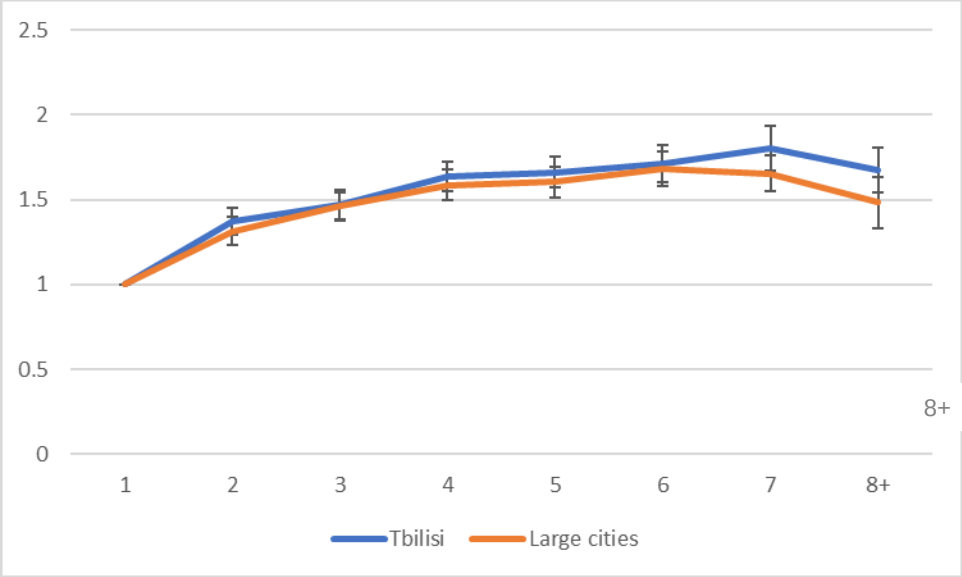
- **Agriculture and cultures.** The possibility of introducing indicators for the type of cultures run by farming households has been studied. The evidence in support of the introduction of these variables, however, was not satisfactory.

- **Agriculture and farming.** A livestock index is introduced, while variables that are hard to verify or appear to be nonsignificant in the sample (number of beehives and number of poultry units) are removed. The livestock index sums up the number of buffaloes, cows, and young cattle; the number of horses; and one-tenth of the number of sheep, goats, and pigs. In the formula, the livestock index is treated in a nonlinear way, with a disregard for values less than or equal to 1, which seem to be owned by smaller and poorer households, and a higher coefficient for those owning more than 4 units of livestock.

- **Quality of assets.** As an attempt to capture heterogeneous quality of movable and immovable assets, several variables have been studied interacting the availability of assets with the presence of elderly people in the household. The rationale would be that movable assets owned by older people are more likely to be of lower quality and less productive. This hypothesis, however, did not stand the tests performed in the analysis.

- **Geographical variables.** The use of regional indicators is streamlined and only indicators for regions that are significantly poorer or richer than average are added. This increases the geographical fairness of the model.

Figure A1.2: Household expenditure by size, relative to single member households, by size of household - standard errors in brackets



Source: Authors' calculations based on HIES 2018 data.
Note: The values are inferred from the regression of log aggregate household expenditure on a set of categorical variables for the household size.

Annex B: Variables and coefficients of the proposed new model

Table B1.1: Variables and coefficients of the proposed new model

Category	Variable	Tbilisi	Large cities	Other urban	Rural
	Constant	4.809***	4.172***	4.173***	4.097***
Revenues	Log (1+) Income from hired employment (deflated to its value in 2018 GEL)	0.0300***	0.0672***	0.0419***	0.0339***
Revenues	Log (1+) Revenues from self-employment (deflated to its value in 2018 GEL)		0.0509***	0.0499***	0.0272***
Revenues	Log (1+) Income from selling agricultural product (deflated to its value in 2018 GEL)			0.0368***	0.0451***
Revenues	Log (1+) Income from property (leasing, interest on deposits) (deflated to its value in 2018 GEL)	0.0465***			0.0496*
Revenues	Log (1+) Other revenues (remittances, gifts, and property disposal) (deflated to their value in 2018 GEL)	0.0324***	0.0291***	0.0301***	0.0230***
Utility expenditure	Ln (1+) Yearly expenditure on electricity last year (deflated to its value in 2018 GEL)		0.168***	0.138***	0.0890***
Employment	One member with employer-provided insurance (0/1)			0.124	0.0815
Employment	Two or more members with employer-provided insurance (0/1)			0.251***	0.176***
Employment	One member worked in last 3 months (0/1)	0.224**		0.0559	0.0847*
Employment	Two members worked in last 3 months (0/1)	0.436***		0.133	0.159***
Employment	Three or more members worked in last 3 months (0/1)	0.591***		0.215*	0.176***
Employment	Some members are abroad (0/1)			0.125	
Movable properties	Owns one or more refrigerators (0/1)			0.183**	0.117***
Movable properties	Owns one or more washing machines (0/1)			0.112*	
Movable properties	Owns one or more movable satellite receivers (0/1)		0.214***		0.0685***
Movable properties	Owns one car, minibus, or truck (0/1)	0.436***	0.196***	0.269***	0.187***
Movable properties	Owns two or more cars, minibuses, or trucks (0/1)	0.613***	0.274**	0.240***	0.368***
Dwelling	Ln Residential area (m^2)				0.139***
Dwelling	Ln Number of rooms in the dwelling			0.245***	
Dwelling	Main flooring material is parquet (0/1)			0.166**	

Category	Variable	Tbilisi	Large cities	Other urban	Rural
Dwelling	Has access to individual system of hot water (0/1)	0.301***	0.235***	0.0719	0.0583**
Dwelling	Has access to individual heating system (0/1)				0.0222
Dwelling	Owns other dwelling or summer house (0/1)		0.187***	0.279***	
Education	Share of HH members with high education ages 50–65	0.302***	0.307***	0.150*	0.251***
Education	Share of HH members with high education ages 32–49	0.594***	0.430***	0.289***	0.251***
Education	Share of HH members with high education ages 22–31	0.444***	0.398***	0.289***	
Demographics	HH size = 2	0.373***	0.316***		0.271***
Demographics	HH size = 3	0.470***	0.467***	0.138***	0.369***
Demographics	HH size = 4	0.636***	0.588***	0.190***	0.502***
Demographics	HH size = 5	0.662***	0.605***	0.262***	0.502***
Demographics	HH size = 6	0.714***	0.683***	0.416***	0.610***
Demographics	HH size = 7	0.803***	0.655***	0.220**	0.597***
Demographics	HH size > 7	0.674***	0.483***	0.220**	0.597***
Demographics	=1 if there is a disabled member of type 1, 2; 0 otherwise	−0.201***			−0.0654**
Agriculture	Log (1+) land area (ha)				0.214***
Agriculture	1 < Livestock index <= 4				0.116***
Agriculture	Livestock index > 4				0.205***
Geography	Guria (0/1)				−0.157**
Geography	Samegrelo - Zemo Svaneti (0/1)		−0.107**		−0.172***
Geography	Racha Lechkhumi - Kvemo Svaneti (0/1)			−0.829***	−0.184**
Geography	Mtskheta - Mtianeti (0/1)				−0.226***
Geography	Kakheti (0/1)			−0.158**	

Note: HH = Household. Asterisks represent the significance level of underlying coefficients in the OLS model. *p < 0.10; **p < 0.05; ***p < 0.01.

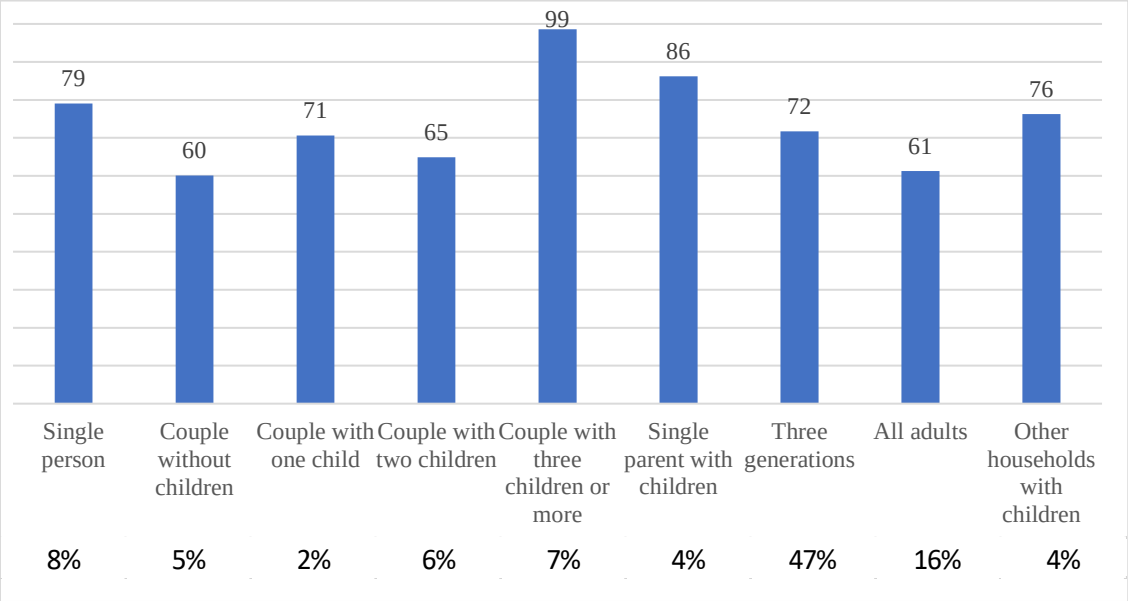
Table B1.2: Change in the information required after the change in the formula

New information required	Information no longer required
Young cattle (n)	Beehives (n)
Sheep (n)	Poultry (n)
Horses (n)	Soviet manufacturing of owned cars, passenger vehicles, or trucks (yes/no)
Goats (n)	Tractors (except for mini tractors), combines, and seeding machines (n)
Pigs (n)	Revenues from social package and pensions (GEL)
Members with employer provided insurance (n)	At least one member is a child who is of full age and lives as an independent family (yes/no)
Members abroad (n)	Household head is a man (yes/no)
Members who have worked in the past three months (n)	At least one member is less than 16 years old (yes/no)
Refrigerators (yes/no)	Garage (yes/no)
Washing machines (yes/no)	Cellar (yes/no)
Satellite receivers (yes/no)	Kitchen (yes/no)

New information required	Information no longer required
Access to individual system of hot water (yes/no)	Unfinished house or structure/workshop (yes/no)
Access to individual heating system (yes/no)	Cattle shed (yes/no)
	Storage hut (yes/no)
	Basement (yes/no)
	Commercial area (yes/no)
	Total area of other owned accommodation (apartment/house) in m^2
	Total area of other country houses owned by the household in m^2
	Mountain location

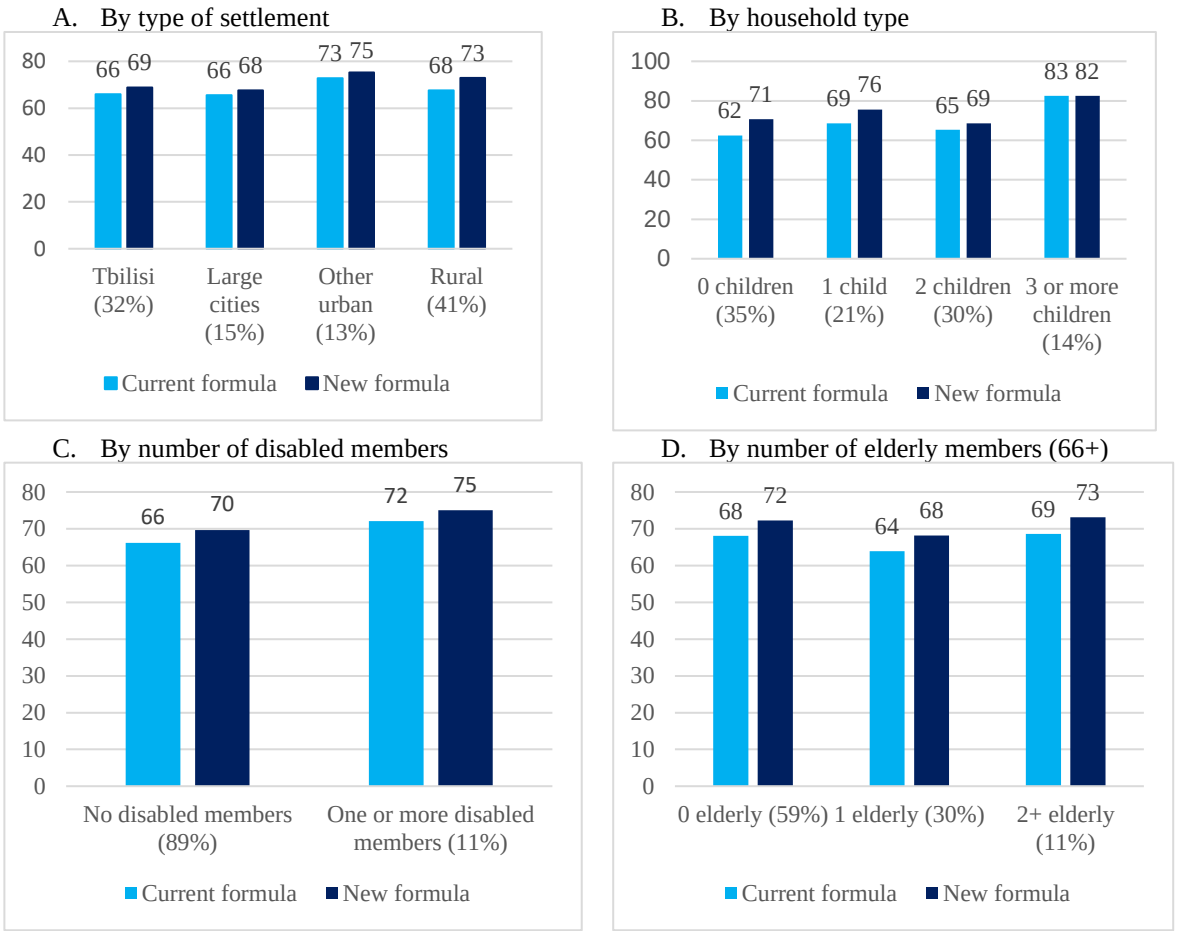
Annex C: Detailed statistics l on model performance

Figure C1.1: Percentage of population overlap in 'true' and estimated welfare for the poorest 20 percent of the population, by household type



Source: Authors' analysis of HIES 2018 data.
Note: The population overlap is estimated by comparing the households in the bottom 20 percent of the national consumption distribution with households in the bottom 20 percent of respective 'estimated' welfare distribution. The share of each household-type group with respect to the poorest quintile is reported below the respective group.

Figure C1.2: Percentage of population overlap in 'true' and estimated welfare for the bottom 30 percent of respective distributions of different subpopulations - new versus current formula



Source: Authors' analysis of HIES 2018 data.

Note: The population overlap is estimated by comparing the households in the bottom 30 percent of the respective settlement/household type's 'true' welfare distribution with households in the bottom 30 percent of respective 'estimated' welfare distribution. The share of each settlement/household type group with respect to the overall population is reported in parentheses.

Annex D: Limitations in the replication of the TSA score in the HIES data

Most of the data limitations summarized in this annex are adapted from Carraro, Honorati and Marguerie (2020).

Movable property. While Res. 758/2014 requires accounting for the "number of automobiles, passenger vehicles or trucks (Non-Soviet manufacturing) in a household," we cannot disentangle between Soviet and non-Soviet type of cars in HIES data.

Revenue index and TSA benefits. While nearly all monetary in-flows enter the formula as they were received in the second-last month before application, the simulation relies on an average of the latest three months. On average, this is not expected to create any bias; however, in the presence of any strong income shock, the simulation procedure would be expected to overestimate the PMT score of an affected household.[39]

Utility expenditure. This item corresponds in the law to the "amount paid for electricity, natural gas, water supply and cleaning for the last 12 months." However, HIES data collect expenditures for the last three months only. We checked the seasonality in expenses (using month of survey) and confirm that there is a high variability for electricity and gas expenditures. Therefore, a more complex estimation is required. We compute average household expenses in electricity (respectively gas) per month across unique households, using the panel structure of the data. For each available observation (ranging from 1 to 12 months, depending on the rotation scheme and the number of times the household was interviewed in 2018), we compute the ratio between actual expenses for the month and the average monthly expenses of other households. An average ratio is computed across monthly observations available, per unique household. Missing observations of monthly expenses are estimated by applying the average ratio to the average monthly spending value, and monthly expenses are added to provide an estimate for the 12 months of expenses.

Demographic variables. The formula applies a coefficient to households with at least one son or daughter who is of full age and lives as an independent family. This refers to a separate household, while in HIES data, only the members of the household are observed (and not family outside of the household). Therefore, this variable cannot be estimated and is set to zero for all households.

The formula accounts for the share of capable members in the family ages 18 to 65. Among the four categories of 'non-capable' adults, two cannot be identified in the HIES data and are thus unidentifiable in the simulations: "persons confined to a bed" as well as "persons who cannot move without assistance and/or who needs a caregiver."

Household needs index. Some subcategories (which are given a specific weight) are hard to identify in the data.

Single pensioner/social package beneficiary. This category corresponds to a single person receiver of state pension or social package or state compensation. The latter category, namely persons receiving state compensation, cannot be identified.

[39] For a simulation of the effect of an income shock to TSA demand, see Honorati, Marguerie, and Sormani(2020).

Pregnant woman. This information is not directly available in HIES. However, in the expenditure module, a table is conditional on the following question “did any member of your household give birth or was she expecting childbirth during the past three months?.” Answer to this question means there was a pregnant woman in the household (or a woman who recently delivered). We have to make assumptions to identify the pregnant woman at the individual level: we restrict mother’s age to be between 16 and 45, we exclude overlaps with women identified as breastfeeding mothers, and if there are several ‘potential’ pregnant women in the same household, we consider the youngest to be the pregnant woman.

Breastfeeding mother. This information is not directly available in the HIES. We consider there is a breastfeeding mother in households with at least one woman age between 16 and 45 and a child less than 1 year old. If there are other women who could be potential mothers, the youngest of the potential mothers is the one considered as a ‘breastfeeding mother’.

Single mother. A special category exists in the household module for single parents; however, there is no occurrence in the 2018 data, which does not seem realistic**.** We recode this category to take into account single or widow women, ages between 16 and 61 years, belonging to a household in which there is at least one child younger than 18 years old and no other woman in the household who is non-single and could be the mother of the child. The constraint on the woman’s age is to take into account the age difference between the mother and the child.

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ABSTRACT

This paper investigates reasons of Georgian Targeted Social Assistance (TSA)'s declining performance and proposes a new PMT model estimated on the most recent household income and expenditure survey data (2018). The paper finds that the proposed updated formula performs better in terms of its ranking property, coverage of the poor and benefit incidence among the poor. The updated PMT formula would improve the coverage of the poorest decile by raising it from 69% to 77% and the benefit incidence in the poorest decile from 60 to 65 percent. The analysis also finds that most of the "winners" are in the poorest quintile while the losers in the top quintiles. In the medium term, the paper highlights the potential benefits of moving to a hybrid targeting approach, whereby reported income is used as a first-stage exclusion criterion before a PMT assessment.

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