Determinants of household savings rates: Logistic quantile regression approach

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Abstract

Saving rates have a fundamental economic importance that affects the economic performance of countries and the welfare level of individuals. Savings have been addressed in various ways with alternative economic approaches. The determinants of household savings rates were examined at the level of quantiles in this study. For this purpose, the logistic quantile regression approach proposed for bounded dependent variables was used. Since savings rates have a bounded and continuous structure, it is appropriate to analyze them with this method. Income level has been considered the principal determinant of savings rates and the change in the effect of income on savings rate at the level of quantiles was examined in details. As a result of the analysis performed separately for homeowners and tenants, it was determined that there were differences between the two groups. The change in the income effect was non-linear at the quantile level in both groups. While income was more effective at high savings rates for homeowners, it was more effective at low savings rates for tenants. On the other hand, the effects of other characteristics of the households also differed between the homeowners and the tenants at the level of the quantiles.

Keywords: Saving Rates, Income, Household, Logistic Quantile Regression, Bounded Outcomes

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1. INTRODUCTION

Savings, which consist of the non-consumed part of the disposable income, have been handled in different ways by the schools of economics. According to the classical school of economics, consumption and saving decisions are determined by interest rate. Economic actors divide their income between consumption and savings according to the current interest rate. Savings, which have a positive relationship with interest rates, turn into investments, increasing the capital stocks and growth performances of countries. In Keynesian economic thought, this positive approach towards savings has changed. The situation which is called the saving paradox by Keynes (1936) is defined such that the increase in savings causes a decrease in production and employment by reducing demand and consumption expenditures without causing an increase in investments. Thus, a skeptical approach to saving was developed by Keynes, and the view that saving is harmful to the economy emerged (Modigliani 1986: 704).

According to the growth theories, the level of savings is vital for the economic performance of countries. In economic growth theories, in addition to exogenous theories such as Solow (1956) model and the Harrod-Domar model (Harrod 1939; Domar 1946), savings have positive effects on growth in endogenous growth theories (Lucas 1988). In addition, savings are decisive in explaining the differences in economic development between countries. One of the important factors in countries having different levels of development is the difference between capital stocks. Countries with low capital stocks lag in economic welfare in the long run, due to their slower growth. For a developing country like Türkiye, one of the key factors in achieving the welfare levels of developed countries is to increase capital accumulation. Savings are the element that allows for the necessary investments to expand capital stock.

Another factor in which savings are important is its relationship with the current account deficit, which is particularly important for the Turkish economy (Rijckeghem and Üçer 2009: 14). The main issue with countries having high current account deficits is low savings inspite of high investments. Low savings lead to the use of foreign resources in order to finance growth along with the increase in capital stock which results in a current account deficit. Hence, it is crucial to increase savings to reduce the current account deficit.

The first approach to explain saving behavior is the absolute income hypothesis developed by Keynes (1936). According to Keynes, consumption and saving are a functions of income. Income increases lead to higher consumption and savings. However, the marginal propensity to consumption and the marginal propensity to savings, which show the percentages of income to be allocated to consumption and savings, are determinative. While the marginal propensity to save is high in high-income holders, the marginal propensity to consume is high at the low-income levels. According to Keynes, with a rise in income, the percentage of income allocated to savings increases. Empirical studies initially proved Keynes' absolute income hypothesis by finding a positive relationship between the share of income saved and income. However, the study conducted by Kuznets for the USA in the period after 1899, reached findings that conflicted with Keynes' theory and it was determined that the share allocated to savings from income remained the same despite the increase in real income (Friedman 1957: 3-4; Modigliani 1986: 705). These empirical contradictions have led economists to develop new approaches to explain consumption and savings.

The first of the new approaches is Duesenberry (1967)'s relative income hypothesis. The hypothesis assumes that Keynes' absolute income hypothesis is incomplete since it assumes that each consumer's consumption expenditure decisions are independent of other consumers and the consumption relations are reversible. In this regards, the Keynesian theory serves as a special case of the general consumption theory (Duesenberry 1967: 1). The relative income approach depends on the explanation of Brady and Friedman's view that a consumer's consumption is independent of absolute income, however, in terms of imitation of upper-income groups (Modigliani 1986: 705) it is dependent on the position of the consumer in the distribution of income among consumers in the community (Friedman 1957: 4). According to Dusenberry's relative income hypothesis, utility is a function of relative income rather than absolute income (Dusenberry 1967: 112). The behavior of those at the upper limits of the income distribution differs in two ways compared to those at the lower limits. First, the change in saving rates affects total savings much less, secondly, the type of consumption in high-income groups is more affected by the competitive considerations than in lower-income groups (Duesenberry 1967: 113). In addition, Duesenberry's approach makes it possible to interpret aggregate data by expressing the ratio of consumption to income as a function of the ratio of current income to the highest level it reaches earlier (Friedman 1957: 4).

The inconsistency that emerged in Keynes' theory because consumption and savings show a certain regularity despite changes in current income was tried to be resolved by Modigliani and Brumberg's lifetime income hypothesis developed in 1954. (Modigliani 1986: 705). Modigliani and Brumberg (2005) obtained results that are basically compatible with Keynes' theory. The main difference is that instead of the psychological factor called animal motives in Keynes, they treat people as having forward-looking expectations (Modigliani and Brumberg 2005: 32). According to the lifetime income hypothesis, saving is proportional to the average income-earning capacity of households rather than their current income, as it is made to provide a cushion against large changes and short-term fluctuations in income over the life cycle (Modigliani and Brumberg 2005: 32). The ratio of income to savings is independent of current income, and the deviations result from short-term fluctuations in households' earning capacity and changes in this capacity (Modigliani and Brumberg 2005: 32). According to the lifetime income hypothesis since the income will be high in the working age, the saving will also be high, and dissaving will occur in the retirement period (Rijckeghem and Üçer 2009: 20). Basically, consumers are making an intertemporal smoothing.

Friedman developed the permanent income hypothesis which makes a distinction between recorded income and permanent income and explains consumption and saving behaviors according to the latter (Friedman 1957: 221). Temporary changes in a consumer's income would not have an impact on consumption unless they transform into permanent effects. In this case, while consumers are not sensitive to temporary shocks in their incomes, they smoothen by adjusting their consumption considering permanent effects. The permanent income hypothesis implies Ricardian equivalence, which suggests that private savings and public savings would balance. Increases in public savings with tax rises cause a decrease in private savings and reductions in public savings due to expenditure cause an increase in private savings (Rijckeghem and Üçer 2009: 21).

The studies in the empirical literature can be classified into two specific groups. The first group analyzes studies cross-countries. Edwards (1995) analyzes 32 countries and finds that the determinants of public and private savings vary. While demographic variables, social security expenditures and the depth of the financial sector do not affect public savings, private savings are sensitive to these variables. Opoku (2020) explores the income and substitution effects of short-term nominal interest rates in 19 OECD countries. The findings show that the substitution effect outweighs the income effect in the long run and the short run, the income effect is higher than the substitution effect. Inflation, wealth, income and wealth taxes, unemployment rate and general government gross debt have negative effects on household savings in the long run. Hunt et al. (2021) find that in 36 OECD countries, in addition to traditional determinants of household savings such as life expectancy and income tax rate, changes in socio-economic and demographic conditions are also influential. A narrower gender gap in access to higher education and employment leads to a larger household savings rate. Fredriksson and Staal (2021) examine 14 OECD countries and identify the positive effects of unexpected income changes and unexpected inflation on savings. Uncertainty affects savings positively, while social security suppresses savings.

The second group studies focus on a certain country. While these studies deal with demographic variables, they also examine other effects such as cultural factors and macroeconomic variables. Finlay and Price (2015) find that saving behavior varies between age groups in Australia. They find that situations that increase risk, such as being a single-parent and migrant household, are negatively associated with savings. They also find that savings are positively correlated with incomes and negatively correlated with wealth and gearing. Mirach and Hailu (2014) find that demographic factors such as age, gender, marital status, as well as the existence of financial institutions where savings will be used, and cultural background also affect savings in Ethiopia. Rehman et al. (2011) investigate the determinants of savings in Pakistan for different income groups. While saving increases with income in low and middle-income groups, children's education expenditure, family size, and household obligations per capita are negatively related to saving. In the higher income group, the findings are consistent with the lifetime income hypothesis. Pan (2016) examines the savings of rural and urban households in China. Savings in rural areas are largely explained by income. In addition, having a school-age child is also decisive in high-income quantiles. Changes in quantile regression coefficients explain the urban saving rates. Paiva and Jahan (2003) find that private savings and public savings are offsets in Brazil. Private savings have a high and inverse response to public savings. In addition, financial depth and terms of trade positively affect savings. Curtis et al. (2015) examine the effect of demographic changes on household savings in China. Demographic changes explain more than half of household savings rates.

Among the studies on Türkiye, Ozcan et al. (2003) find that a change in one of the determinants of saving is effective in the long run rather than the short run. Public savings crowd out private savings. The increase in public savings is balanced by the decrease in private savings. The income level has a positive effect on the private saving rate. The negative impact of life expectancy supports the life cycle hypothesis. Terms of trade shocks increase private savings. The economic crisis affects the savings rate negatively. Nalın (2013) finds that inflation can increase household savings in Türkiye if other macroeconomic factors remain constant. Household income, education level, occupation, place of residence (rural/urban), car ownership, and household size are other important variables in explaining the change in household savings and portfolio preference behavior. Rijckeghem (2010) examines the decline in savings in Türkiye and finds being a homeowner is decisive. Homeowners substantially reduced their savings rates, while the decrease in tenants was minor. Households with interest income do not reduce their savings.

This study examines the effects of household characteristics on household savings in Türkiye. Saving rates are crucial determinants of many variables and economic development, and the examination of savings rates is extremely important for contributing to the literature and policy implications.

Figure 1 presents household savings rates which fluctuate at a low level in Türkiye. Savings ratios, which fell below 10% in the post-global crisis period, rose between 2013-2017 and declined in the last four years.
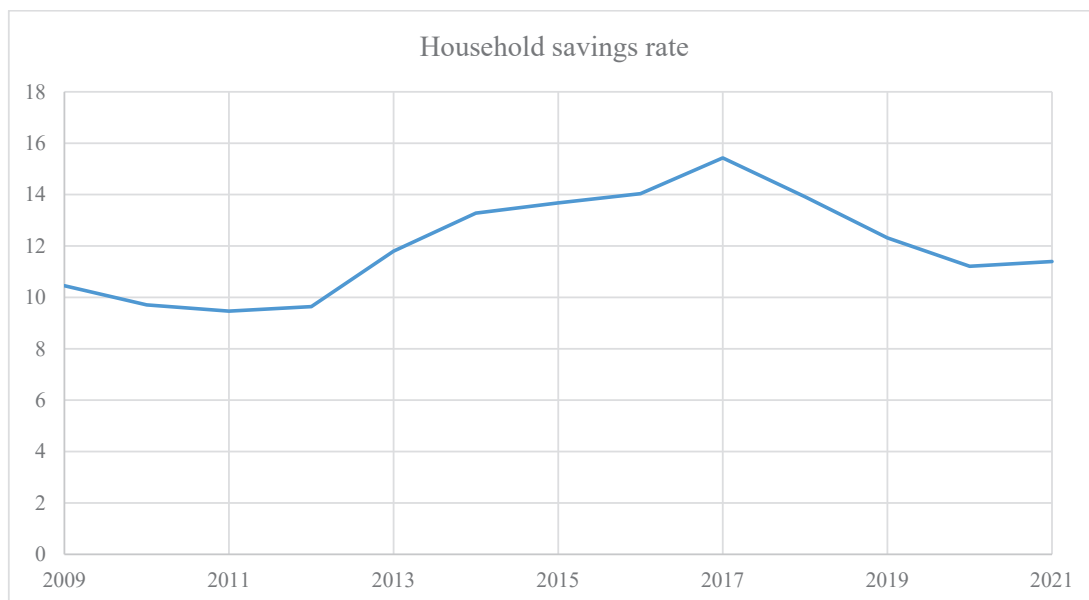
Figure 1. Household Savings Rates in Türkiye

Source: Compiled from Turkish Statistical Institute report (TURKSTAT 19.02.2023)

The most important possible explanation for fluctuations in savings rates is income level. It is theoretically consistent that savings fell until 2012 due to the economy that shrank by 5% in the global crisis. It is possible to explain the increase in savings with the recovery of the economy and the start of growth in the 2013-2017 period. The recent decline in savings may have contributed to the increase in the inflation rate. It is theoretically and empirically known that households increase their expenditures to protect themselves from price increases in the future in high inflation periods.

The next section explains the dataset and the method. Then the findings are presented and interpreted. The last section summarizes the results and discusses policy recommendations.

2. DATA AND METHODOLOGY

In this study, the logistic quantile regression method was employed to determine the household characteristics that affect household savings rates in Türkiye. The data set of the study was obtained from the 2019 Household Budget Survey applied by the Turkish Statistical Institute (TURKSTAT). Data for 2019 were preferred to avoid the impact of the pandemic on the household budget balance. Household Budget Survey was applied to 15552 households across Türkiye in 2019, and responses were received from 11521 households. In this study, the factors affecting savings rates, especially for homeowners and tenants, were examined and compared. Therefore, the sample size consists of 9669 households, of which 7092 homeowners and 2577 tenants. The budget survey is applied separately for households and individuals. Here, the data of the questionnaire applied to the households were used and the characteristics of the households were examined. The dependent variable, the annual savings rate of the household was calculated as the ratio of annual savings to annual disposable income. Among the independent variables, the logarithmic annual disposable income was the main variable focused on, and the change in the effect of this variable on the saving rate at the level of quantiles was graphically examined. In addition, other characteristics of the house and the household were employed in the model, and the model findings that had a statistically significant effect on the savings rate were interpreted. The explanations and details of the variables included in the analysis are given in Table 1.

Table 1. Variables and Definitions

Savings_Rate	Annual savings / annual disposable income (Dependent)
Log_Inc	Logarithmic annual disposable income
No_Hh	Total number of members living in the household
Size_H	Size of the residence (10 m2)
Calorifere	Calorifere ownership
Sec_H	Second home ownership
No_Mob	Number of mobile phones
No_Pc	Number of computers
No_Net	Number of internets
No_Oto	Number of cars (excluding those for commercial use)
Smoking	Presence of individuals in the household who have the habit of smoking cigarettes, tobacco and cigars
Alcohol	Presence of individuals in the household who have the habit of using alcoholic beverages
Eat_Out	Presence of the habit of eating lunch or dinner out
Paid_Spor	Presence of individuals engaged in sports, entertainment, culture, etc. activities by paying a fee in the household
Paid_Tv	Presence of paid TV subscriptions in the household
Cafe	Presence of individuals in the household who have the habit of going to coffee houses, cafés, etc.
Ccard	Presence of individuals using credit cards in the household
Market	Presence of the habit of going to the market in the household
Onl_Shop	Presence and frequency of online shopping habits in the household

Dummy variables (Calorifere, Sec_H, Smoking, Alcohol, Eat_Out, Paid_Spor, Paid_Tv, Café, Ccard, Market, and Onl_Shop) are coded so that a value of zero represents absence. Summary statistics for household savings rate and logarithmic income for homeowners and tenants are given in Table 2. When the table is explored, it could be seen that nearly 75% of the households in the country-wide sample are homeowners. When the income level is examined, it is determined that the average income level is close for the homeowners and the tenants.

Table 2. Summary Statistics for Household Savings Rate and Income

	Variables	Number of Observations	Mean	Median	Min	Max
Home owner	Savings_Rate	7092	0.0452	0.1599	-12.506	0.9567
	Log_Inc	7092	10.882	10.876	7.9399	13.791
Tenant	Savings_Rate	2577	-0.0733	0.0722	-35.806	0.8475
	Log_Inc	2577	10.791	10.796	6.2328	14.219

It can be suggested that the lowest and highest income levels are similar for both groups. On the other hand, the two groups present a significant distinction in saving rates. The average savings rate for homeowners is positive and around 4.5%, while the average savings rate for tenants is negative. In other words, it is seen that the tenants are in debt on average. The fact that the median values are significantly larger than the mean indicates that the savings rates have an asymmetrical distribution and are skewed to the left in both groups. This inference, which was obtained by the location measures of the distribution of savings rates for both groups, was supported by both graphical methods such as histograms and normal distribution tests. As a result of the examinations and tests, the asymmetrical distribution of savings rates in both groups was determined clearly. The presence of large negative values in minimum savings rates indicates the presence of households with high debt levels and extreme value characteristics. However, the maximum savings rate is limited to 1 from the upper. The saving rate variable, which shows the continuous, limited, and asymmetric distribution, has a suitable structure for analysis with logistic quantile regression.

In this study, the logistic quantile regression method is utilized to investigate household savings rates. The quantile regression is developed as an alternative method to the classical mean-based regression models since it is based on modeling the conditional quantiles of the dependent variable rather than the conditional mean. The quantile regression method is more robust to the existence of outliers and allows for investigation of the targeted point of the dependent variable distribution by allowing to stretch of the normality assumption in classical models. The logistic quantile regression model was presented by Bottai et al. (2010) as an alternative approach to the quantile regression model. This approach is proposed for models with a limited and continuous dependent variable within a certain range. The quantile of a variable is invariant under monotonous transformations. In other words, for a non-decreasing function h, the q. quantile of the variable y, $Q_y(q)$, has the feature of

$$h\left(Q_y(q)\right) = Q_{h(y)}(q) \qquad (1)$$

However, the expected value of the variable, and therefore its mean, does not have this feature. Based on this feature of the quantile regression, it has been proposed to estimate the conditional quantiles after applying a monotone transformation to the variable if the dependent variable is limited. This transformation, called the link function, is preferred as the logistic transformation in logistic quantile regression:

$$h(y_i) = \log\left(\frac{y_i - y_{\min}}{y_{\max} - y_i}\right) \qquad (2)$$

Here, the $(y_{\min}, y_{\max})$ values do not have to be the lowest and highest values of the variable but are the values that limit the variable from above and below. This transformation, which is applied to the probability values in the range $(0,1)$ in the logistic regression, is applied here for the continuous and limited dependent variable. The quantile regression model is estimated using the transformed dependent variable:

$$Q_{h(y_i)}(q) = Q_{\text{logit}(y_i)}(q) = x'_i \beta_q \qquad (3)$$

Here, β_q represents the regression coefficients for the q. quantile of the dependent variable. For the coefficients, bootstrap standard errors, which are more successful, are used instead of asymptotic standard errors (Bottai et al. 2010).

3. FINDINGS

Before examining the determinants of household saving rates at the quantile levels, assumptions were tested in the classical mean-based regression model. The OLS model results estimated separately for both homeowners and tenants will be presented along with the logistic quantile regression results. However, before moving on to the estimation results, heteroscedasticity and normality tests were applied for the residuals of the OLS models. The results of the Breusch-Pagan Test applied for heteroscedasticity and the Jarque-Bera Test applied for normality are given in Table 3.

Table 3. Heteroscedasticity and Normality Tests Results for OLS Models

	Test	Test Stat. (Chi2)	Prob.
Home owner	Breusch-Pagan	1426.43	0.000
	Jarque-Bera	2.8e+08	0.000
Tenant	Breusch-Pagan	41354.63	0.000
	Jarque-Bera	1.5e+08	0.000

When the Breusch-Pagan Test test results are examined, the null hypothesis of the test suggesting that the homoscedasticity is valid, is rejected according to the tail probabilities and there is a problem of heteroscedasticity in the OLS models. Similarly, as a result of the Jarque-Bera Test with the null hypothesis that the residuals are normally distributed, the null hypothesis was rejected in both groups according to the tail probabilities, and the OLS residuals do not have a normal distribution. Therefore, the assumptions of the OLS model are not provided and it is appropriate to prefer the quantile regression.

In the next step, the savings rates for both homeowners and tenants are modeled in low, medium and high quantiles. For this purpose, the models were estimated at 25th, 50th (median) and 75th quantiles, respectively. Table 4 presents OLS and logistic quantile model estimation results. The results suggest that the main determinant of household savings rates for both homeowners and tenants is household income. The income variable is considered as the main determinant of expenditures and saving rates according to the economic theory. The results of the model report that coefficients of the income variable in all models are significantly higher compared to the coefficients of all other variables. As a result, inline with the economic theory, it has been revealed that income is the most influential variable on the change in saving rates among the variables examined in the model.

Table 4. Model Estimation Results

	Homeowners				Tenants			
Variables	**OLS**	**q25**	**q50**	**q75**	**OLS**	**q25**	**q50**	**q75**
Log_Inc	0.505***	0.515***	0.544***	0.609***	0.905***	0.608***	0.573***	0.582***
Size_H	-0.007***	-0.010***	-0.009***	-0.008***	-0.025***	-0.015***	-0.014***	-0.007**
Calorifere	-0.090***	-0.080***	-0.113***	-0.131***	-0.233***	-0.111***	-0.122***	-0.116***
No_Mob	-0.017**	-0.019*	-0.028**	-0.038***	-0.067***	-0.024	-0.020	-0.028**
No_Pc	-0.032***	-0.020	-0.029**	-0.045***		-0.013	-0.008	-0.036***
No_Oto	-0.179***	-0.201***	-0.141***	-0.111***	-0.334***	-0.230***	0.155***	-0.159***
Smoking	-0.046***	-0.026*	-0.055***	-0.083***		-0.078***	-0.061***	-0.090***
Alcohol	-0.101***	-0.147***	-0.151***	-0.162***	-0.114**	-0.042	-0.062*	-0.097***
Eat_Out	-0.048***	-0.051***	-0.064***	-0.083***	-0.141***	-0.103***	-0.110***	-0.101***
Paid_Spor	-0.101***	-0.095**	-0.133***	-0.115***	-0.158***	-0.111***	-0.132***	-0.146***
Paid_Tv	-0.085***	-0.086***	-0.068***	-0.117***	-0.162***	-0.139***	-0.108***	-0.112***
Cafe	-0.049***	-0.056***	-0.036***	-0.029*	-0.116***	-0.115***	-0.074***	-0.076***
Ccard	-0.057***	-0.046**	-0.060***	-0.100***	-0.107***	-0.098***	-0.090***	-0.065***
Onl_Shop	-0.040***	-0.057***	-0.048***	-0.067***	-0.114***	-0.084***	-0.056***	-0.053***
No_Hh	-0.021***	-0.013**	-0.021***	-0.024***	-0.043***	-0.035***	-0.042***	-0.042***
Sec_H	-0.068***	-0.066**	-0.059***	-0.058***				
No_Net	-0.026***	-0.026***	-0.023***	-0.019***				
Market	-0.070***	-0.082***	-0.069***	-0.107***	-0.065*			
Cons	-4.898***	-1.496***	-1.495***	-1.840***	-8.677***	-2.348***	-1.761***	-1.644***

Note: *, ** and *** indicate statistical significance for 10%, 5% and 1% margin of error, respectively.

It has been determined that the impact of income on the savings rate is generally higher for tenants than for homeowners. However, as a finding that could not be obtained with the OLS model, it was determined that the effect of income at the quantile levels was non-linear and showed a quadratic trend. The change in the effect of income at the levels of quantiles is interpreted in the graph in Figure 2.

When the effect of other variables is examined, it is seen that the variables, which are generally expenditure items, have a significant effect on all quantiles and negatively affect the savings rate. While the effect of the size of the house and the number of cars, which are variables that have a significant effect on both the homeowners and the tenants, decreases towards the higher quantiles, the effect of the number of people living in the household increases. Credit card ownership has different effects on homeowners and tenants. In the case of the move from low savings to higher, the negative impact of credit card ownership increases for homeowners and decreases for tenants. The negative effects of calorifere ownership, habits of smoking, alcohol, and eating out on the savings rate increase linearly across the quantiles for homeowners. Cafe habit has a linearly decreasing effect along the quantiles for homeowners. However, the effect of the same variables differs for the tenants in the extreme quantiles relative to the median and is not linear across the quantiles. While alcohol habit does not have a significant effect on the savings rate at low quantiles for tenants, it becomes more significant towards higher quantiles and its negative effect on the savings rate becomes stronger. The effects of paid TV and paid sports habits are also non-linear for homeowners and differ in extreme quantiles. There are variables with different effects on homeowners and tenants. The number of mobile phones in the household has a significant effect on all quantiles for homeowners, and its effect becomes stronger as move towards higher savings rates. For tenants, it has a significant effect only on households with high savings rates. While the number of computers in the household does not have a significant effect on savings rates for both homeowners and tenants in low quantiles, it has a negative and significant effect in high quantiles. In addition, it has a significant effect on the median, that is, the medium savings level, for homeowners, but not for tenants. On the other hand, while the variables of the number of computers and smoking habits were not found significant for tenants in the OLS model, they were found to have a significant effect when analyzed at the quantile levels. The opposite is true for market habits.

In addition, some variables have an impact on savings rates for homeowners but not for tenants. These variables are second home ownership, the number of internet and market habit. These variables only have a negative effect on savings rates for homeowners. Second home ownership and the number of internet variables were excluded from the tenants model because, unlike homeowners, they had no statistically significant effect on either the average or the quantiles of savings rates. This is because although these variables are key expenditure items for homeowners, most tenants do not have these. The Markets variable, on the other hand, was excluded from the quantile models, although it had an effect on the average savings rate for tenants, as it did not have a statistically significant effect at the quantiles level. It has been determined that although the market habit has an effect on the average savings rates for tenants, it is not a determining factor in low and high savings rates.

It has been determined that the effect of household income on the saving rate is not linear across the quantiles. The change in the income effect across quantiles for homeowners and tenants is shown in Figure 2.
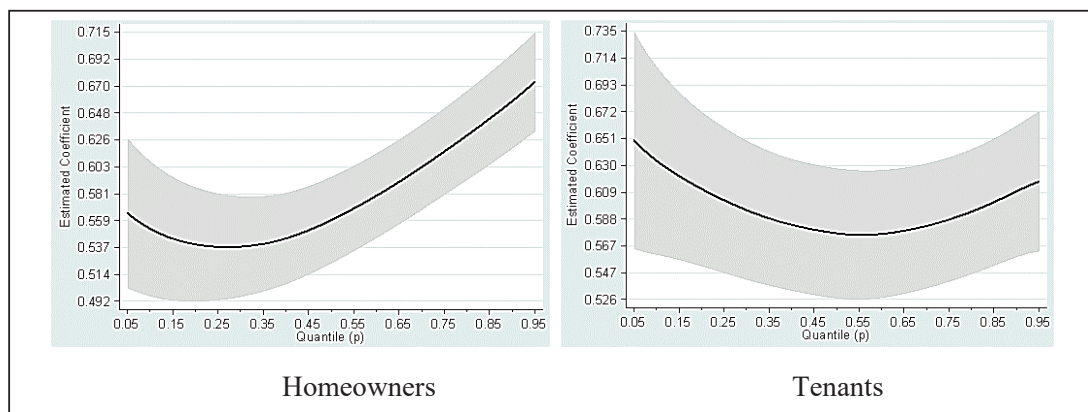
Figure 2. Change of the Effect of Household Income across the Quantiles

Examining the graphs, it is understood that income has a quadratic effect across quantiles for both homeowners and tenants. However, the change in the impact differs for homeowners and tenants. It is seen that the positive effect of income decreases for homeowners until the 30th quantile, in other words, for the households in the lowest 30 percent according to the savings rate. However, from this point on, as the savings rate increases, the positive effect of income gets stronger. It has been determined that this turning point for the tenants is around the 60th quantile. In other words, while the positive effect of income weakens as the savings rate rises for households in the low 60 percent, it increases for the 40 percent with high savings rates. However, this increase is not as sharp as for homeowners. Income is most effective in households with the highest savings rate for homeowners, and the lowest savings rate for tenants. The lowest income effect generally occurs in households with average savings.

4. CONCLUSION

The factors that determine household savings rates are the subject of extensive research in the literature. In particular, the relationship between income level, which is the main determinant of saving, and saving is important. This study analyzes the determinants of household savings rates and discusses the relationship between income and savings in detail. OLS model estimations lose their reliability due to the presence of extreme values in the dependent variable. The quantile regression models allow us to examine the desired point of the distribution instead of the conditional mean of the variable being studied. Logistic quantile regression models, on the other hand, have been proposed as an alternative to quantile models when the dependent variable is continuous and limited within a certain range. In this study, unlike previous studies in the literature, savings rates were examined with logistic quantile regression models. Since the household savings rate is limited to 1 from the upper, it is suitable for these models. In addition, separate models were estimated for homeowners and tenants, and differences at the level of quantiles were revealed.

When the findings were examined, it was determined that the principal determinant of the savings rate was income level for both homeowners and tenants. Income level has a positive effect on the saving rate. However, this effect is not linear across the quantiles and differs between homeowners and tenants. When the change of the income

effect according to the quantiles is examined, it is seen that there is a quadratic change throughout the quantiles. Accordingly, the effect of income decreases up to a certain saving rate and then increases. However, this turning point occurs quicker for homeowners than for tenants, with a stronger impact afterward. Income is more effective at high savings rates for homeowners, while it is more effective at low savings rates for tenants.

When the other determinants of the savings rate are examined, it has been determined that the variables are generally expenditure items and have a negative effect on the savings rate. It is understood that the main expenditure items affect the savings rate for both homeowners and tenants. However, while some of these effects are linear throughout the quantiles, most are non-linear. When the coefficients of the quantile models are examined, it is seen that the effects of these variables do not increase or decrease linearly from low quantile to high. This is because the variables examined have different effects on low and high savings rates. Because the priority order and amount of income and expenditure items differ for families with different savings rates. When the order of priority or amount of these items changes, their impact on savings rates may decrease up to a threshold and then start to rise and vice versa. Therefore, there is a nonlinear change at the quantiles level. In this case, examining the savings rates at the level of quantiles rather than the average allows to obtain more detailed and realistic findings. It has been understood that expenditure items are generally more effective in extreme quantiles, that is, in low and high savings rates than the average.

High savings rates are critical for many economic variables. With the attainment of high savings rates, the capital stock and growth rates will increase in the Turkish economy. High savings will also allow the current account deficit to decrease. Therefore, policy recommendations are crucial to increase savings. The findings show that the most significant determinant for the high saving rate is income level. Although the Turkish economy achieves high growth rates from time to time, these periods are interrupted by domestic or foreign crises. For this reason, the most crucial policy proposal is to ensure long-term growth that is not interrupted by crises.

The negative impact of all expenditure items on savings shows the importance of inflation on savings rates. High inflation reduces the savings rates by pushing the expenditures forward and increasing the share of expenditure items in the budget. So the second policy recommendation is to have low and stable inflation.

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Conflict of Interest

All authors declare that there is no conflict of interest.

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