Microeconomics in Practice: Computational and Applied Approaches

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Editör: Doç. Dr. Işıl Şirin SELÇUK

Gazi
kitabevi

"En İyi Akademi, Bir Kitaplıktır."

Microeconomics in Practice: Computational and Applied Approaches

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Chapter 9

WHEN DISASTER DAMAGE IS BOOKED ELSEWHERE: HEADQUARTERS ATTRIBUTION AND RECORDED EXPORTS AFTER TÜRKİYE'S 2023 EARTHQUAKES

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ENERGY POVERTY MEASUREMENT UNDER ADMINISTERED PRICES: EVIDENCE FROM TÜRKİYE, 2018-2023

Mücahit Zor[1]

Governments often respond to energy price shocks by intervening in the prices households pay for electricity and heating fuel. In many countries these prices are set by a regulator or a state supplier, and the most direct way to shield households from rising costs is to hold the tariff down, which makes energy more affordable and protects household budgets. But the tariffs that protect household budgets also lower the energy bills that household surveys record. This creates a measurement problem. Expenditure-based energy poverty measures are calculated from this recorded spending, and the research on energy poverty, its determinants and the policy responses to it relies on these measures. An indicator with a fixed threshold, such as the widely used 10% rule that classifies a household as energy poor when energy spending exceeds 10% of its income (Boardman, 1991), falls when recorded bills fall. When the threshold is instead recalculated each year from the spending distribution, the same fall in bills can have the opposite effect. For example, the 2M rule classifies a household whose energy budget share, defined as its energy spending divided by its total spending, exceeds twice the national median. When low tariffs pull most budget shares down, the median falls, the threshold falls with it, and the measured rate can rise even as bills shrink. During a large price intervention, a change in an energy poverty rate can therefore reflect both a change in household affordability and the way prices and thresholds enter the indicator.

Türkiye went through a severe inflation shock in 2021-2023 with annual consumer price inflation climbing from about 36% at the end of 2021 to a peak of 85.5% in October 2022. The government responded by holding household energy tariffs down, a response this chapter calls the tariff hold from now on. The hold covered electricity and network gas, the two energy prices the state sets, while

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coal, wood and bottled gas stayed at market prices. The Household Budget Survey (HBS) conducted in 2022 and 2023 recorded household energy spending through both years of this policy. The recorded bills therefore reflect the protection itself. Any attempt to measure energy poverty from survey data collected in such a period must ask how much the rates owe to the tariffs and how much to real changes in affordability. Calculations from the HBS show that the share of households spending more than 10% of income on energy fell from 14.1% to 8.8% between 2022 and 2023. Meanwhile, the share of households whose energy budget share exceeded twice the national median rose from 21.5% to 29.2%. The two widely used energy poverty rates are calculated from the same households and the same recorded energy items, yet one fell by a third and the other rose by a third. The only difference between the 10% of income rate and the 2M rate is how each classifies the same spending. Before the crisis, the two surveys show no such disagreement. In 2018 and 2019, all five of the energy poverty measures this chapter follows moved together.

The inflation episode and the tariff hold in Türkiye provide a natural setting for examining the sensitivity of expenditure-based energy poverty indicators to administered prices. We ask how much of the divergence across these indicators between the 2022 and 2023 surveys came from real changes in household affordability and how much came from the effect of the administered prices on recorded bills. The energy poverty literature has produced a standard set of expenditure-based measures, and both academic research and national policy assessments rely on them. We calculate five such measures from the 2018, 2019, 2022 and 2023 surveys. The 10% of income and 10% of expenditure rules apply a fixed 10% threshold to the share of energy in income and in total expenditure. The other three measures, 2M, M/2 and Low Income High Costs (LIHC), which combines high energy costs with low income, set their thresholds from the distributions observed in each survey year instead of fixing them in advance. To separate the effect of the tariffs, we recalculate each household's 2023 electricity and network gas bill at the prices that would have applied had tariffs risen with the broader price level, and recompute the two fixed-threshold measures and 2M from the adjusted bills. For 2M and M/2, we decompose the 2022-2023 change into the part that came from changes in household spending and the part that came from the threshold being recalculated.

The question is related to two literatures. One is the literature on how energy poverty measures are constructed and where they disagree, and the other is the literature on how broad energy price support reaches households. Studies of energy poverty measurement show that different indicators can produce different rates and select different households within the same institutional setting (Deller

et al., 2021; Maier & Dreoni, 2026; Menyhért, 2024). Research on energy price support examines how the benefit of a broad tariff intervention is spread across households, and finds that the money from an untargeted price cap flows disproportionately to areas with higher consumption and higher incomes (Fetzer et al., 2024). The Turkish literature provides energy poverty rates from earlier HBS years, simulations based on the 2022 data, income-based rates that reach the 2023 survey, and an account of the support system built from regional totals. However, none of these studies captures the full divergence in the 2023 survey or measures each household's bill difference under an alternative price path (Cin & Onaygil, 2025; Dogan et al., 2021; Emre, 2025; Kargın Akkoç, 2026; Selçuk et al., 2019). This chapter combines the indicator comparison with a price benchmark computed household by household on the 2023 data and shows that disagreement across energy poverty measures can change when a government holds energy tariffs down. It also shows which part of the divergence between the measures comes from recorded bills, which part from changing thresholds, and how the bill reduction from the tariff hold is distributed across households.

The benchmark and the decomposition each take on one side of the divergence between the measures. The benchmark asks what the fixed-threshold rates would have shown without the tariff hold while the decomposition asks whether the rise in 2M and M/2 reflects deprivation or a moving threshold. The lower tariffs reduced the energy bills that the fixed-threshold rates depend on. Had these tariffs risen with the broader price level, the 2023 10% of income rate would have been 14.7% to 18.9%, which is 5.9 to 10.1 percentage points above the observed 8.8%. The range runs from a lower bound that lets demand respond to the higher prices to an upper bound that holds quantities fixed. In contrast, the thresholds of the median-referenced measures moved with their own medians. Repricing the bills barely changes 2M, which stays between 28.8% and 29.3% across all thirty two benchmark specifications against the observed 29.2%. The rise in the 2M rate came entirely from a falling threshold. At the threshold implied by the 2022 median, the 2023 2M rate is lower than the 2022 rate. Most of the M/2 increase also came from its threshold, although that threshold moved the other way.

The measures also disagreed about the kind of household they select. By 2023, the households M/2 classified had become hard to distinguish from the average household. For instance, 64.5% of the classified households heated with natural gas, which is almost exactly the 64.6% share among all households. The 2M and LIHC measures continued to select households with lower incomes and solid fuel heating. The tariff hold also reached households unevenly. The difference between what households would have paid under the benchmark and what they actually paid came to roughly 0.5% of gross domestic product (GDP). Households

heating with gas received 84.8% of this amount, and richer households saved more in lira while poorer households saved more relative to income.

1. Institutional and Measurement Background

The global energy crisis of 2021 and 2022 raised international prices for natural gas, electricity, and other fuels. Energy demand recovered faster than supply after the COVID-19 pandemic, and Russia's invasion of Ukraine in February 2022 pushed European gas and electricity prices to record highs. This external shock hit Türkiye while it was already in a domestic inflation episode of its own. Consumer price inflation reached 85.5% year on year in October 2022. The minimum wage rose by 50% in January 2022, by 30% in July 2022, and by 55% in January 2023 (OECD, 2023). These developments are of great importance to the energy poverty measures since most of the standard measures divide energy spending by either household income or total household expenditure, and both denominators rose with the wage gains and broad inflation. Between 2021 and 2023, an energy poverty measure could therefore move even when a household's energy use did not change. On the other hand, energy spending, which is the numerator of these measures, did not rise as fast as either denominator. The reason lies in how these prices are set. In Türkiye, household electricity and natural gas prices are administered by the state and do not move with the market. The Energy Market Regulatory Authority sets residential electricity tariffs whereas the state gas importer BOTAŞ sets household natural gas prices. Through the crisis both were held far below the rise in consumer prices. Emre (2025) reports that the first block of the residential electricity tariff was almost unchanged in dollar terms between 2019 and 2023. The IMF (2023) describes household natural gas prices in early 2022 as heavily subsidized and among the lowest in Europe.

The government's protection of households through these prices reached only as far as the electricity and gas network. Between 2021 and 2023, households that heated with coal, wood or bottled gas, roughly three in ten of all households, had no comparable protection for their heating since those energy sources stayed at market prices. The protection did reach these households partly since they still bought electricity for lighting and appliances at the tariffs the government held down. What did not reach them was the price of network gas, a fuel their heating did not use.

Holding tariffs down was only one part of the government's response. The Ministry of Family and Social Services provided direct cash based energy assistance to households, and in 2022 the government widened the lower priced

first block of the progressive residential electricity tariff from 150 to 240 kilowatt-hours per month. A cap on wholesale settlement prices followed late in the same year. The cap applied to what suppliers paid in the wholesale market instead of the bills households received (Emre, 2025).

The OECD (2023) estimates the 2022 cost of measures aimed at households at 0.6% of GDP. These cover fee reductions, assistance payments, the extension of the lower priced first block, and a reduction in electricity value added tax. The IMF (2023) separately reports a BOTAŞ capital injection of 0.8% of GDP that paid for subsidized gas deliveries to households and to small and medium-sized enterprises. The two estimates cover different but partly overlapping sets of measures. No single figure gives the household total. But regardless of the total, the tariff hold reached households unevenly and the bills recorded in the HBS carry that unevenness into the data, and every energy poverty measure built from them inherits it.

Energy poverty is most often measured from household energy spending. The most widely used measure is the 10% rule of Boardman (1991). The 10% rule is fixed and easy to understand, but the rate is sensitive to energy prices since energy spending enters the numerator. Hills (2012) treats this price sensitivity as the main weakness of the English 10% indicator and proposes the LIHC measure in its place.

The three median-referenced measures, 2M, M/2 and LIHC, take their thresholds from the year's own spending distribution. When a tariff changes the bills households record, the distribution shifts and the thresholds shift with it. Of the three, M/2 classifies a household when its equivalised energy spending, adjusted for household size, is below half the median of that spending, a level often read as a sign that a household is spending too little to meet its needs.

These measures record what a household spends on energy but they do not directly capture how much energy it needs or whether it stays warm. That gap matters, because the same level of spending can point in opposite directions. A high energy budget share can mean an unaffordable burden, but it can equally mean a large home or a household that keeps warm by choice. Low spending is even harder to read. A household may be spending little because it is holding its heating below what it needs. This is called hidden energy poverty in the literature (Karpinska & Śmiech, 2020a, 2020b). These studies do not separate energy from other housing costs, and they identify these households from modeled costs and the standard relative poverty line. But the same low spending can mean the opposite of hardship. Maier and Dreoni (2026) show that a home with good insulation or one that generates its own power can spend little on energy while being comparatively

well off. Administered prices add a further reason, and it is the one we investigate in this chapter. When a regulator holds a tariff down, every household on that tariff records a lower energy bill even though their energy use and needs are unchanged. The measured rate can then move for a whole population while the hardship the measure is meant to capture stays the same.

A large empirical literature shows that the choice of measure changes both how many households are counted as energy poor and which ones. Deller et al. (2021) compare the expenditure-based measures with households' own reports of being unable to afford adequate warmth in the United Kingdom and find that the expenditure measures and the self-reports pick out largely different groups, with no more than 5% of the households the expenditure measures flag also reporting that they cannot afford to keep warm. Menyhért (2024) uses Hungarian data in which the same households appear in both an expenditure survey and a living conditions survey, and finds the five main European measures so divergent that fewer than a third of the energy poor are counted by more than one measure. Maier and Dreoni (2026) reach the same conclusion across the whole European Union, where two in five people are energy poor on at least one of four measures but almost none on all four. Deller et al. (2021) also follow their indicators across eight years that include the energy price rises of 2007 and 2008, and report that the lack of overlap persists through those price rises. What none of these studies observes is a government intervening directly in the prices the measures are built from. That intervention is the subject of this chapter.

Several Turkish studies provide the baseline this chapter builds on, but none measures the 2022-2023 divergence on survey data from both years. Selçuk et al. (2019) apply the 10% rule to the 2003 and 2017 surveys, on both an income and an expenditure basis, and find that energy poverty fell over that period. Dogan et al. (2021) add the 2M and LIHC measures on the 2018 survey and confirm that even within a single year the three measures classify different households. Cin and Onaygil (2025) apply the same three measures to the 2022 survey and then project the households forward under assumed price and income growth, which produces a falling 10% rate and a rising 2M rate. Değirmenci and Limanlı (2025) build a multidimensional index from living conditions data through 2020, and Emre (2025) studies Türkiye's energy support system but works from regional totals that cannot show which households the support reached. Kargın Akkoç (2026) uses the 2023 survey and sets a fixed-threshold rate beside a relative one for that year, but measures both on income shares and follows only the relative rate over time. As a result, the two families of measures are never seen moving apart. Each of the studies that measure energy poverty therefore either stops before the 2022-2023 change, projects it rather than observing it, or follows the

change through a single family of measures. This chapter instead follows all five measures across the four observed survey years.

2. Data and Empirical Approach

2.1. Survey Data and Measures

The main analysis uses the household records of the 2018, 2019, 2022 and 2023 Household Budget Survey conducted by the Turkish Statistical Institute (TurkStat). The survey did not run in 2020 or 2021 because of the COVID-19 pandemic. Each year of the survey is an independent national cross section, with 11,828 households in 2018, 11,521 in 2019, 11,922 in 2022 and 10,688 in 2023. For each sampled household, the survey records one month of expenditure at the level of the individual items the household bought.

Household energy expenditure is the sum of the items that the international classification of household consumption (COICOP) assigns to group 04.5, which includes electricity, network gas, bottled gas, liquid fuels, solid fuels and district heating. Unless noted otherwise, HBS estimates are calculated with the survey weights supplied by TurkStat, and the household is the unit of analysis. Section 3.1 also reports the two fixed-threshold rates without weights, the form in which we compare them with earlier Turkish rates. Disposable income refers to the twelve months before the interview and is indexed by TurkStat to December of the survey year. We exclude sixteen households across the four years from the measures that use income in the denominator because their reported income is zero, negative or a placeholder value.[2] Survey nonresponse was higher in 2023 than in the three earlier surveys, and the 2023 file carries a small group of households whose survey weights are far larger than any that appear in the earlier years. Section 3.2 reports how the benchmark results change when the fifteen households with the largest weights are removed.

The way solid fuel purchases are recorded changed between the 2018-2019 and 2022-2023 survey pairs. The 2018 and 2019 files record solid fuel expenditure as a smoothed monthly amount, whereas the 2022 and 2023 files record the purchase made in the survey month. A household that bought coal or wood earlier in the

[2] TurkStat changed the treatment of imputed rent in the income aggregate between the 2019 and 2022 releases. Under the later formula, the imputed rent component is not indexed in the same way, which lowers reported 2022 income for owner households by roughly 2% to 3% relative to the earlier formula. Comparisons between 2018 and 2019 and between 2022 and 2023 each use a common income definition. Comparisons across the two pairs also reflect this change in construction.

season can report no solid fuel purchase during its interview month. Its recorded energy expenditure then falls below what it actually spends. Among households that heat with solid fuel, the share with no recorded solid fuel purchase is 24% in 2018, 28% in 2019, 86% in 2022 and 88% in 2023. As a result, measures built from the distribution of recorded expenditure are not fully comparable between the two pairs of surveys. The central comparison between 2022 and 2023, however, is not affected by this break since both years use the same recording method. For this reason, the benchmark and the decomposition use only the 2022 and 2023 surveys. The 2018 and 2019 surveys serve as descriptive context for the period before the crisis, since any movement in the measures between 2019 and 2022 crosses the break.

Table 1 defines the five expenditure-based measures we use. All these measures are calculated separately for each survey year from recorded household spending.

Table 1

Five Expenditure-Based Measures of Energy Poverty

Measure	**Family**	**A household is classified as energy poor if**	**Threshold and scale**
10% of income	fixed threshold	energy expenditure exceeds 10% of monthly disposable income	fixed at 10%; household level
10% of expenditure	fixed threshold	energy expenditure exceeds 10% of total expenditure	fixed at 10%; household level
2M	median referenced	its energy budget share exceeds twice the contemporaneous median share	twice the weighted median; household level
M/2	median referenced	its equivalised energy expenditure is below half the contemporaneous median of equivalised energy expenditure	half the weighted median; modified OECD scale

Measure	Family	A household is classified as energy poor if	Threshold and scale
LIHC	median referenced	its equivalised energy expenditure exceeds the contemporaneous median and its equivalised residual income is below 60% of median residual income	joint condition; modified OECD scale

Note. The energy budget share is energy expenditure divided by total household expenditure. Residual income is monthly disposable income minus energy expenditure. Medians are weighted with TurkStat survey weights and recalculated in each survey year. Equivalisation uses the modified OECD scale. Section 3.3 also reports 2M with income rather than total expenditure in the denominator.

Our LIHC measure is an approximate version of the LIHC indicator discussed by Hills (2012). Hills combines two conditions. A cost condition asks whether a household's energy costs are above a threshold, and an income condition asks whether its residual income is below a separate income threshold. We use recorded expenditure in the cost condition, since the HBS does not contain modeled required energy costs. Hills equivalises energy costs on a separate scale built for that purpose. We apply the modified OECD scale to both energy expenditure and residual income. Our income condition is different as well. We measure income before housing costs. Hills tests residual income against the official poverty line, which is 60% of median equivalised income measured after housing costs, while we test it against 60% of median residual income.

The HBS data we use do not provide sampling cluster or stratum identifiers. Standard errors therefore use linearized survey estimates that treat the household as the sampling unit and apply the supplied survey weights. This linearization does not incorporate the full two-stage sample design. For the median-referenced measures, the reported standard errors also condition on the estimated threshold. We calculate standard errors for differences between observed and benchmark indicators from the paired difference at the household level.

The final part of the analysis uses TurkStat's 2020-2023 longitudinal release of the Turkish Survey on Income and Living Conditions (SILC). We use the 18,269 households observed in both 2022 and 2023. The survey asks whether the household can keep its dwelling adequately warm, whether it has been in arrears on utility bills during the previous twelve months, and whether it has fallen behind

on rent, mortgage or installment payments. These questions do not use the household's recorded energy expenditure and provide a separate description of reported hardship during the same period. The survey also records how the dwelling is heated, and we report stove, gas combi boiler and central heating which are the three most common systems. The unit of analysis is the household, but the released longitudinal weights apply to persons and no household weight exists for this panel. The SILC results are reported unweighted.

2.2. Benchmark and Supporting Comparisons

The benchmark calculation asks what the 2023 indicators would have recorded if household electricity and network gas tariffs had increased with a general index of consumer prices instead of following their observed path. For each household we recompute electricity and network gas expenditure at the benchmark prices. Other prices and household incomes remain at their observed 2023 values. Total expenditure moves by the change in the energy bill, and the two fixed-threshold measures and 2M are recalculated household by household. This measurement benchmark is not an estimate of the tariff required for cost recovery and does not describe a complete general equilibrium counterfactual.

The benchmark uses three assumptions, and we test several settings of each. The first assumption is how far electricity and gas prices rise. We test four price scenarios. One is the general consumer price index, which rose 53.9% between the two survey years. The other three scenarios take that index and remove household energy from it at weights around household energy's official share of the index, which is about 5%. At the central weight, the resulting index rose by 56.9%. The second assumption is how to split the increase between electricity and network gas. We use two splits. The first uses Eurostat's electricity and gas price indices for Türkiye (Eurostat, 2026). The second, the calibrated split, shifts both indices by a common amount so their weighted average matches TurkStat's household energy index. Under the central scenario and the calibrated split, electricity ends up 48% above the price households paid and network gas 97% above it. Eurostat's gas index also includes bottled gas, which kept market prices. The gas adjustment is therefore smaller than an index covering network gas alone would give.

The last assumption is about the demand response. Fixed quantity calculations apply the benchmark prices to the quantities implied by observed expenditure. These calculations give an upper bound on benchmark expenditure, since households would normally reduce consumption when prices rise. The remaining

specifications allow demand to respond using own-price elasticities of -0.24, -0.31 and -0.37 from Levell et al. (2025). We use an elasticity of -0.31 with the calibrated split and the price index excluding household energy as the central specification for the indicator comparison. Together, these choices give thirty two benchmark specifications.

All thirty two specifications keep household income and the sample of households fixed. Two further checks relax these in turn. One raises household income by the small increase in the general price level implied by the higher benchmark energy prices, and the other removes the fifteen households with the largest 2023 survey weights.

A second calculation asks where the 2022-2023 rise in 2M and M/2 came from. We separate the 2022-2023 change into a distribution component and a threshold component. The distribution component evaluates the 2023 household distribution at the threshold implied by the 2022 median, and the threshold component is the remaining change produced by recalculating the threshold from the 2023 distribution.

The incidence calculation values each household's observed electricity and network gas consumption at the central benchmark prices and subtracts the recorded bill. We refer to the result as the reduction in household electricity and network gas bills implied by the benchmark. It is not observed government expenditure, a cost-recovery subsidy, or a complete measure of the fiscal cost of energy support. We summarize this amount by income quintile and heating fuel in lira, as a share of household income, and as a share of the aggregate amount.

Finally, we compare the households each measure selects in 2022 and 2023, first through their overlap and then through their income and heating characteristics.

3. Results

3.1. Divergence Across Measures in 2023

As Figure 1 shows, the five energy poverty measures moved in opposite directions between the 2022 and 2023 surveys. The two fixed-threshold measures, the 10% of income and 10% of expenditure rules, fell by about one third. The 10% of income rate declined from 14.1% to 8.8%, while the 10% of expenditure rate declined from 21.2% to 14.1%. In contrast, the three median-referenced measures increased over the same period. The 2M rate rose from 21.5% to 29.2%, M/2 from 17.7% to 23.6% and LIHC from 8.8% to 12.0%.

The divergence happened during an unusual change in the relative price of household energy. Between the 2022 and 2023 annual averages, Türkiye's consumer price index rose by 53.9% and TurkStat's price index for goods and services outside administered and directed pricing rose by 57.8%. TurkStat's household energy index fell by 3.9%. Over the same period, Eurostat's harmonized indices show electricity prices about 4% higher, gas prices 23% lower and solid fuel prices 23% higher. Electricity and network gas are the fuels subject to administered pricing. Network gas fell outright, and electricity rose by far less than the general price level. The two together held the household energy index down.

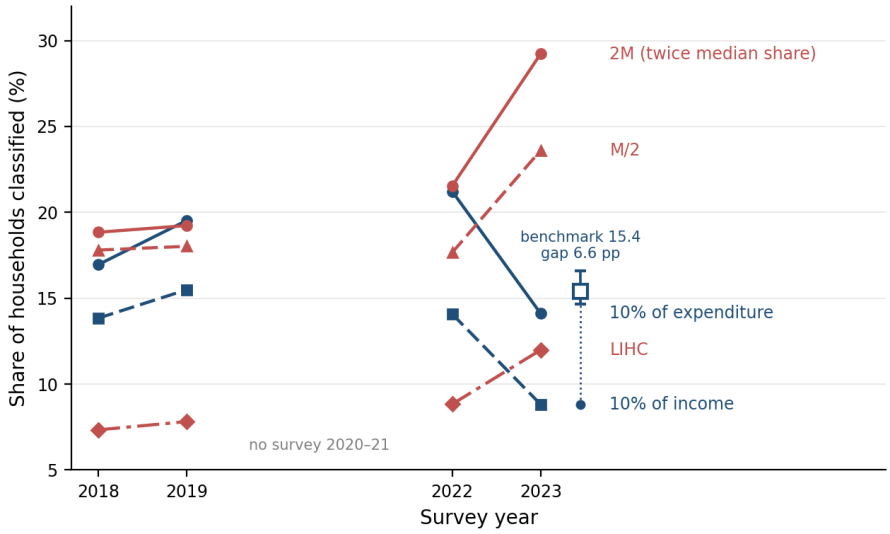
The fixed-threshold and median-referenced measures respond differently to these price movements. The median household energy budget share fell from 4.9% in 2022 to 2.9% in 2023. A fixed 10% threshold consequently classified fewer households, while the 2M threshold, defined as twice the contemporaneous median, followed the median down.

The earlier surveys show how the five measures moved in 2018, 2019 and 2022, before the 2022-2023 divergence. In 2018 and 2019, all five measures moved in the same direction with increases between 0.2 and 2.6 percentage points. Between 2019 and 2022 the measures moved in both directions without splitting by family. The 10% of income rate and M/2 fell, while the 10% of expenditure rate, 2M and LIHC rose. The movement between 2019 and 2022 crosses the break in solid fuel recording described in Section 2.1. We read it as context only. Within the series we observe, the two families moved in opposite directions only between 2022 and 2023. The decline in the two fixed-threshold measures also holds when the rates are computed without survey weights. In that form, our 2018, 2019 and 2022 rates are similar in level to the 2017 rates that Selçuk et al. (2019) report. The 2023 rates fall below both of their years. Appendix Table A1 reports the full weighted series and the unweighted rates.

Section 3.2 measures how far the fixed-threshold rates depend on the administered prices that enter recorded spending, and Section 3.3 turns to the thresholds.

Figure 1

Energy Poverty Rates Under Five Measures, Türkiye Household Budget Survey, 2018-2023



Note. The figure reports the weighted share of households classified by each measure. The five measures are defined in Table 1. The survey was not conducted in 2020 or 2021. Standard errors for the plotted rates range from 0.26 to 0.74 percentage points. The additional 2023 marker for the 10% of income measure reports the benchmark results from Section 3.2. The open square shows the central estimate of 15.4%, and the vertical bar shows the 14.7% to 16.6% demand response range. The dotted line connects this estimate to the observed rate of 8.8%, a benchmark gap of 6.6 percentage points. The fixed quantity specifications give a higher range of 18.0% to 18.9%. Source: author's calculations from TurkStat Household Budget Survey microdata.

3.2. Fixed-Threshold Measures Under the Benchmark Price Path

Under the benchmark price path, the 10% of income rate ranges from 14.7% to 18.9%, compared with an observed rate of 8.8% (Table 2). We refer to the difference between the benchmark and observed rates for the same households as the benchmark gap. The gap is 6.6 percentage points at the central specification (described in Section 2.2). The same gap ranges from 5.9 to 7.8 points across the specifications that let demand respond to the higher prices at the elasticities of Levell et al. (2025). The fixed quantity specifications hold energy use constant and give a larger range of 9.2 to 10.1 points, an upper bound. At a given demand response, the choice of price scenario and split between electricity and gas moves the gap by less than one percentage point. Most of the spread across the benchmark rows in Table 2 therefore comes from the assumed demand response.

The 10% of expenditure measure shows the same pattern under the benchmark, with total expenditure instead of income in the denominator. Its observed 2023 rate is 14.1%, compared with 19.3% to 24.4% under the benchmark. The corresponding gap ranges from 5.2 to 10.3 percentage points. Income in the HBS covers the twelve months before the interview, whereas expenditure refers to the survey month. A gap of similar size under both measures therefore shows that the result is not specific to the timing of the income denominator. The benchmark also addresses the other possible explanation for the fall, that incomes and total spending grew fast enough to shrink the energy share on their own. At benchmark prices the 10% of income rate for 2023 is 15.4%, slightly above its observed 2022 rate of 14.1%. Had tariffs followed the broader price level, the rate would have held roughly flat instead of falling by a third.

The same repricing also changes the measured depth of energy poverty under the income rule. Among households above the 10% of income threshold, the aggregate amount by which energy expenditure exceeds 10% of income is 46.5 billion Turkish lira (TL) per year in the observed data. It ranges from 65.3 to 93.4 billion TL under the benchmark and equals 69.3 billion TL in the central specification. The median excess among classified households is 533 TL per month in the observed data, compared with 575 to 850 TL under the benchmark and 633 TL in the central specification.

The result is not sensitive to the two further checks considered outside the main benchmark. Removing the fifteen households with the largest 2023 survey weights changes the benchmark gap by 0.4 to 0.5 percentage points. Raising incomes by the increase in the general price level implied by the benchmark energy prices reduces the gap by no more than 0.5 points.

Table 2

Observed Energy Poverty Measures and the Benchmark Price Calculation, 2023

2023	10% of income (SE)	10% of expenditure (SE)	Benchmark gap, income rule (pp)	Aggregate excess expenditure (bn TL/yr)	Median excess among classified households (TL/month)
Observed 2023	8.8 (0.50)	14.1 (0.57)	-	46.5	533
Benchmark, fixed quantity	18.0-18.9	23.3-24.4	9.2-10.1	86.4-93.4	810-850
Benchmark, demand response range	14.7-16.6	19.3-21.7	5.9-7.8	65.3-75.7	575-682

2023	10% of income (SE)	10% of expenditure (SE)	Benchmark gap, income rule (pp)	Aggregate excess expenditure (bn TL/yr)	Median excess among classified households (TL/month)
Central specification	15.4 (0.65)	20.2 (0.63)	6.6	69.3	633

Note. SE = standard error. The benchmark is defined in Section 2.2. The fixed quantity row holds consumption constant. The demand response range applies own-price elasticities of -0.24, -0.31 and -0.37 from Levell et al. (2025). The central specification uses the price index excluding household energy, calibrated electricity and gas factors, and an elasticity of -0.31. The benchmark gap is the benchmark rate minus the observed rate for the same households. Aggregate excess expenditure is the weighted sum of energy expenditure minus 10% of income among households above the income rule's threshold. The median reports the same excess at the household level. The income rule columns are calculated on households reporting income, and the 10% of expenditure column on all households. Standard errors for the benchmark gap are calculated from the paired difference at the household level and range from 0.48 to 0.51 percentage points. Source: author's calculations from TurkStat Household Budget Survey 2023 microdata and TurkStat consumer price indices.

3.3. The Role of Changing Thresholds

Section 3.2 traced the fall in the fixed-threshold measures to the administered prices in recorded spending. The rise in the median-referenced measures has a different source. Because these measures recalculate their thresholds from each year's distribution, their increase could reflect either a change in household energy spending or a change in the threshold itself. This section distinguishes the two. The first sign that the threshold is doing the work is that repricing electricity and network gas has almost no effect on 2M. Across all thirty two benchmark specifications, the 2M rate remains between 28.8% and 29.3%, compared with 29.2% in the observed data. This stability comes from the relative construction of the indicator. A uniform proportional increase in energy spending raises both household budget shares and the threshold. Households' positions relative to the median are then left largely unchanged. The benchmark is not uniform because it reprices only electricity and network gas and permits demand responses, but the resulting change in 2M is still smaller than half a percentage point.

A separate calculation applies the actual 2022-2023 growth of energy and non-energy prices to the 2022 households while holding quantities and real allocations fixed. This calculation reduces the median energy budget share from 4.9% to 3.1%, which is close to the observed 2023 value of 2.9%. It therefore reproduces

most of the fall in the level of energy shares. Yet it raises the 2M rate by only 0.54 percentage points compared with the observed increase of 7.70 points. The relative price change explains much of the fall in energy budget shares. It does not explain the increase in the 2M rate.

Neither repricing nor the general movement of prices accounts for the 2M rise. The rise must then come from the threshold. Table 3 separates the change in each median-referenced measure into a distribution and a threshold component, as defined in Section 2.2.

For 2M based on total expenditure, the measured rate rises by 7.70 percentage points, from 21.5% to 29.2%. At the fixed 2022 threshold, however, the 2023 rate is 14.3%, 7.20 points below the 2022 rate. Recalculating the threshold adds 14.90 points and more than offsets this decline. The same pattern holds for the version of 2M with the income denominator, whose total increase of 6.56 points combines a distribution component of -7.14 points and a threshold component of 13.70 points.

The result follows directly from the movement of the median. The 2M threshold equals twice the median energy budget share. It fell from 9.9% of expenditure in 2022 to 5.8% in 2023. A household could cross the threshold even though its own energy share fell, as long as that share fell by less than the median share.

Although its threshold moved the other way, M/2 shows a similar result. Its threshold equals half the median of equivalised energy expenditure. The median rose from 236.2 TL to 271.7 TL per month between 2022 and 2023, which is an increase of 15.0% in nominal terms, while the household energy price index fell by 3.9%. Relative to energy prices, the threshold therefore increased by 19.7%. If the 2022 threshold is carried into 2023 unchanged in nominal lira, the distribution component is 0.6 percentage points. If it is adjusted by the household energy price index, the component is -0.6 points. Under either convention, most of the observed increase of 5.9 points in M/2 comes from the recalculated threshold.

A third M/2 comparison raises the 2022 threshold by the general consumer price index. It asks how many households would fall below a threshold that rose with the overall price level rather than with household energy prices. This produces a distribution component of 17.6 points. We report this result separately because it answers a different question from the nominal and the household energy price conventions. Energy prices fell by 3.9% between 2022 and 2023, while the general price level rose by 53.9%. A threshold raised by the general index therefore mainly registers the gap between the two, which Section 3.2 measures directly on household bills.

At the 2022 thresholds, the 2M rates fall, and M/2 is approximately unchanged whether its threshold is carried forward in nominal lira or adjusted by the household energy price index. The observed increases in these measures are therefore driven mainly by recalculating their thresholds from the 2023 expenditure distribution. This conclusion is unchanged after removing the households with the largest 2023 survey weights. Because LIHC combines a cost condition with an income condition, its movement cannot be assigned to a single threshold and so Table 3 does not decompose it.

Table 3

Decomposition of Changes in Median-Referenced Measures, 2022-2023

Measure	2022	2023	Total change	Distribution component, 2023 at fixed 2022 threshold	Threshold component
2M, expenditure denominator	21.5	29.2	+7.70	-7.20	+14.90
2M, income denominator	21.2	27.8	+6.56	-7.14	+13.70
M/2, 2022 threshold in nominal lira	17.7	23.6	+5.95	+0.57	+5.38

Note. The distribution component evaluates the 2023 distribution at the threshold implied by the 2022 median. The threshold component is the remainder. Rates are weighted percentages of households. For M/2, carrying the 2022 threshold into 2023 in nominal lira gives a distribution component of 0.57 percentage points. Adjusting the threshold with the TurkStat household energy index gives -0.58 points. Adjusting it with the general consumer price index gives 17.56 points and answers a different question about the purchasing power of the 2022 threshold. Source: author's calculations from TurkStat Household Budget Survey microdata.

3.4. Households Identified by the Measures

The divergence in rates was accompanied by a change in which households the measures select. Panel A of Table 4 reports how much the measures overlap. As the rest of this paragraph shows, that overlap moves mainly with the sizes of the groups. The composition in Panel B is what shows the change. The 2M threshold sat below 10% of expenditure in both years, at 9.9% in 2022 and 5.8% in 2023. Every household above the fixed expenditure line was therefore also above the

2M line, and the share of 2M households that the fixed expenditure rule also classified is the ratio of the two rates. The share of 2M households also classified by the fixed expenditure rule fell from 98.6% to 48.3%. The income rule and 2M use different denominators, and neither measure contains the other. For that pair, the share of 2M households that the 10% of income rule also classified fell from 54.0% in 2022 to 28.5% in 2023. Both falls record the same fact about sizes rather than about membership. The 2M group grew from 21.5% to 29.2% of households while the fixed-threshold groups shrank by about a third. The fixed-threshold groups could therefore cover a smaller part of the 2M group. The same overlap read from the other side rises, since 82.6% of the households the income rule classified in 2022 were also classified by 2M, against 94.7% in 2023. One share divided by the other gives exactly the ratio of the two rates. What changed is the kind of household the measures select and that shows in their composition rather than in their overlap.

Of the five measures, M/2 changed most in the households it selects. In 2022, the households M/2 classified were concentrated among groups commonly associated with energy hardship. Of these households, 56.4% used stove heating, 52.3% used solid fuels and 39.0% were in the bottom quintile of equivalised income. In 2023, the group was much closer to the population as a whole. Natural gas heating accounted for 64.5% of the M/2 group and 64.6% of all households. Stove heating accounted for 33.7% and 31.2%, respectively. The bottom quintile accounted for 25.8% of the M/2 group, compared with 20.0% of all households.

Unlike the M/2 group, the 2M and LIHC groups changed little in composition. In 2023, 42.7% of households classified by 2M used stove heating, 41.6% used solid fuels and 34.9% were in the bottom quintile. LIHC remained the measure most concentrated among households with low incomes, with 74.9% of its classified population in the bottom quintile.

The 10% of income rule and 2M classify populations that differ in both size and concentration. In 2023 the income rule flags 8.8% of households against 2M’s 29.2%. The income rule’s group is more concentrated in the bottom quintile of equivalised income (50.1 against 34.9%), it heats more with solid fuel (48.5 against 41.6%) and less with natural gas (47.1 against 53.0%), and its median energy share of expenditure is 17.4% against 9.8% inside the 2M group. 2M is therefore not an enlarged copy of the income rule but a broader group of households whose typical member spends a smaller share of the household budget on energy.

M/2 still contains a distinct core of households with very low recorded expenditure since a household that reports no energy expenditure falls below half

the median by construction. In 2023 such households were 10.2% of the M/2 group against 2.4% of all households. Zero recorded expenditure may indicate severe self-rationing, with the household heating less than it needs, but it can also arise because solid fuels are purchased in a different month. The 2023 M/2 group therefore combines a small set of households with no recorded energy expenditure and a much larger set whose observed heating and income profile is close to the population average.

Table 4

Overlap and Composition of the Populations Classified by the Energy Poverty Measures, 2022 and 2023

Panel A. Overlap

$$P(\text{10\% of expenditure} \mid \text{2M}) = 98.6\% \text{ in 2022 and } 48.3\% \text{ in 2023}$$

$$P(\text{10\% of income} \mid \text{2M}) = 54.0\% \text{ in 2022 and } 28.5\% \text{ in 2023}$$

$$P(\text{2M} \mid \text{10\% of income}) = 82.6\% \text{ in 2022 and } 94.7\% \text{ in 2023}$$

Panel B. Composition of the classified populations

Group	Stove heating (%)	Natural gas heating (%)	Solid fuel heating (%)	Bottom quintile of equivalised income (%)
All households, 2022	33.8	60.3	30.9	20.0
10% of income, 2022	48.3	42.1	46.8	44.0
2M, 2022	42.4	49.7	40.6	30.6
M/2, 2022	56.4	40.2	52.3	39.0
LIHC, 2022	54.9	39.3	52.4	71.8
All households, 2023	31.2	64.6	29.1	20.0
10% of income, 2023	47.5	47.1	48.5	50.1
2M, 2023	42.7	53.0	41.6	34.9

Group	Stove heating (%)	Natural gas heating (%)	Solid fuel heating (%)	Bottom quintile of equivalised income (%)
M/2, 2023	33.7	64.5	32.0	25.8
LIHC, 2023	55.3	42.2	52.5	74.9

Note. Panel A reports weighted conditional shares. The 2M threshold lies below 10% of expenditure in both years, so the households the expenditure rule classifies are a subset of the households 2M classifies and the first line equals the ratio of the two rates. The income rule uses a different denominator and neither measure contains the other, but the second line still moves largely with the sizes of the two groups because 2M grew while both fixed-threshold groups shrank. The third line reports the same overlap from the other side and rises, so the households the income rule classifies sit almost entirely inside the 2M group by 2023. Panel B reports weighted group characteristics, which show the kind of household each measure selects and do not depend on the sizes of the groups. Standard errors for the printed shares range from 0.4 to 3.1 percentage points. Source: author's calculations from TurkStat Household Budget Survey microdata.

3.5. Distribution of the Bill Reduction Under the Benchmark

The central price specification holds quantities at their observed levels. Under it, the electricity and network gas bills paid by households in 2023 were 131.8 billion TL lower over the year than the amount implied by applying the benchmark prices to the same consumption. Across the general index, the central index excluding household energy, and the two item calibrations, the implied bill reduction ranges from 125.6 to 140.1 billion TL, or 0.47% to 0.53% of 2023 GDP. It is not comparable with the 2022 budget figures in Section 1, which cover different measures and a different year.

The distribution of the implied bill reduction depends on the metric used (Table 5). The mean monthly amount rises from 313 TL in the poorest quintile to 448 TL in the richest. The poorest quintile receives 15.2% of the aggregate bill reduction while each of the other quintiles receives about one fifth. Relative to income, however, the amount falls from 3.27% in the poorest quintile to 0.93% in the richest. The same ordering holds for the median household in each quintile, from 1.50% to 0.43%. The ordering therefore does not depend on a few incomes reported close to zero. Richer households receive more in lira while poorer households receive more relative to their income.

Differences by heating fuel are larger in lira than the differences across income quintiles. Households using natural gas for heating account for 64.7% of

households reporting income but receive 84.8% of the implied bill reduction with a mean of 541 TL per month. Solid fuel households account for 29.1% of households reporting income and receive 11.2% of the total with a mean of 159 TL per month. Their main heating fuels stayed at market prices, although they still gained from the electricity tariff. Households heating with stoves receive 191 TL per month on average compared with 513 TL among other households. Support delivered through the two tariffs therefore went mostly to households heating with gas.

Table 5

Household Distribution of the Reduction in Electricity and Network Gas Bills Under the Benchmark, 2023

Group	Share of households reporting income (%)	Mean bill reduction (TL/month, SE)	Share of income (%)	Share of aggregate bill reduction (%)
Income Q1, poorest	20.0	313 (13)	3.27	15.2
Q2	20.0	427 (32)	2.80	20.7
Q3	20.0	428 (16)	2.04	20.8
Q4	20.0	447 (19)	1.54	21.6
Q5, richest	20.0	448 (13)	0.93	21.7
Electric heating	5.7	271 (14)	1.32	3.8
Natural gas heating	64.7	541 (13)	2.64	84.8
Other fuels	0.5	151 (15)	0.89	0.2
Solid fuel heating	29.1	159 (5)	1.14	11.2
Non-stove heating	68.9	513 (12)	2.46	85.6
Stove heating	31.1	191 (6)	1.35	14.4

Note. For each household, the amount equals the cost of observed electricity and network gas consumption under the central benchmark prices minus recorded expenditure. The central price specification uses the index excluding household energy and calibrated electricity and gas factors. Quantities are held at their observed levels for this incidence calculation. Means are

weighted by TurkStat survey weights, with linearized standard errors at the household level in parentheses. The income share is the weighted mean of each household's ratio of the monthly bill reduction to monthly disposable income. Quintiles are of equivalised income. The final column reports each group's share of the aggregate amount. Source: author's calculations from TurkStat Household Budget Survey 2023 microdata and TurkStat consumer price indices.

3.6. Self-Reported Hardship in the SILC Panel

The SILC panel describes the same two years through questions about utility arrears and adequate warmth instead of recorded spending. In the unweighted balanced sample, the share of households reporting utility arrears rose from 15.9% in 2022 to 17.4% in 2023. The share in arrears on any of the obligations the survey covers, including rent, mortgage and installment payments, rose from 21.7% to 23.2%. Reported inability to keep the dwelling adequately warm decreased slightly from 19.1% to 18.5%. These small changes in arrears and warmth are nothing like the fall of about a third in the two fixed-threshold measures over the same period.

The increase in utility arrears was largest for households heating with stoves, whose rate rose from 22.7% to 25.6%. For households with a gas combi boiler the rate rose from 13.1% to 14.1%, and for those with central heating from 9.0% to 9.9%. The bill reduction implied by the benchmark was also smaller for households heating with stoves than for households heating with gas (Table 5).

Arrears and inadequate warmth tend to affect the same households. Among households that entered utility arrears between 2022 and 2023, 34.1% also reported that they could not keep the dwelling adequately warm, against 18.5% of the panel as a whole. Appendix Table A2 reports the full panel rates and transition statistics.

4. Discussion

The results show why movements in expenditure-based energy poverty indicators must be read carefully during a broad price intervention. Lower administered prices reduce household bills and can improve affordability, but they also reduce the recorded expenditure the energy poverty indicators are built from. The benchmark measures the drop in recorded expenditure, the second of these effects, and Section 3.2 showed it to be the main reason the fixed-threshold rates fell. That does not mean the observed decline was spurious or that lower tariffs gave households no benefit. Instead, it means that the fixed-threshold rate combines a change in affordability with the direct effect of lower prices on recorded expenditure. The benchmark cannot separate the two in welfare terms. The

median-referenced measures respond through a different route since their thresholds are recalculated from each year's distribution. Menyhért (2022) shows that measures defined against the contemporaneous distribution can be insensitive to a price change shared uniformly across households. The Turkish episode was not uniform, because the share of a household's energy that passed through electricity and network gas differed with its fuel mix. Recomputing the 2023 bills at the benchmark prices nevertheless barely moves 2M, and the observed rise appears only when the threshold is recalculated from the 2023 distribution.

These findings extend the literature on disagreement across energy poverty indicators. The studies reviewed in Section 1 hold the policy setting fixed and show that different measures identify different households within it. The present results show that the degree of disagreement can itself change when the setting changes. Between 2022 and 2023 the composition of the M/2 group moved close to the population average while the 10% of income rule, 2M and LIHC stayed anchored to poorer households heating with solid fuels. Indicator disagreement is therefore more than a fixed property of competing definitions, because it varies with the prices and thresholds from which the indicators are built.

A separate question is who gained from the tariff hold. The bill reduction implied by the benchmark rises with income in lira and falls with income as a share of household resources. Fetzer et al. (2024) study the United Kingdom's untargeted price cap and find the reduction rises with income in absolute terms, as we do in lira, but cannot say whether it falls as a share of income because their data lack household incomes. Levell et al. (2025) report both readings for the same United Kingdom relief package and they recompute a fixed-threshold energy poverty rate at the prices that would have applied without it. That is the exercise Section 3.2 carries out for the Turkish tariff hold. In our results, the differences in lira are larger across heating fuels than across income quintiles. This is because a tariff reaches a household through the fuels it actually buys and most of the reduction went to households on the gas network.

The panel evidence in Section 3.6 shows that self-reported hardship did not improve on the scale the falling fixed-threshold rates suggest. This gap between self-reported hardship and the fixed-threshold rates does not mean that one measure should replace the others. Instead, fixed-threshold measures describe the burden households face at the prices they actually pay, while median-referenced measures describe a household's position relative to the contemporaneous distribution. Self-reported measures describe whether households say they can meet particular needs. Each of the three families of energy poverty measures

answers a different question, and during an administered price episode, monitoring should make those questions explicit.

Several limitations define the scope of the chapter. The benchmark depends on a reference price path, an allocation of that path between electricity and gas, and an assumed demand response. Reporting the range of specifications makes those choices visible without recreating a complete tariff system. All five measures use recorded energy expenditure that reflects what households paid and can differ from what they need. Because the self-reported evidence comes from a different survey, the chapter compares expenditure-based and self-reported measures across the population instead of within households. Within these limits, we show how administered prices and recalculated thresholds entered the 2023 energy poverty statistics for Türkiye. If the tariff hold ends and recorded energy bills rise toward the broader price level, the gap between the fixed-threshold and median-referenced measures should close again.

5. Conclusion

Between the 2022 and 2023 surveys, standard expenditure-based energy poverty measures in Türkiye moved in opposite directions. During this period, the 10% of income rate fell from 14.1% to 8.8%, while the 2M rate rose from 21.5% to 29.2%. The government held electricity and network gas tariffs well below the broader price level. Had they instead risen with it, the 10% of income rate would have been 15.4% at the central specification, between 14.7% and 16.6% across the demand responses considered, and 18.9% when quantities are held fixed. The rise in 2M and M/2 has a different source, which a decomposition of their 2022-2023 change makes clear. At the threshold implied by the 2022 median, the 2023 2M rate is lower than in 2022, which places its rise in the moving threshold. Most of the M/2 increase is also attributable to its recalculated threshold. This is the first study to observe that divergence across the 2022 and 2023 surveys and to price the tariff hold into individual household bills.

Fixed-threshold measures are calculated from the prices households actually pay under the administered tariffs, while median-referenced measures can change when the reference distribution and its thresholds change. Neither family's movement can be interpreted without knowing how prices and thresholds were set. The results show that a decline in an expenditure-based rate does not necessarily imply a comparable decline in underlying energy need or hardship.

The same tariff hold that moved these statistics also lowered household bills by amounts that varied across households. In lira, the bill reduction implied by the

benchmark rose from 313 TL per month in the poorest quintile to 448 TL in the richest, while as a share of income it fell from 3.27% to 0.93%. Households heating with natural gas received 84.8% of the total, and solid fuel households 11.2%. Together, the divergence between the measures and the uneven reach of the tariff hold show that a headline energy poverty rate says little on its own. Energy poverty statistics feed official monitoring, research and policy assessment. Especially during an administered price episode, analysis that relies on these statistics should read their movements with care and report the rates together with their thresholds, the prices entering household expenditure, and complementary self-reported indicators. That information allows readers to distinguish a change in recorded bills from a broader change in households' ability to obtain adequate energy services.

Appendix

A.1. Annual HBS Rates

Table A1

Energy Poverty Rates in the Household Budget Survey, 2018-2023

Measure	2018	2019	2022	2023
10% of income	13.8 (0.35)	15.5 (0.38)	14.1 (0.37)	8.8 (0.50)
10% of expenditure	17.0 (0.38)	19.5 (0.41)	21.2 (0.43)	14.1 (0.57)
2M	18.8 (0.40)	19.2 (0.41)	21.5 (0.43)	29.2 (0.74)
M/2	17.8 (0.43)	18.0 (0.42)	17.7 (0.40)	23.6 (0.61)
LIHC	7.3 (0.26)	7.8 (0.28)	8.8 (0.29)	12.0 (0.60)
Median energy budget share (%)	4.8	5.0	4.9	2.9

Unweighted rates, 2018-2023

Measure	2018	2019	2022	2023
10% of expenditure	20.76 (0.37)	23.58 (0.40)	22.73 (0.38)	15.42 (0.35)
10% of income	16.75 (0.34)	18.23 (0.36)	15.18 (0.33)	9.70 (0.29)

Note. Rates in the upper panel are weighted with TurkStat survey weights. Standard errors are reported in parentheses and use linearization at the household level. The final row reports the weighted median of the household energy budget share. The lower panel reports the two fixed-threshold measures without weights, the form in which they are compared with the rates reported by Selçuk et al. (2019). Source: author's calculations from TurkStat Household Budget Survey microdata.

A.2. Self-Reported Hardship in the SILC Panel

Table A2

Self-Reported Hardship in the SILC Household Panel, 2022-2023

Indicator	2022 (%)	2023 (%)	Entry among households not reporting the condition in 2022 (%)	Exit among households reporting the condition in 2022 (%)
Utility arrears	15.9	17.4	8.0	32.9
Unable to keep the dwelling adequately warm	19.1	18.5	3.1	16.4
Arrears on any listed obligation	21.7	23.2	10.2	29.8

Utility arrears by heating system

Heating system	Households	2022 (%)	2023 (%)	Change (percentage points)
Stove	6,105	22.7	25.6	+2.9
Gas combi boiler	9,526	13.1	14.1	+1.0
Central heating	1,928	9.0	9.9	+0.9

Note. The sample contains 18,269 households observed in both years. All rates are unweighted. Changes are differences between the displayed rounded rates. Utility arrears refer to arrears on utility bills during the previous twelve months. The combined arrears indicator includes utility bills, rent or mortgage payments, and installment payments. Entry is the share of households without the condition in 2022 that report it in 2023. Exit is the share with the condition in 2022 that do not report it in 2023. Source: author's calculations from TurkStat Survey on Income and Living Conditions (SILC) panel microdata.

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