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The Effect of Tenants Housing Cost Burden on Household Economic Hardship in Turkey

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Abstract

The aim of this study is to contribute to the poverty literature in Turkey by associating the serious economic difficulties experienced by the tenants with the burden of housing costs. Housing costs, which are an important expenditure item for households, reduce non-housing expenditures such as health, education, food, and clothing, and thus cause serious economic difficulties for households. The empirical analysis relies on data derived from the TURKSTAT Income and Living Conditions Survey (ILCS) micro data set for 2021. We limited our research to tenants aged 15 and over who are in the respondent of the household. We first worked with the probit model to understand the impact of actual and perceived housing cost burdens on household economic difficulties. In the following part, We worked with ordered probit models to determine the probability of households being unable to pay their electricity and water bills, rent, interest-bearing debts, or housing loans as planned in the last 12 months, and finally being unable to meet their total expenditures with their total income. We acted with the hypothesis that those responsible for households who have heating problems due to insulation are unemployed (or not working), have health problems, are married, have a low education level, and have a low income are traditionally included in the disadvantaged categories. Our findings indicate that as housing expenses increase, the probability of households experiencing severe economic difficulties also increases. As housing costs rise, individuals are more likely to be unable to pay their rent, energy, and water bills once or twice a year. The study revealed that the cost of living imposed a greater economic burden on vulnerable groups such as young people, individuals with health problems, parents of children under 6 years

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old, unemployed, women, low-educated, those living in substandard housing, and married individuals.

Keywords: Housing cost burden, Economic hardship, Ordered probit model

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1. Introduction

Housing is one of the most fundamental human requirements. Security, food, and other wants, in addition to shelter, are among the most essential needs according to Maslow's Hierarchy of Needs Theory (Maslow, 1943). The housing situation of a country is an important indicator of the health, economic well-being, and social conditions of its citizens (Osunwusi, 2018: 60). Households usually allocate the largest share of their income to housing. Therefore, the actual and perceived cost of housing is one of the most important determinants of household welfare. A high share of income allocated to housing expenditures will require households to compromise on the consumption of non-housing goods and services as well. Low-income households facing high housing costs spend less on food, education, transportation, and health services than similar households without a housing cost burden. Housing cost burden, by forcing households to compromise on other basic needs, affects the general welfare of households as well as causing insecurity and life dissatisfaction (Acolin and Reina, 2022: 1792; Shamsuddin and Campbell, 2021: 413, Choi and Ramaj, 2023: 2). While spending 25 percent of available income on housing was considered an affordable cost (Stone, 2004: 109), this rate was reduced to 30 percent in the 1980s (Leventhal and Newman, 2010: 1170, Gawrys and Carswell, 2020, 373). This traditional measure, by not taking into account the expenditure pattern of households, may underestimate the economic hardship faced by tenant households (Airgood-Obrycki et al., 2022). Low-income and many middle-income households, by allocating 30 percent (or even 25 percent) of their limited income to housing, struggle to meet their other needs and face economic hardship. On the other hand, many high-income households do not actually face economic difficulty even if they pay much more than 30 percent for housing. Therefore, it is important to distinguish whether the housing cost burden and the perceived housing cost burden cause economic hardship or not. In other words, the traditional measure is not actually sufficient to measure the cost of housing burden. Therefore, the fact that housing expenditure is a burden for households actually shows that it cannot allocate enough budget to other basic needs due to housing expenditure (Stone, 2004: 109). Stone (2006) made a distinction between absolute poverty and shelter-poor. Accordingly, a household is shelter poor if it "is unable to meet its non-housing needs at a minimum level of competence after paying for housing"; those who do not have enough income to meet their basic non-housing needs, even without housing expenses, are absolute poor. However, some very low-income households and households that pay less than 30 percent of their income are still poor in terms of housing. Because after paying the housing costs, there is still not enough income surplus to meet their non-shelter needs at a minimum level. The burden of housing costs also forces

households to compromise on housing quality. Rent-burdened households reduce their costs by changing their home consumption (Rosen et al., 2022: 3). Conley (2001) found that these households were more likely to live in overcrowded housing or in neighborhoods with underperforming schools; Leventhal and Newman (2010) stated that this situation adversely affects the physical and educational achievements of children. Therefore, the burden of housing costs affects not only the current well-being of families but also the well-being of the next generation.

According to Human Capital Theory (Becker 1964; 1965), individuals and families strive to improve their education, professional experience, or work experience in order to increase their future income and therefore their satisfaction. Investing in human capital can improve the financial, psychological, and physical well-being of individuals throughout their lives (Mimura, 2008: 154). Poverty (economic hardship) is becoming an endless cycle for households that, owing to the weight of housing costs, cannot devote adequate money for education, health, and cultural activities and so cannot invest in their human capital. Although it is frequently suggested that housing costs are one of the primary determinants of household poverty status, housing costs have not been found to be significantly associated with poverty. Income level or socioeconomic factors mostly cause poverty or economic suffering. However, because housing costs are one of the most important expenses in a household's budget, ignoring the housing cost burden will prevent a thorough examination of household poverty (Deidda, 2015: 531). In our work, we are following in the footsteps of Deidda (2015). In addition to the exorbitant rises in housing and rent costs in Turkey, the rise in the inflation rate, particularly after 2020, has considerably diminished economic units' buying power. Therefore, the significant increase in housing expenses in Turkey has served as the motivation behind our study. The economic hardship caused by housing costs is widely analyzed in the literature for developed countries, but the literature for developing countries is quite limited. A study analyzing the impact of housing expenses on economic distress in Turkey has not been identified by us so far. Although there are many studies on the determinants of poverty in Turkey, there is no study that relates the housing burden to material deprivation. Therefore, our study aims to contribute to the poverty literature by examining the economic difficulties of families in relation to their housing cost burden. The aim of our study is to provide guidance for identifying the material deprivation induced by housing costs and for developing an institutional framework that will implement a long-term socio-economic program based on this identification. Renters typically have lower incomes and are especially susceptible to high housing costs (Shamsuddin-Campbell, 2022, 414). Hence, the study seeks to delineate the profile of the association between housing burdens and economic hardships faced by renter households in Turkey. Our study generally seeks answers to the following questions. Are tenant households in Turkey a) in poverty and deprivation, b) can they afford housing costs? and how much is the cost of housing? c) Are they having trouble paying their rent bills? d) Whether he/she can make ends meet? Some of our answers to these questions are as follows in summary. In the sample we studied, we found that about fifty percent of those living in households lived in severe

material deprivation. We calculated that the gross housing cost burden of tenants is about 39 percent. We found that as the actual and perceived burden of housing costs increased, the likelihood that the household would experience serious financial hardship increased. We observed that they were having trouble paying their rent and bills. We have also shown that the actual housing expense burden and the perceived housing cost burden produce similar results. This paper is structured as follows. The first section reviews the dynamics of the Turkish housing market, the rent load, and the relevant literature. The second section describes the data and the variables used in the study. The third section discusses the methodology and the results of the analysis. The final section summarizes the findings, policy implications, and directions for further research.

2. Dynamics of the Housing Market in Turkey, Rent Burden and Economic Distress

Home affordability has been a big concern in many Western countries due to sharp rises in property prices since the mid-1990s. Millions of people have encountered home affordability issues as property prices and rents have grown faster than salaries. In Turkey, housing costs are a great burden for many households, especially due to high prices in big cities. This situation makes it especially difficult for low-income segments to own a home. The provision of housing through residential building societies in Turkey emerged in the 1930s. Cooperatives continued to operate in the 1960s and 1970s with loans from Social Security Institutions. Housing cooperatives expanded their activities in Turkey in the second half of the 1980s, thanks to the Mass Housing Laws and the Mass Housing Fund. Against the stagnation in the economy and housing sector in the 1980s, cooperatives were brought to the forefront among the actors in housing construction with the Mass Housing Law No. 2487 dated 1981 and the Mass Housing Law No. 2985 that followed it. With this law, emphasis has been placed on mass housing construction in meeting housing needs. As the organizations that will build mass housing, it is envisaged to support cooperatives, cooperative unions, and social security institutions. In this process, the share of cooperatives in licensed housing supply increased to 30%, while the share of the private sector decreased. However, the share of cooperatives in the licensed housing supply began to decline after the second half of the 1990s. In the 2000s, their effectiveness weakened. The decrease in the share of cooperatives in the supply of housing is due to many changes in legal regulations and a decrease in their financial support. In the 2000s, with the amendments made to Mass Housing Law No. 2985, it is seen that the Mass Housing Administration (TOKI) is increasingly authorized. With these authorizations, the Administration has adopted the way of building housing directly instead of giving loans to cooperatives (Koç, 2022). Housing policies in Turkey for the housing problem are carried out by the Ministry of Environment and Urbanization. The Ministry implements various housing policies such as urban

transformation projects, housing built by the TOKI, and other social housing projects. In addition, it aims to encourage housing ownership with measures such as housing loans, tax cuts, and other incentives. In recent years, urban transformation projects have come to the fore. Urban transformation projects aim to improve the quality of urban life, especially through the renewal of risky structures and the construction of modern, safe housing (T.R. Ministry of Development Eleventh Development Plan, 2018). To summarize, building cooperatives that provided housing for low and middle-income households within the licensed housing delivery system accounted for 30 percent of the market in the pre-2000 period. However, after the amendments made to the Mass Housing Law in the 2000s, the Housing Development Administration of Turkey (TOKI) took over the role of authorized cooperatives and aimed to increase the public sector's involvement in housing policies. As a result of these changes, the share of cooperatives in the licensed housing supply dropped sharply in the 2000s. According to the data from the Turkish Statistical Institute (TURKSTAT), the share of building cooperatives decreased from 30 percent to 1 percent, while the share of the private sector increased from 63 percent to 93 percent. The share of the state increased from 5 percent to 6 percent. In other words, the decline of building cooperatives has significantly increased the dominance of the private sector in the housing market in Turkey and TOKI has failed to fulfill the function of building cooperatives. TOKI's main objective is to meet the qualified housing needs of low and middle-income citizens. However, for 2022, the monthly household income criteria for low-income applicants to TOKI projects have been set as 14,000 Turkish lira (Tl) for the whole country and 16,000 Tl for Istanbul. Considering that the minimum wage for 2022 is 5,500 Tl and the poverty line is 26,485 Tl, it is not feasible for low-income households to afford the monthly payments for social housing produced by TOKI within these criteria. Even though TOKI sells its houses at cost price, the rise in construction costs in recent years has made it impossible for low-income households to pay for housing (Eurostat), that is, the rate of renting has increased. According to Eurostat 2021 data, Turkey ranks fourth among the countries with the lowest hosting rate and is well below the European Union average (69.9 percent). When the housing ownership rates of different income groups in Turkey are examined, it is seen that the lowest income group's rate has decreased from 51.3 percent to 46 percent (5.3 points) in 2021 compared to 2010, the middle-income group's rate has decreased from 58.5 to 52.8 percent (5.7 points), and the highest income group's rate has decreased from 70.4 to 66.1 percent (4.3 points) (BETAM, 2022a). The main reason for the decrease in the housing ownership rate in Turkey is that housing prices have increased and household incomes have not increased at the same rate. According to the real house price index calculated by the OECD based on 2015, Turkey's housing price index in the first quarter of 2023 is 185,642. For the euro area, this value is 125.25, while the OECD average is 133.60. With the excessive increase in housing prices as well as the increase in the tenancy rate, the rental price index based on 2015 was realized as

297 in the first quarter of 2023. In the face of such an increase in rent increases, in June 2022, the government limited the rent increase rate to 25 percent.

In light of these developments, the housing price/rent ratio in Turkey has increased to 308.64. This is well above the OECD average of 137.80 and the euro area average of 130.37 (OECD Housing Data). Turkey ranks first in the world in both housing prices and rent prices increase in recent years. The excessive increase in both housing prices and rental prices in Turkey is fed by more than one source. The fact that housing is seen as an investment tool in Turkey and the negative real interest rate policy implemented in recent years have significantly increased the demand for housing and therefore housing prices. In addition, due to the immigration policies implemented in Turkey, the population growth rate has exceeded the natural rate. According to UNCHR 2020 data, Turkey is the country hosting the largest number of refugees in the world. Turkey hosts approximately 3.6 million registered Syrian refugees, as well as some 320,000 other nationalities. They are potential home buyers and renters, increasing demand for housing. In addition to the increase in the number of refugees, the granting of citizenship rights to foreigners who buy housing in the amount of at least 500,000 US Dollars or its equivalent in foreign currency or equivalent in Turkish Lira to provide foreign currency inflow to the country and the excessive depreciation of the Turkish lira against foreign currencies have made Turkey one of the most preferred countries for foreigners to acquire property. One of the reasons that have increased the demand for housing in Turkey in recent years is the urban transformation of slum areas, which are defined as unauthorized structures built on public lands (Ercan and Akansel, 2003) without complying with the legislation and general provisions regulating zoning and construction works in Turkey. However, the oversupply crisis that erupted at the beginning of 2018 significantly slowed down the production of new housing. (BETAM, 2022b).

In addition to exorbitant rises in housing and rent prices, Turkey's rising inflation rate, particularly since 2020, has considerably eroded the buying power of economic units. Food costs, the expenditure category on which families spend the most of their income after housing, are rising in Turkey, contrary to global trends, and food price inflation is higher than consumer inflation. According to FAO food price index statistics for March 2023, global food prices have declined by 20.5 percent year on year, whereas food inflation in Turkey is 67.89 percent. In 2023, Turkey ranks 10th in the highest inflation ranking in the world and 4th in food inflation. The increase in housing prices as well as consumer and food inflation in Turkey indicates significant economic distress for households to meet their basic needs other than housing costs.

According to the Hunger and Poverty (2023) research conducted by the United Metal Business Class Research Center, the monthly expenditure required for a healthy and balanced diet for a family of four in Turkey is 8,782 TL for January 2023. According to the calculation results based on household consumption expenditures over the household level hunger, the poverty line is 30,379 TL. In

2023, the minimum wage is 8,506 TL and 42 percent of the paid workforce is working with minimum wage. According to OECD statistics from 2021, Turkey's minimum wage to average pay ratio is 70.6 percent. As a result, Turkey's average salary is quite close to the minimum wage. In addition to the rise in housing and rent costs in Turkey, the rise in the prices of other basic commodities, along with the fact that salaries have not risen at the same rate, has resulted in severe household economic misery and poverty. Due to the aggravation of housing costs and economic hardship, the Turkish government has launched a rent assistance program for those who have difficulty paying rent through the Ministry of Family and Social Services as of November 2022. Rental aid differs from province to province and ranges from 2000 Tl to 3500 Tl.. To qualify for rental assistance, the household income must not exceed one-third of the minimum wage, and the household must not receive any social security, pension, widower's pension or regular income. At the same time, as of April 2023, natural gas consumption of 25 cubic meters has been made free for one year. According to Eurostat (2020) data, the housing cost overload rate that causes economic distress in Turkey is 10.2 percent, which is above the average of 27 European Union countries (7.8 percent). When the data on the distribution of household consumption expenditures according to TURKSTAT 2019'year income percentile are taken into consideration, the share of income allocated to housing and rental expenditures is 24.2 percent. While the share of households in the first income percentile from their income to housing expenditures is 31.2 percent, this rate is 28.2%, 25.2%, 23.8,% and 20.1% for the other quantiles, respectively. Therefore, the cost of housing for households in the first income percentile is an excessive burden. According to the last income percentile from the first income percentile, the ratio of housing load to income decreases. Given the consumption sequence, the cost of housing leads low-income groups to compromise on meeting other basic expenses. Due to the housing load, low-income households cannot dedicate a sufficient percentage of their educational and cultural expenses to contribute to their human capital. As the income level decreases, the share of income allocated to housing payments increases, while the share allocated to education and cultural expenditures decreases. In other words, the housing burden points to the economic hardship in Turkey, especially for households in the low-income group. This situation is also determined in our study.

3. Literature Review

Studies on the impact of housing cost burden on household economic difficulties, mainly conducted in the United States and Europe, but also in a few developing countries, investigate different aspects of the housing sector. These studies highlight the negative effects of the housing cost burden on household incomes and reveal its negative effects on household welfare and social mobility. In the United States, studies have focused on low-income households (nativity, ethnicity, race, and country/region of origin). For example, Mimura (2008) investigates the links between housing cost burden, poverty, and economic hardship in low-income households. He discovered that families that were burdened by housing expenditures were more likely to live below the poverty line and face

economic hardship. Furthermore, it has been shown that families that are burdened by housing costs are able to dedicate less money for to their expenses essential to satisfy their fundamental necessities, resulting in other economic issues. Drawing from the Housing Vacancy Survey for 2011, according to Meltzer and Schwartz (2016), higher out-of-pocket rent costs are connected with worse self-reported health problems and a higher risk of postponing medical care due to financial constraints. This association is especially significant for households with high rent costs. Furthermore, the burden of housing costs is as relevant as or more essential than other physical home factors in explaining heterogeneity in self-reported overall health status and health care deferral. Alley et al. (2009) use data from the 2004 and 2006 Health and Retirement Surveys to determine the impact of "housing disadvantage," "food disadvantage," and "health care disadvantage" on the health of persons aged 50 and up. Because of the high cost of housing, low-income persons have a more difficult time accessing health and food options, according to the study. They also discovered that these difficulties had a detrimental impact on health outcomes. Desmond and Kimbro (2015) used propensity score matching to study the impact of eviction on multiple domains among low-income urban moms in the United States. They discovered that moms who had been evicted in the preceding year had more financial difficulties, were more likely to suffer from despair, and reported poorer health for themselves and their children. The study, however, is based on survey data from very small groups. According to a study conducted by Benfer et al. (2017), the burden of housing costs was connected with greater levels of food insecurity among low-income renters in the United States. Based on the survey, food insecurity is defined as a lack of access to adequate food to live an active, healthy life. Similarly, Shamsuddin and Campbell (2021) use data from the Survey of Income and Program Participation to show that a high housing cost burden is associated with an increased chance of experiencing material hardship, such as food insecurity, difficulty paying bills, and postponing medical treatment.

In studies conducted in Europe, country-specific institutional factors have much higher explanatory power than individual effects in explaining country differences in material deprivation. Deidda (2015) uses a survey data set called European Union Statistics on Income and Living Conditions (EU-SILC) to examine the relationship between housing cost burden and household economic hardship in five European countries (Italy, Germany, the United Kingdom, Spain, and France). According to the findings, housing costs constitute a significant burden in all five European countries. Moreover, Deidda found that renting significantly increases the household hardship situation. Cracolici et al. (2011) discovered that self-reported financial strain—most notably housing cost burden, inability to buy clothing, and difficulty g on vacation—had a substantial influence on economic well-being as defined by the perceived capacity to make ends meet. Crucially, the self-reported financial pressure might differ from objective assessments of such strain. Using the German Socio-Economic Panel Study, Zumbro (2014) demonstrated that homeownership was especially crucial for low-income households and that there is a strong relationship between homeownership and the state of the housing, as well as home ownership and household financial stress. Using EU-SILC data, Balestra and Sultan (2013) discovered that objective

measures of housing cost burden were connected with lower levels of contentment with housing, but subjective cost burden assessments were associated with higher levels of material deprivation. Using data from the 2018 European Union Statistics on Income and Living Conditions (EU-SILC) for 14 countries, according to Acolin and Reina (2022), the cost of housing in Anglo-Saxon countries was higher than in other European countries, creating life dissatisfaction. He explained this situation with the social state. In European countries, more families are burdened by established definitions of a cost burden than housing costs actually bear. People believe they have greater financial responsibilities where inequality is greater, and these views differ between nations. As a result, in studies conducted in Europe, the subjective housing cost pressure was higher than the objective housing cost pressure (Brandolini et al. 2013).

There have been few studies that examine the influence of housing costs on economic hardship in developing countries. Wang (2023) investigated the association between migrant workers' housing cost burden, property, and self-assessed health in Chinese cities. According to this study, migrant workers who spent more than 30% to 50% of their income on housing had considerably worse self-assessed health. Furthermore, it has been demonstrated that this link fluctuates with migrant workers' stay time. Libertun de Duren (2018) investigated the influence of public housing location and cost on migrant workers' quality of life utilizing cases from Brazil, Colombia, and Mexico. According to this study, public housing located further away from the city center had a lower market value, access to social networks, and greater commuting expenditures. Park and Seo (2018) investigated the association between housing cost burden and psychological health in older persons, as well as how financial burden influenced this relationship. The authors use nationally representative longitudinal research in Korea to examine the relationship between housing expense burden and depression symptoms in older persons aged 65 and up.

This topic has received little attention in the Turkish context and the few studies that exist primarily focus on the issue of housing affordability. Aşıcı et al. (2011) conducted an empirical analysis of housing affordability in Turkey, using a novel method that incorporated income distribution and house price distribution. They computed the Housing Affordability Index (HAI) for the seven largest cities of Turkey between June 2007 and December 2009 and found that housing remained unaffordable for average-income households. Moreover, they identified the low-income households, tenants, and households residing in regions with housing shortages or poor quality as the most vulnerable groups in terms of housing cost burden. According to Ozdemir Sarı and Aksoy Khurami (2018), households that have low income, rent their dwellings, perceive problems with their housing and neighborhood quality, reside in regions with high socioeconomic development and housing scarcity are more likely to experience severe housing cost burden. In another study, Aksoy Khurami and Ozdemir Sarı (2022) present a study that aims to reveal the burden on tenant households due to housing and transport expenditures in Turkey. According to the findings of the study, two factors explain the burden of

housing and transport expenditures on tenant households: the mobility of tenant households and the adequacy of the current housing unit for a tenant household. The study, based on the Household Budget Survey-2018 data, shows that the mismatch between the number of bedrooms in the housing unit and the household size is not a determinant of the burden of housing and transport expenditures, but a determinant of the duration of residence. It is observed that tenant households reside longer, in which case the housing rent and burden are less.

3. Data and Descriptive Statistics

3.1. Data

The empirical analysis is based on TURKSTAT's 2021 Income and Living Conditions Survey microdata set. ILCS's database is also available for past years. The sample on which our study is based consists of 1820 tenant households aged 15 years and over. In ILCS, there is information such as demographic variables, health, income, material deprivation, registration status, employment status and form, and additional work. There are detailed questions, for example, about the type and ownership of the dwelling in which the household resides, the average monthly cost of housing, the number of rooms, the area of the dwelling, the heating system, and the properties owned in the dwelling, and the economic status of the household's responsible. In our study, we initially combined household and individual data. We solely utilized the demographic information of the responsible household in the individual data. Throughout the article, we used four different measures in the dependent variable to account for the economic hardship experienced by the household. The first dependent variable shows how much the "serious household economic hardship" is to measure the economic hardship experienced by the household. The deprivation variable of the household is regulated by questions of Income and Living Conditions. The serious household economic hardship variable is regulated by the no and financial insufficiency options of the questions mentioned below. It is stated that the household that could not answer at least four of the aforementioned questions was defined as severely material deprived. Related questions: your household's economic aspect; Can all of your family members afford a week's vacation away from home, either together or separately? Can your family afford a supper with beef, chicken, or fish every two days? Is your family able to pay the expense of heating your home? What is the status of the household in terms of possessing a car, a mobile phone, a washing machine, and a color television? Is your household economically able to afford an unexpected compulsory expenditure (approximately 1079 TL) with its own means? How has the house rent, interest-bearing debt repayment, or housing loan not been paid as planned in the last 12 months? For example, 61 percent of households could not afford a week's vacation, while about 58 percent do not own a car. In our variable, measuring the financial hardship of households, approximately 50 percent of tenant households were found to be in serious economic hardship (Conclusions about the material deprivation of the household are not shown in our article. Available from authors when necessary). Our second and third dependent variable refers to the household's financial distress. These are, respectively, "inability to pay

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house rent, interest-bearing debt repayment or housing loan as planned in the last 12 months" and the other is "inability to pay electricity and water bills in the last 12 months". The answers given by the households are 1: no did not 2: yes (once) 3: yes (two or more). Our fourth and final dependent variable is an individual's self-reported measure of distress. It helps to overcome any problems related to the unobserved preferences of the household and, at the same time, to consider the role of comparative income effects on subjective well-being (Deidda 2015, Vian 2017). The question "How is the situation of being able to make total expenditures with the total income of the household" was answered by combining very easy and easy options due to the small number of data in them. The answers were corrected from 1: Very easy/easy to 5: Very difficult. To calculate the equivalent household disposable individual income with the equivalence scale, the incomes collected at the household level need to be converted into individual incomes. In this calculation, the coefficients called the equivalence scale were used to take into account the differences in the adult-child composition of the households and it was calculated how many adults (equivalent number of individuals) each household size was equivalent to. The corresponding equivalised household disposable income for the household was determined as household net yearly disposable income divided by the equivalised household size. This variable was converted into real using the 2003-based consumer price index obtained from the Central Bank of the Republic of Turkey (CBRT). In our study, the OECD scale was used by multiplying by the coefficient of "1" for the reference person in the household, "0.5" for all individuals aged 14 and over, and "0.3" for all individuals under 14 years of age. The equivalence scale also allows comparisons between households of different sizes and compositions. In our data set, two housing cost measures were used as the most important independent variables. The first, is "What is your average monthly housing cost? (water, electricity, monthly rent, fuel, housing service, maintenance costs, property tax, etc.)". The household's monthly housing expense was divided by the household's monthly disposable income and it was found out how much of the household's income consisted of the actual housing cost burden. The value we find is the gross value. These two variables were made real and used in the models. The second independent variable is the perceived housing cost burden. In other words, it is a subjective measure related to the perception of housing expenses declared by the household itself: It consists of the answers given to the question "When considering housing cost, how much of a burden do these expenses place on the household?" We hypothesized that both variables would increase economic hardship. We also created control variables: first, disadvantaged poor households were calculated if the median income of equivalent households was below 50%. We then proceeded with the hypothesis that households that are unemployed/not working, have heating problems in their homes, suffer economic hardships due to the heating system, are married, have health problems, and have low levels of education are traditionally included in disadvantaged categories. Due to the nature of our research question, we limited our analysis to tenant households aged 15 years and older who were responsible for households. By focusing on the phenomenon of material and financial deprivation, we have obtained 1,820 tenant households

that are at greater risk of facing difficulties. The definitions of the dependent and control variables are described in Table 1 below.

Table 1. Dependent and control variables definition

Variable	Definition	Source
1st Dependent variable Household material hardship	From the nine variables, the variable of severe material deprivation has been created. 1: Financial insufficiency (Yes) 0: No If at least four variables in the household are experiencing financial insufficiency, it means that there is serious material deprivation.	GYKA code numbers (HE010, HE080, HE090, HE100, HE110, HE160, HE170, HH200, HH240)
2ndDependent variable The financial distress of the household: Inability to pay house rent	A household's inability to pay the house rent, interest-bearing debt repayment, or housing loan as planned within 12 months 1: No it didn't 2: Yes (once) 3: Yes (twice or more)	HE010
3rd Dependent variable The financial distress of the household: inability to pay the bill	The household's inability to pay its electricity and water bills in the last 12 months 1: No it didn't 2: Yes (once) 3: Yes (twice or more)	HE020
4th Dependent variable Economic adequacy	Ability to make ends meet with total household income 1: Very easily/Easily 2: Fairly easily 3: With some difficult 4: With difficulty 5: With a great difficulty	HE040
Actual housing cost burden	HC = Average monthly housing expenses / Household disposable monthly income (gross) (Monthly accommodation expenses (water, electricity, monthly rent, fuel, housing service, maintenance costs, property tax, etc.)	HC=HH050/HG110
The real burden of housing cost	HC_year: Annual real housing expense/equivalent individual income (deflated.)	We calculated it
Perceived housing cost burden	How do housing costs burden the household? 1: not a burden 2: a slight burden 3: a heavy burden	HE060
Gender	Gender of the household responsible 1:Male 0:Female	
Age	Age of household responsible in the survey year	FK070
Married	(Marital status of the household responsible for households) 1:Single 0:Married	FB100
Education level	Education level of the household responsible 0:Illiterate 10:PhD	FE030
Number of 0-6-year-old children	Number of 0-6-year-old children in the household	We created it
General health status	General health status of the household responsible 1: Very good 2: Good 3: Fair 4: Bad 5: Very Bad	FS010
Low-income households	If the equivalent household income is below the median income, it is the disadvantaged poor household with “poor income”. 1: Low-income households 0:High income households	We calculated it
Not working	Whether the individual has worked to earn an income in the previous week 1: Not working 0:Working	FI020

Variable	Definition	Source
Size of dwelling in squamates	Size of the house in square meters	HH070
Having a heating system in the dwelling	The heating system of the house 1: Stove 2: Radiator (joint or central heating 3: Radiator(heating system for only a flat/combi boiler) 4: Air conditioner	HH080
Heating problems because of insulation	Whether there is a heating problem due to the insulation of the dwelling 1:Yes 0:No	HS020

3.2. Descriptive Statistics

Table 2 provides descriptive statistics of tenant households. The average monthly household disposable income in Turkey in 2021 is 5685 TL. The average income per equivalent individual is around 8340TL. The equivalent household size is on average two. The average monthly housing cost is 1462 TL. The proportion of household income spent on housing costs around 39% of gross monthly income. (In the USA, this rate constitutes 34.9 % of the monthly household income and the average housing cost burden in the European Union in 2020 is 22.3 %). This is the measurable variable. How do housing costs burden the household? About 85 % said that the burden of housing cost brings a little or too much of a burden. The effect of the burden of housing costs on economic hardship will be discussed in the following parts of our study. When we look at the dependent variables, 50 % of the tenant households live in severe material hardship. The measures of economic hardship are twofold. First, about 36 % of households stated that they could not pay their house rent, interest-bearing debt repayment, or housing loan once or twice, while 32 % stated that they could not pay their electricity and water bills. The last dependent variable is the ability of households to make their total expenditures with total income. Approximately 66 % stated that they were in economic hardship and could not make ends meet. If we interpret some of the control variables, it was found that the household responsible was 37 years old, 25 % were university graduates, 67 % were in good general health, 25 % were single, and 75 % were working. It was also observed that 59 % had young children between the ages of 0-6 and about 48 % lived in low-income households. It was also found that 55 % of them lived in a dwelling with a combi floor heating system. In order to understand the economic hardship of tenant households, codes, and definitions have been developed for disadvantaged households.

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.
Household disposable income	68213.76	85845.8
Monthly household disposable income	5684.480	7153.8170
Equivalent household size	1.9123	0.6246
Equivalent per capita income	8339.9980	9353.4240
Monthly housing costs (water, electricity, monthly rent, fuel, housing service, maintenance costs, property tax, etc.)	1462.0850	967.3294
HC(Housing cost burden=Monthly housing cost/ Household disposable income (gross)	0.3924	0.5215

Variable	Mean	Std. Dev.
How housing costs are burdening the household?		
Perceived housing cost burden		
1: Not Burden	0.1486	0.3558
2: Brings some burden	0.5379	0.4986
3: Brings a lot of burden	0.3133	0.4639
Serious material hardship		
No serious material hardship	0.4956	0.5001
Serious material hardship	0.5044	0.5001
Inability to pay house rent (The household's inability to pay the house rent, interest-bearing debt repayment, or housing loan)		
1: No it didn't	0.6338	0.4819
2:Yes(once)	0.0644	0.2456
3: Yes (two or more)	0.3018	0.4591
Inability to pay the bill (Inability of the household to pay electricity and water bills)		
1: No it didn't	0.6820	0.4658
2:Yes(once)	0.0566	0.2311
3: Yes (two or more)	0.2614	0.4395
Economic adequacy (The household's ability to make total expenditures with total income)		
1: Very easily/easily	0.1300	0.3363
2: Fairly easily	0.2131	0.4096
3: With some difficult	0.2698	0.4440
4: With difficulty	0.2852	0.4517
5: With a great difficulty	0.1019	0.3026
Gender		
Male	0.7483	0.4340
Female	0.2516	0.4340
Marital Status		
Married	0.7406	0.4384
Single	0.2593	0.4384
Age	37.4730	10.2911
Education level	5.0116	2.5844
General health status	2.1530	0.6817
Number of 0-6 years old children	0.5909	0.7824
Income status of the household		
Not low income	0.5226	0.4996
Low-income household	0.4774	0.4996
Employment status		
Not working	0.2508	0.4336
Working	0.7492	0.4336
Size of dwelling in squamates m^2	110.2247	33.9996
Heating problems because of insulation		
Yes	0.3216	0.4672
No	0.6784	0.4672

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Variable	Mean	Std. Dev.
Heating system		
Stove	0.2533	0.4350
Radiator (joint or central heating)	0.0435	0.2040
Radiator (heating system for only a flat/combi boiler)	0.5501	0.4976
Air conditioner	0.1531	0.3602
N	1820	

4. Empirical Results

Many social phenomena examined in the research are measured by ordinal categorical variables. Ordered categorical variables are often used to indicate the order of a particular quality. Categories of ordinal variables take consecutive integer values and are encoded starting from one. There are studies stating that it is appropriate to analyze the ordinal results with linear regression models because of this coding. However, Winship and Mare (1984) showed in their work that the linear regression model assumption is violated and the estimation results are invalid. While the standard logit or probit model is only valid for variables with two (yes/no) categories, complex methods are required for the analysis of variables containing more than two categories. In our study, the probit model was first used to understand whether the actual and perceived housing cost burden was in serious financial distress of the household. In Table 3, the goodness of fit of the probit model was evaluated using the Hosmer-Lemeshow test. At a significance level of 5%, the chi-square test statistic was found to be chi2(8) = 9.04 (p-value = 0.516), indicating that the model has a goodness of fit. The probit model achieves an approximately 73.37% correct classification rate in terms of performance. The Cragg-Uhler (Nagelkerke) R^2 value is 33.9%. The likelihood ratio test statistic is 531.282 with a p-value of 0.000. It can be concluded that the model is statistically usable. In Table 4, the Hosmer-Lemeshow test was examined to evaluate the goodness of fit of the probit model. At a significance level of 5%, the chi-square test statistic was found to be chi2(8) = 9.427 (p-value = 0.377), indicating that the model has a goodness of fit. The probit model achieves an approximately 73.48% correct classification rate in terms of performance. The Cragg-Uhler (Nagelkerke) R^2 value is 33.2%. The likelihood ratio test statistic is 518.96 with a p-value of 0.000. Based on these results, it can be concluded that the probit model in Table 4 has a goodness of fit.

Ordered probit models were also used to determine the probability that the household would not be able to pay its electricity and water bills in the last 12 months, the household's inability to pay the house rent, interest-bearing debt repayment, or housing loan as planned in the last 12 months, and finally the probability of not being able to meet the total income and total expenses of the household. As an example of this variable below, when asked "Households have not been able to pay their electricity and water bills in the last 12 months", the results of the answer variable obtained are as follows for the continuous latent variable:

$$y_i = \begin{cases} 1 \Rightarrow \text{No it didn't} & \tau_0 = -\infty \leq y_i^* < \tau_1 \\ 2 \Rightarrow \text{Yes(one time)} & \tau_1 \leq y_i^* < \tau_2 \\ 3 \Rightarrow \text{Yes(two or more)} & \tau_2 \leq y_i^* < \infty \end{cases} \quad (1)$$

Parameter estimates in the ordered probit model are obtained using the maximum likelihood method (Borooah 2001). The housing cost burden refers to all expenses incurred continuously while living in a house; that is, it represents the housing-related expenses for each household (Kim et al., 2022). In Turkey, the housing cost burden continues to grow due to high housing and rental prices. The housing cost burden is known to be s influenced by various factors such as household characteristics and housing attributes (Kim et al., 2022; Acolin, 2022; Deidda, 2015; Park et al., 2015). Tables 3-4 and Figures 1-4 show the model estimation results. Reviews are based on marginal effect and marginal effect graphs. As the real and perceived housing cost burden increases, the probability of households experiencing serious economic difficulties increases (Zumbro, 2014). Looking at Table 3, the probability of experiencing serious material deprivation increases by 13 % as the actual housing cost burden increases. Again, the probability of households not being able to pay their rental expenses two or more times in the last twelve months increases by 2 %. The probability of being unable to pay their bills twice or more increases by approximately 2 %. It can be said that the probability of those who declare that they have difficulty meeting their expenses increases by about 6 %. When Table 4 is examined, the probability of experiencing serious material deprivation increases by 4 % as the perceived burden of housing costs becomes heavier. Again, as the perceived burden of housing expenses gets heavier, the probability of households not being able to pay their rent expenses twice or more in the last twelve months is increased by 13 %; The probability of being unable to pay their bills twice or more increases by approximately 12 %. It can be said that the probability of those who have difficulty meeting their expenses increases by 20% as the perceived housing cost burden becomes heavier. All outcomes of actual and perceived housing costs support each other. In addition, different measures of difficulty of the burden of housing cost may have been affected by an endogeneity problem. These can be attributed to unobservable factors, possibly housing characteristics that affect household needs and therefore household challenges. Households with larger families, for example, will likely need larger housing. However, before conducting the test, we reduced the number of dependent variable categories of the ordered probit models to two. We tested its endogeneity by correlating the housing cost burden with the area (squameters) of the dwelling and the number of children in the household between the ages of zero and six. Wald test results of the IV probit model are presented below all model results in Table 3-4. According to the test results, the actual housing cost burden and the perceived housing cost burden were weak exogeneity. Therefore, we did not present the IV probit estimation results in the article. We thought that working only with tenant households ensured homogeneity in the data. (Deidda 2015, Vian 2017) showed in their studies that home ownership causes endogeneity. Since the model's control variables are our disadvantaged groups, it would be appropriate to

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interpret some of them. we found that as age and education levels increased, the probability of the household suffering decreased. We observed that married people (in most models), those with children between the ages of zero and six, disadvantaged poor households with a median income of less than 50 percent relative to equivalent household income, (i.e. disadvantaged households with "low income"), responsible of household who are not working and whose general health status is impaired are increasingly likely to suffer economically. We even found that as the characteristics of the dwelling in which he lived improved, the probability of the household suffering decreased. In Table 3, we found that households experiencing heating issues due to insulation are 8% more likely to face serious material hardship compared to households without heating problems. Additionally, we observed that households using stoves for heating have approximately a 20% higher probability of experiencing serious material hardship, while households using air conditioners have a roughly 2% higher probability. In Table 3, we observed that households using air conditioners for heating are 15% less likely to have no difficulties paying rent, and 13% more likely to experience two or more difficulties in paying rent.

Table 3. The Effect of the Actual Housing Cost Burden on the Economic Hardship of the Household

	Serious material hardship		**Inability to pay house rent**	**1: No it didn't**	**2: Yes(once)**	**3: Yes (two or more)**
VARIABLES	**probit coeff**	**mfx**	**probit coeff**	**mfx**	**mfx**	**mfx**
HC	0.3274***	0.1305***	0.0765*	-0.0273*	0.0037*	0.0236*
	(0.0930)	(0.0370)	(0.0440)	(0.0157)	(0.0022)	(0.0136)
Male	0.1494*	0.0595*	-0.1162	0.0415	-0.0056	-0.0359
	(0.0851)	(0.0339)	(0.0867)	(0.0309)	(0.0042)	(0.0268)
Age	-0.0073**	-0.0029**	-0.0124***	0.0044***	-0.0006***	-0.0038***
	(0.0036)	(0.0014)	(0.0037)	(0.0013)	(0.0002)	(0.0011)
Single	0.2405***	0.0958***	-0.0294	0.0105	-0.0014	-0.0091
	(0.0895)	(0.0357)	(0.0911)	(0.0326)	(0.0044)	(0.0282)
Education level	-0.0593***	-0.0236***	-0.1142***	0.0408***	-0.0055***	-0.0353***
	(0.0168)	(0.0067)	(0.0170)	(0.0060)	(0.0010)	(0.0052)
General health status	0.1299**	0.0518**	0.2699***	-0.0964***	0.0130***	0.0834***
	(0.0532)	(0.0212)	(0.0513)	(0.0184)	(0.0028)	(0.0159)
Number of 0-6 years old children	0.0247	0.0099	0.0620	-0.0222	0.0030	0.0192
	(0.0487)	(0.0194)	(0.0462)	(0.0165)	(0.0022)	(0.0143)
Low-income household	0.6223***	0.2480***	0.7222***	-0.2580***	0.0348***	0.2231***
	(0.0923)	(0.0368)	(0.0835)	(0.0296)	(0.0055)	(0.0256)
Not working	0.1574*	0.0627*	0.2530***	-0.0904***	0.0122***	0.0782***
	(0.0877)	(0.0350)	(0.0826)	(0.0295)	(0.0042)	(0.0255)
Size of dwelling in squamates	-0.0036***	-0.0014***	-0.0024**	0.0009**	-0.0001**	-0.0007**
	(0.0010)	(0.0004)	(0.0011)	(0.0004)	(0.0001)	(0.0003)
Heating problem (Yes)	0.2174***	0.0863***	0.3515***	-0.1285***	0.0155***	0.1130***
	(0.0750)	(0.0295)	(0.0716)	(0.0266)	(0.0033)	(0.0239)
Stove	0.4937***	0.1968***	0.2116*	-0.0756*	0.0102*	0.0654*
	(0.1204)	(0.0480)	(0.1216)	(0.0434)	(0.0060)	(0.0376)
Air conditioner	0.0434	0.0173	0.4342**	-0.1551**	0.0209**	0.1342**
	(0.1754)	(0.0699)	(0.1778)	(0.0634)	(0.0089)	(0.0549)
Radiator(heating system for only a flat/combi boiler)	0.0505	0.0201	-0.0520	0.0186	-0.0025	-0.0161
	(0.0953)	(0.0380)	(0.1064)	(0.0380)	(0.0051)	(0.0329)
Constant	-0.3382					
	(0.2771)					

	Serious material hardship		Inability to pay house rent	1: No it didn't	2: Yes(once)	3: Yes (two or more)
VARIABLES	**probit coeff**	**mfx**	**probit coeff**	**mfx**	**mfx**	**mfx**
/cut1			0.2565			
			(0.2830)			
/cut2			0.5013*			
			(0.2832)			
Hosmer-Lemeshow test	chi2(8) = 9.04					
	[0.516]					
Wald test of exogeneity	0.02		0.37			
chi2(1)	[0.8844]		[0.5444]			
N	1,810		1,810			

	Inability to pay the bill	1: No it didn't	2: Yes(once)	3: Yes (two or more)
VARIABLES	**probit coeff**	**mfx**	**mfx**	**mfx**
HC	0.0584*	-0.0193	0.0027	0.0166
	(0.0360)	(0.0119)	(0.0017)	(0.0103)
Male	-0.0594	0.0197	-0.0028	-0.0169
	(0.0874)	(0.0289)	(0.0041)	(0.0248)
Age	-0.0091**	0.0030**	-0.0004**	-0.0026**
	(0.0037)	(0.0012)	(0.0002)	(0.0010)
Single	0.0397	-0.0131	0.0019	0.0113
	(0.0926)	(0.0306)	(0.0043)	(0.0263)
Education level	-0.1195***	0.0395***	-0.0056***	-0.0339***
	(0.0171)	(0.0056)	(0.0010)	(0.0048)
General health status	0.2085***	-0.0690***	0.0098***	0.0592***
	(0.0508)	(0.0168)	(0.0026)	(0.0145)
Number of 0-6 years old children	0.0685	-0.0227	0.0032	0.0195
	(0.0464)	(0.0154)	(0.0022)	(0.0132)
Low-income household	0.6893***	-0.2280***	0.0323***	0.1958***
	(0.0838)	(0.0275)	(0.0052)	(0.0237)
Not working	0.1690**	-0.0559**	0.0079**	0.0480**
	(0.0832)	(0.0275)	(0.0040)	(0.0236)
Size of dwelling in squamates	-0.0022**	0.0007**	-0.0001**	-0.0006**
	(0.0011)	(0.0004)	(0.0001)	(0.0003)
Heating problem(Yes)	0.3598***	-0.1231***	0.0158***	0.1074***
	(0.0720)	(0.0253)	(0.0034)	(0.0225)
Stove	-0.0905	0.0300	-0.0042	-0.0257
	(0.1231)	(0.0407)	(0.0058)	(0.0350)
Air conditioner	0.1259	-0.0417	0.0059	0.0358
	(0.1828)	(0.0604)	(0.0086)	(0.0519)
Radiator(heating system for only a flat/combi boiler)	-0.0782	0.0259	-0.0037	-0.0222
	(0.1075)	(0.0356)	(0.0050)	(0.0306)
/cut1	0.3193			
	(0.2876)			
/cut1	0.5317*			
	(0.2878)			
Wald test of exogeneity chi2(1)	1.49			
	[0.2221]			
	1,796			

	Economic adequacy	1:Very easy/Easy	2:Some what easy	3:Somewhat difficult	4: Difficult	5: Very difficult
VARIABLES	**probit coeff**	**mfx**	**mfx**	**mfx**	**mfx**	**mfx**
HC	0.2203***	-0.0336***	-0.0440***	-0.0050**	0.0559***	0.0267***

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VARIABLES	Economic adequacy probit coeff	1:Very easy/Easy mfx	2:Some what easy mfx	3:Somewhat difficult mfx	4: Difficult mfx	5: Very difficult mfx
	(0.0378)	(0.0060)	(0.0078)	(0.0021)	(0.0099)	(0.0048)
Male	-0.0015	0.0002	0.0003	0.0000	-0.0004	-0.0002
	(0.0653)	(0.0099)	(0.0130)	(0.0015)	(0.0166)	(0.0079)
Age	-0.0021	0.0003	0.0004	0.0000	-0.0005	-0.0002
	(0.0028)	(0.0004)	(0.0006)	(0.0001)	(0.0007)	(0.0003)
Single	-0.0173	0.0026	0.0034	0.0004	-0.0044	-0.0021
	(0.0685)	(0.0104)	(0.0137)	(0.0015)	(0.0174)	(0.0083)
Education level	-0.0780***	0.0119***	0.0156***	0.0018**	-0.0198***	-0.0094***
	(0.0131)	(0.0021)	(0.0027)	(0.0007)	(0.0034)	(0.0017)
General health status	0.0969**	-0.0148**	-0.0194**	-0.0022*	0.0246**	0.0117**
	(0.0400)	(0.0061)	(0.0080)	(0.0012 (0.0102))	(0.0049)	
Number of 0-6 years old children	0.0817**	-0.0124**	-0.0163**	-0.0018*	0.0207**	0.0099**
	(0.0368)	(0.0056)	(0.0074)	(0.0011)	(0.0094)	(0.0045)
Low-income household	0.5858***	-0.0893***	-0.1170***	-0.0132**	0.1485***	0.0709***
	(0.0677)	(0.0111)	(0.0147)	(0.0053)	(0.0182)	(0.0092)
Not working	0.0401	-0.0061	-0.0080	-0.0009	0.0102	0.0049
	(0.0668)	(0.0102)	(0.0133)	(0.0015)	(0.0169)	(0.0081)
Size of dwelling in squamates	-0.0025***	0.0004***	0.0005***	0.0001**	-0.0006***	-0.0003***
	(0.0008)	(0.0001)	(0.0002)	(0.0000)	(0.0002)	(0.0001)
Heating problem(Yes)	0.2254***	-0.0325***	-0.0451***	-0.0078**	0.0563***	0.0291***
	(0.0579)	(0.0081)	(0.0117)	(0.0033)	(0.0144)	(0.0081)
Stove	0.3353***	-0.0511***	-0.0669***	-0.0076**	0.0850***	0.0406***
	(0.0920)	(0.0142)	(0.0187)	(0.0036)	(0.0236)	(0.0114)
Air conditioner	0.4715***	-0.0718***	-0.0941***	-0.0106**	0.1195***	0.0571***
	(0.1375)	(0.0212)	(0.0279)	(0.0051)	(0.0352)	(0.0170)
Radiator(heating system for only a flat/combi boiler)	0.2121***	-0.0323***	-0.0423***	-0.0048*	0.0538***	0.0257***
	(0.0739)	(0.0114)	(0.0149)	(0.0025)	(0.0188)	(0.0091)
/cut1	-1.1280***					
	(0.2149)					
/cut2	-0.2406					
	(0.2129)					
/cut3	0.6143***					
	(0.2134)					
/cut4	1.8039***					
	(0.2172)					
Wald test of exogeneity chi2(1)	3.37 [0.0662] 1,810					

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.HC, converted to annual and real. The results of the IV probit model are not given due to weak exogeneity. Reference categories: Female, married, not low income, working, no serious material hardship, heating problems because of insulation: no, heating system: radiator (joint or central heating).

Table 4. The Effect of the Perceived Housing Cost Burden on the Economic Hardship of the Household

VARIABLES	Serious material hardship probit coeff	mfx	Inability to pay house rent probit coeff	1: No it didn't mfx	2: Yes(once) mfx	3: Yes (two or more) mfx
Perceived housing cost burden 1: not a burden 2: a slight burden 3: a heavy burden	0.1051*	0.0419*	0.4396***	-0.1552***	0.0224***	0.1328***
	(0.0555)	(0.0221)	(0.0589)	(0.0206)	(0.0039)	(0.0176)
Male	0.1410*	0.0562*	-0.1488*	0.0525*	-0.0076*	-0.0449*
	(0.0849)	(0.0339)	(0.0883)	(0.0311)	(0.0046)	(0.0266)
Age	-0.0077**	-0.0031**	-0.0124***	0.0044***	-0.0006***	-0.0038***
	(0.0036)	(0.0014)	(0.0037)	(0.0013)	(0.0002)	(0.0011)
Single	0.2297**	0.0916**	-0.0243	0.0086	-0.0012	-0.0073

VARIABLES	Serious material hardship probit coeff	mfx	Inability to pay house rent probit coeff	1: No it didn't mfx	2: Yes(once) mfx	3: Yes (two or more) mfx
	(0.0893)	(0.0356)	(0.0928)	(0.0328)	(0.0047)	(0.0280)
Educational level	-0.0586***	-0.0234***	-0.1021***	0.0360***	-0.0052***	-0.0308***
	(0.0169)	(0.0067)	(0.0173)	(0.0060)	(0.0010)	(0.0052)
General health status	0.1267**	0.0505**	0.2523***	-0.0891***	0.0129***	0.0762***
	(0.0530)	(0.0211)	(0.0517)	(0.0183)	(0.0030)	(0.0157)
Number of 0-6-year-old children	0.0338	0.0135	0.0576	-0.0203	0.0029	0.0174
	(0.0484)	(0.0193)	(0.0467)	(0.0165)	(0.0024)	(0.0141)
Low-income households	0.7676***	0.3061***	0.6606***	-0.2332***	0.0337***	0.1995***
	(0.0806)	(0.0321)	(0.0813)	(0.0286)	(0.0055)	(0.0245)
Not working	0.2057**	0.0820**	0.2580***	-0.0911***	0.0132***	0.0779***
	(0.0862)	(0.0344)	(0.0831)	(0.0293)	(0.0045)	(0.0251)
Size of dwelling in squamates	-0.0033***	-0.0013***	-0.0025**	0.0009**	-0.0001**	-0.0007**
	(0.0010)	(0.0004)	(0.0011)	(0.0004)	(0.0001)	(0.0003)
Heating problem (Yes)	0.2087***	0.0829***	0.2970***	-0.1072***	0.0142***	0.0930***
	(0.0753)	(0.0297)	(0.0726)	(0.0267)	(0.0035)	(0.0235)
Stove	0.4338***	0.1730***	0.2080*	-0.0734*	0.0106*	0.0628*
	(0.1185)	(0.0473)	(0.1230)	(0.0434)	(0.0064)	(0.0372)
Air conditioner	0.0087	0.0035	0.3494*	-0.1233*	0.0178*	0.1055*
	(0.1749)	(0.0697)	(0.1808)	(0.0638)	(0.0094)	(0.0545)
Radiator(heating system for only a flat/combi boiler)	0.0362	0.0144	-0.0544	0.0192	-0.0028	-0.0164
	(0.0948)	(0.0378)	(0.1083)	(0.0382)	(0.0055)	(0.0327)
Constant	-0.3989					
	(0.2942)					
/cut1			1.0968***			
			(0.3094)			
/cut2			1.3486***			
			(0.3098)			
Hosmer-Lemeshow	chi2(8) =9.427					
	[0.6244]					
Wald test of	0.24		0.46			
exogeneity chi2(1)	[0.6244]		[0.4987]			
N	1,810		1,810			

VARIABLES	Inability to pay the bill probit coeff	1: No it didn't mfx	2: Yes(once) mfx	3: Yes (two or more) mfx
Perceived housing cost burden 1: not a burden 2: a slight burden 3: a heavy burden	0.4286***	-0.1395***	0.0210***	0.1185***
	(0.0606)	(0.0195)	(0.0037)	(0.0166)
Male	-0.0882	0.0287	-0.0043	-0.0244
	(0.0888)	(0.0289)	(0.0044)	(0.0245)
Age	-0.0087**	0.0028**	-0.0004**	-0.0024**
	(0.0037)	(0.0012)	(0.0002)	(0.0010)
Single	0.0398	-0.0130	0.0020	0.0110
	(0.0944)	(0.0307)	(0.0046)	(0.0261)
Educational level	-0.1076***	0.0350***	-0.0053***	-0.0297***
	(0.0174)	(0.0056)	(0.0010)	(0.0048)
General health status	0.1915***	-0.0623***	0.0094***	0.0529***
	(0.0511)	(0.0166)	(0.0027)	(0.0141)
Number of 0-6-year-old children	0.0639	-0.0208	0.0031	0.0177
	(0.0467)	(0.0152)	(0.0023)	(0.0129)
Low-income households	0.6128***	-0.1994***	0.0300***	0.1694***
	(0.0830)	(0.0269)	(0.0052)	(0.0229)
Not working	0.1636*	-0.0532*	0.0080*	0.0452*
	(0.0836)	(0.0272)	(0.0042)	(0.0231)
Residential area m^2	-0.0023**	0.0008**	-0.0001**	-0.0006**
	(0.0011)	(0.0004)	(0.0001)	(0.0003)
Heating problem (Yes)	0.3024***	-0.1015***	0.0141***	0.0874***
	(0.0731)	(0.0252)	(0.0035)	(0.0220)
Stove	-0.1044	0.0340	-0.0051	-0.0289
	(0.1244)	(0.0405)	(0.0061)	(0.0344)

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VARIABLES	Inability to pay the bill probit coeff	1: No it didn't mfx	2: Yes(once) mfx	3: Yes (two or more) mfx
Air conditioner	0.0287	-0.0093	0.0014	0.0079
	(0.1862)	(0.0606)	(0.0091)	(0.0515)
Radiator(heating system for only a flat/combi boiler)	-0.0843	0.0274	-0.0041	-0.0233
	(0.1092)	(0.0356)	(0.0054)	(0.0302)
/cut1	1.1540***			
	(0.3152)			
/cut2	1.3721***			
	(0.3156)			
Wald test of exogeneity chi2(1)	0.48			
	[0.4871]			
	1,796			

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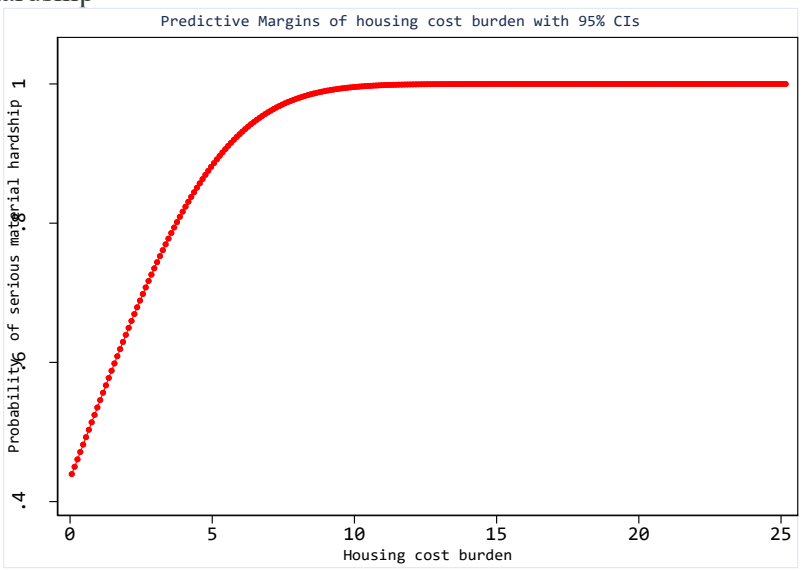
VARIABLES	Economic Adequacy probit coeff	1:Very easy/easy mfx	2:Somewhat easy mfx	3:Somewhat difficult mfx	4: Difficult mfx	5: Very difficult mfx
Perceived housing cost burden 1: not a burden 2: a slight burden 3: a heavy burden	0.7336***	-0.0964***	-0.1579***	-0.0174**	0.1983***	0.0733***
	(0.0450)	(0.0080)	(0.0121)	(0.0070)	(0.0144)	(0.0067)
Male	-0.0469	0.0062	0.0101	0.0011	-0.0127	-0.0047
	(0.0659)	(0.0087)	(0.0142)	(0.0016)	(0.0178)	(0.0066)
Age	-0.0010	0.0001	0.0002	0.0000	-0.0003	-0.0001
	(0.0028)	(0.0004)	(0.0006)	(0.0001)	(0.0008)	(0.0003)
Single	-0.0135	0.0018	0.0029	0.0003	-0.0037	-0.0014
	(0.0691)	(0.0091)	(0.0149)	(0.0016)	(0.0187)	(0.0069)
Educational level	-0.0516***	0.0068***	0.0111***	0.0012**	-0.0140***	-0.0052***
	(0.0133)	(0.0018)	(0.0029)	(0.0006)	(0.0036)	(0.0014)
General health status	0.0616	-0.0081	-0.0133	-0.0015	0.0167	0.0062
	(0.0403)	(0.0053)	(0.0087)	(0.0011)	(0.0109)	(0.0041)
Number of 0-6-year-old children	0.0772**	-0.0101**	-0.0166**	-0.0018	0.0209**	0.0077**
	(0.0370)	(0.0049)	(0.0080)	(0.0011)	(0.0100)	(0.0037)
Low-income households	0.5444***	-0.0715***	-0.1171***	-0.0129**	0.1471***	0.0544***
	(0.0659)	(0.0095)	(0.0152)	(0.0053)	(0.0186)	(0.0075)
Not working	0.0571	-0.0075	-0.0123	-0.0014	0.0154	0.0057
	(0.0669)	(0.0088)	(0.0144)	(0.0017)	(0.0181)	(0.0067)
Residential area m^2	-0.0027***	0.0004***	0.0006***	0.0001**	-0.0007***	-0.0003***
	(0.0008)	(0.0001)	(0.0002)	(0.0000)	(0.0002)	(0.0001)
Heating problem (Yes)	0.1333**	-0.0169**	-0.0287**	-0.0042	0.0359**	0.0139**
	(0.0586)	(0.0073)	(0.0126)	(0.0026)	(0.0158)	(0.0064)
Stove	0.3200***	-0.0420***	-0.0689***	-0.0076**	0.0865***	0.0320***
	(0.0926)	(0.0124)	(0.0202)	(0.0037)	(0.0252)	(0.0095)
Air conditioner	0.3253**	-0.0427**	-0.0700**	-0.0077*	0.0879**	0.0325**
	(0.1389)	(0.0184)	(0.0301)	(0.0045)	(0.0377)	(0.0141)
Radiator(heating system for only a flat/combi boiler)	0.2012***	-0.0264***	-0.0433***	-0.0048*	0.0544***	0.0201***
	(0.0746)	(0.0099)	(0.0162)	(0.0026)	(0.0202)	(0.0076)
/cut1	0.1434					
	(0.2319)					
/cut2	1.1032***					
	(0.2316)					
/cut3	2.0202***					
	(0.2337)					
/cut4	3.2974***					
	(0.2404)					
Wald test of exogeneity chi2(1)	0.61					
	[0.4366]					
	1,810	1,810	1,810	1,810	1,810	1,810

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.HC, converted to annual and real. The results of the IV probit model are not given due to weak exogeneity. Reference categories: Female, married, not low

income, working, no serious material hardship, heating problems because of insulation: no, heating system: radiator (joint or central heating).

When examining the marginal effect graphs of the actual (a) and perceived housing cost burdens (b) in Figure 1, we observe that as the actual housing cost burden increases, the probability of experiencing severe financial hardship also increases. When looking at the perceived housing cost burden in a similar manner, it can be observed that the red line exhibits an upward movement. In Figure 2, as the actual housing cost burden (c) increases, we can infer from the upward movement of the green line that the household faces difficulties in paying rent. We confirm this result with (d). As the perceived housing cost burden increases, it becomes harder for the household to make 2 or more rent payments, which can be observed from the upward movement of the green line. In Figure 3, as the actual housing cost burden (e) increases, we can infer from the upward movement of the green line that the household faces difficulties in paying bills. We confirm this result with (f). As the perceived housing cost burden increases, it becomes harder for the household to make 2 or more bill payments, which can be observed from the upward movement of the green line. In Figure 4, as the actual housing cost burden (g) increases, it becomes very difficult for the household to cover its expenses with its income. This can be seen by following the red line. We confirm this result with (h). As the perceived housing cost burden increases, it becomes harder for the household to cover its expenses with its income, which can be observed with the orange line.

Figure 1. The effect of real and perceived housing cost burden on household material hardship



(a)

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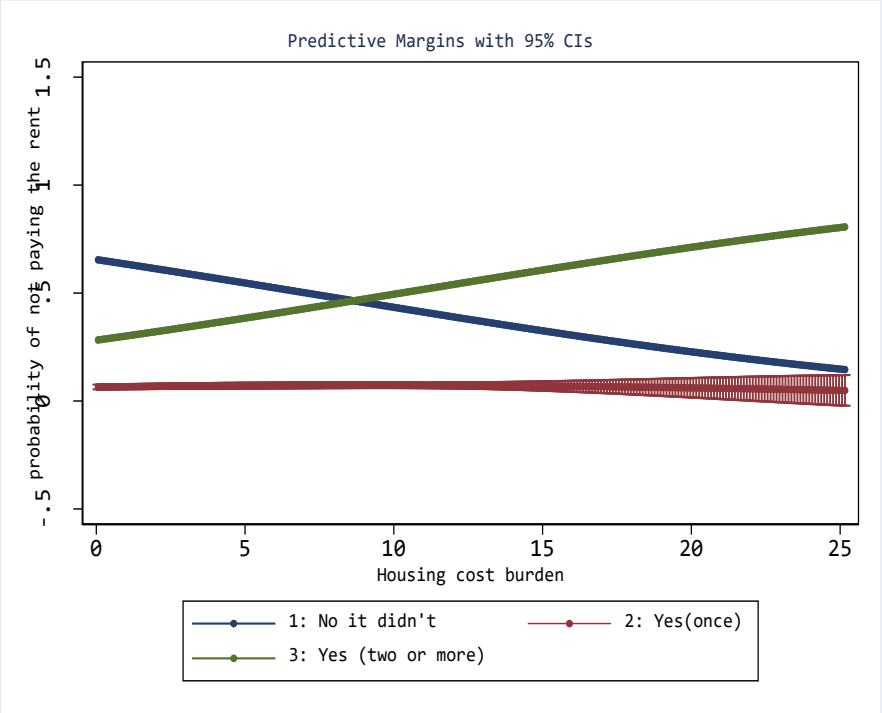
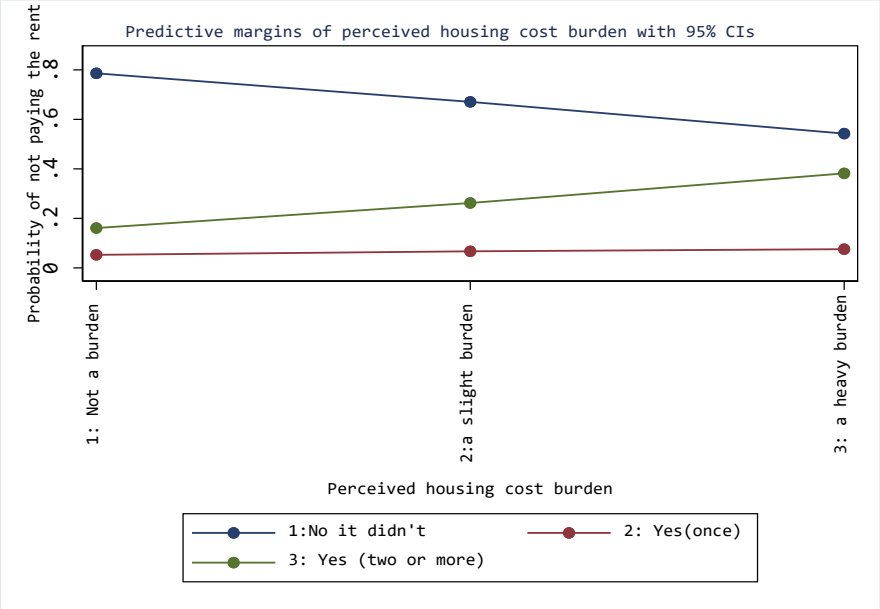
(b)

Figure 2. The probability of the household not being able to pay the rent of the real and perceived housing cost burden

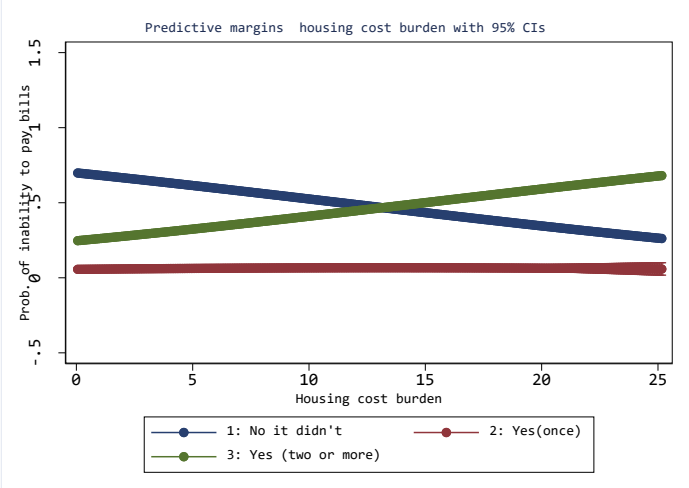


(c)



(d)

Figure 3. The probability of real and perceived housing cost burden not being able to pay bills



(e)

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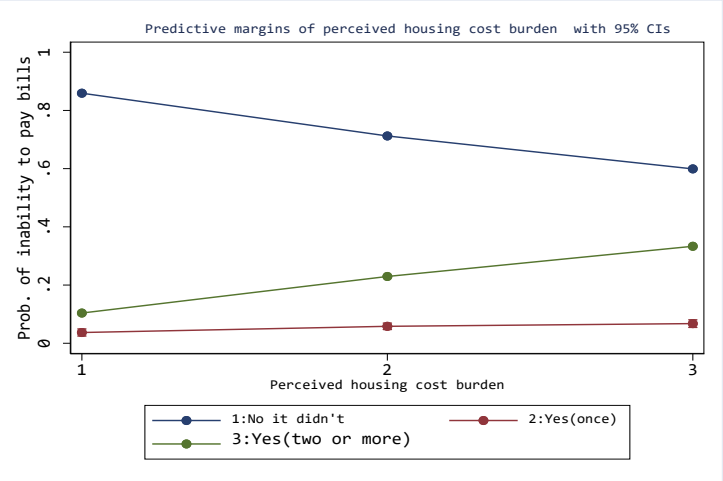
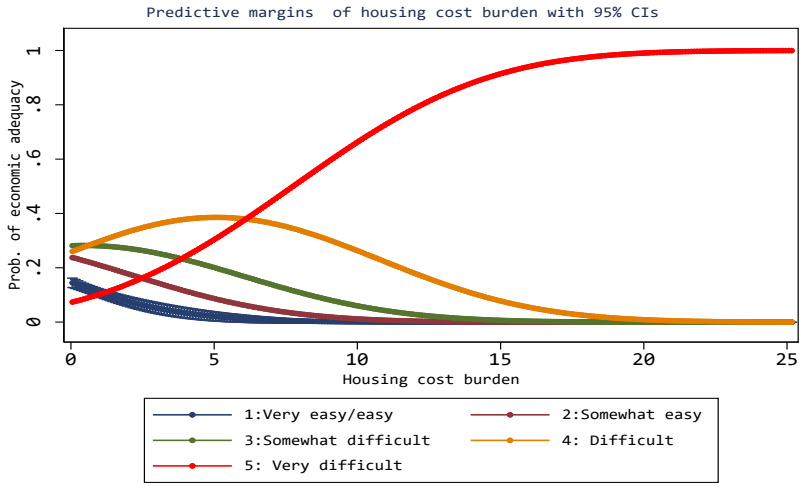
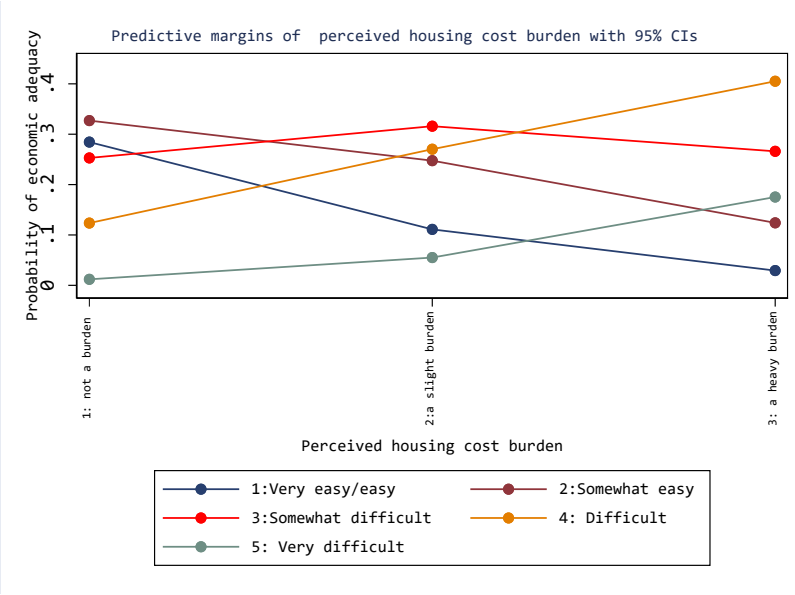


(f)

Figure 4. The probability is that the actual and perceived burden of housing costs will not be sufficient for household expenditures.



(g)



(h)

Source: All the graphs have been generated based on the author's calculations.

5. Conclusion

Economic hardship stems from the income level being insufficient to meet basic needs. Therefore, traditional poverty measurements are based on the income threshold. However, the factors that determine economic hardship are fed by both economic and social factors. For this reason, it is important to identify the socio-economic factors in the design of economic policies for economic hardship. The factors that determine economic hardship or poverty may vary depending on the country or region. Therefore, these factors should be analyzed according to the specific country or region. Housing cost is an important source of expenditure in household budgets, so high housing costs can be a significant cause of economic hardship. In Turkey, especially since 2014, an increase in the rate of renting has been observed. With the 2020 Covid-19 pandemic, the excessive increase in house prices has made it impossible for low and middle-income households to own a home. The increase in rent prices, especially in big cities, along with the increase in housing and inflation rates, has made it difficult for tenant households to meet their basic needs. The factors that cause housing costs and the economic hardship they cause, which have been a major concern for both politicians and academics in recent years, have been analyzed in our study specifically for Turkey with the aim of guiding the design of economic policies. Particularly, renters are generally a disadvantaged group with lower incomes and are vulnerable to high housing expenses. Therefore, in our study, we analyzed the impact of housing costs on household financial distress specifically for renters in the context of Turkey. Our empirical analysis is based on microdata from the 2021 Income and Living Conditions Survey conducted by TURKSTAT. In our study, we calculated disadvantaged poor households if the equivalent household income based on median income was below 50%. Then we continued our study with the hypothesis

that unemployed/non-working individuals, those experiencing heating problems in their homes, those facing economic difficulties due to the heating system, married individuals, those with health problems, and those with low education levels traditionally fall within.

Approximately 50% of renter households in the sample experience severe financial deprivation. Around 36 % indicate that they were unable to pay rent or interest-bearing debt repayments or housing loans once or twice, while 32 % stated that they were unable to pay electricity and water bills. Sixty-six percent of them declare that they are in financial distress and cannot make ends meet. Our results show that housing costs are a nonnegligible burden for disadvantaged households, consistent with Mimura (2008), Balestra and Sultan (2013). Deidda (2015). To observe the economic distress experienced by households, we used the dependent variable in four different measures. The first one is "severe financial deprivation" to measure the economic distress experienced by the household. The second and third measures pertain to (financial) hardships faced by the household. These are "inability to pay rent, interest-bearing debt repayments, or housing loans as planned in the last 12 months" and "inability to pay electricity and water bills in the last 12 months," respectively. The fourth measure is a self-reported measure of distress. We aimed to overcome any issues related to unobserved preferences of the household and, at the same time, measure the role of comparative income effects on subjective well-being. We calculated the marginal effects obtained from probit and ordered probit models. As the real and perceived housing cost burden increases, the probability of households experiencing serious economic hardship also increases. For example, the probability of experiencing severe financial deprivation increases by 13% as the actual housing cost burden increases in our sample. Again, the probability of households not being able to pay two or more rental expenses in the last twelve months increases by 2%. The probability of being unable to pay their bills twice or more also increases by about 2%. It can be said that the rate of those who declared that they had difficulty meeting their expenses increased with a probability of about 6%. The greater the perceived burden of housing costs, the higher the 4% probability of experiencing severe material deprivation. 13% probability that households will be unable to pay their rent twice or more in the last twelve months as the perceived cost of housing outweighs it; The probability of being unable to pay their bills twice or more also increases by about 12%. It can be said that the rate of those who declared that they had difficulty meeting their expenses increased by 20%. All the results regarding actual and perceived housing costs are robust. We observed that as the age and education level of the household responsible increase, the probability of the household experiencing distress decreases. Control variables are our disadvantaged groups. We observed that the probability of economic distress increases for married individuals (in most models), those with children aged six or below, disadvantaged poor households based on median income below 50%, non-working individuals, and responsible for households with poor general health. We even found that as the characteristics of the housing improve, the probability of the household experiencing distress decreases.

Turkey has been ranking first in the world in the increase of housing and rent prices in recent years. Especially since 2020, the rise of the inflation rate has significantly reduced the purchasing power of economic units. According to 2021 OECD data, the ratio of the minimum wage to the average wage in Turkey is 70.6%. Therefore, the average wage in Turkey is very close to the minimum wage. These developments have caused serious economic hardship for low-income tenant households. For this reason, the Ministry of Family and Social Services has launched rent subsidies as of November 2022. Rental aid varies across provinces and is between 2000 Tl and 3500 Tl. The eligibility criteria for rental assistance require that the household income does not surpass one-third of the minimum wage, and that the household does not have any sources of income from social security, pension, widower's pension or regular income. The rent subsidy that came into effect is very low compared to the current rent level, and the conditions for benefiting from the subsidy are only related to the income level. However, one-third of the minimum wage falls far short of the poverty threshold in Turkey. Hence, rent support should be extended to all households whose incomes are below the poverty line. Considering the results we obtained in our study, we suggest that the aid criteria should include not only the income threshold but also socio-economic criteria. In this context, conditions such as age, marital status, number of children under 6 years old, health status of the household responsible, education level, gender, and quality of the housing lived in should also be taken into account in determining who will benefit from the rent subsidy. Another measure taken due to the aggravation of housing costs is to provide 25 cubic meters of natural gas free of charge for one year as of April 2023. Although it is an important application to alleviate housing costs, instead of providing this opportunity to all households, only disadvantaged families should be given a higher natural gas usage right. Similarly, providing cash assistance equivalent to the said amount to low-income households without access to natural gas will increase the effectiveness of the policy implemented.

The Turkish government tries to provide access to housing for low and middle-income households through TOKI. However, due to the increase in housing costs, it is impossible for low-income households to buy housing produced by the public hand, so instead of the policy of providing housing for disadvantaged families, more emphasis should be given to the production of low-rent social housing. In addition, housing cooperatives should be revived and the dynamics of cooperatives should be utilized in the construction of mass housing. In order to prevent the increase in housing prices due to the perception of housing as an investment tool in Turkey, additional taxes should be imposed on those who own more than one house and/or keep their houses vacant. Providing low-interest renovation loans by public banks to houses that are too dilapidated to be rented, on condition of renting them out, may help increase the supply of rental housing. Moreover, to alleviate the rent burden, annual rent increases should be indexed to the inflation rate and rent increases should be made based on the rent paid by the previous tenant when changing tenants.

The excessive increase in housing and rental prices in Turkey in 2022 has aggravated the economic difficulties faced by poor households. Considering the fact that our study reveals that families encounter problems in paying their electricity and water bills due to the housing burden, it should be considered to design social housing to be built by both the state and cooperatives as smart homes. Smart home construction should be encouraged by the state and the necessary financial support should be provided. Smart home technologies will not only help to alleviate the housing burden by saving energy, and increasing the functionality and comfort of the home but also contribute to sustainable development.

The final word, the EU-SILC methodology, is defined in the legal framework to ensure the comparability of data between the EU and candidate countries. Within the scope of this framework, TURKSTAT has started to implement the income and living conditions survey since 2006. Indicators of living conditions are questioned in terms of the situation at the time of the survey. The question about housing costs refers to the year in which the survey was conducted (2021), while the question containing income information takes into account the "previous calendar year" (2020) as the reference period. In order to slightly reduce the measurement error caused by the reference period, both variables were converted in the same year (2020), taking into account the 2003 base-year CPI. Eliminating this difference in the EU-SILC methodology will ensure more reliable results for future studies.

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