

THE EFFECTS OF DEMOGRAPHIC AND SOCIAL CHANGES ON HOUSEHOLD SAVINGS IN TURKEY

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ABSTRACT The aim of this paper is to examine and quantify the impact of demographic change on household savings, which is expected to take place in the following years in Turkey. Moreover, the effects of the increase in the share of people with college degree or more in adult population and the rise in labor force participation rates on household savings are analyzed in this paper. Under the assumption that a change in the structure of population will be accompanied with rising labor force participation rates and increasing ratio of college graduates, household saving ratio is projected to increase by 7.61 percentage points between 2010 and 2050. The sole contribution of the change in the structure of population will be 1.91 percentage points, while the contributions of the increases in labor force participation rates and the share of college graduates are expected to be 1.45 and 4.59 percentage points, respectively. According to our empirical findings, the expected increase in the ratio of college graduates has the highest impact on household savings among the factors taken into account.

JEL D12, J11

Keywords Household savings, Demographic change, College education, Labor force participation rates, Saving projections.

öz Bu çalışmanın amacı önümüzdeki yıllarda Türkiye'nin nüfus yapısında gerçekleşmesi beklenen değişimin hanehalkı tasarruf oranlarını hangi yönde ve ne kadar etkileyeceğini incelemektir. Ayrıca, toplam nüfus içinde üniversite mezunlarının sayısının artmasının ve işgücüne katılım oranlarının yükselmesinin hanehalkı tasarrufları üzerindeki etkileri araştırılmaktadır. Nüfus yapısındaki değişimin yanı sıra üniversite mezuniyeti ve işgücüne katılım oranlarının artacağı varsayımı altında, hanehalkı tasarruf oranının 2010 yılından 2050 yılına kadar olan dönemde 7,61 puan artacağı tahmin edilmiştir. Söz konusu artışın yaklaşık 1,91 puanlık kısmının nüfus yapısındaki değişimden, 1,45 puanlık kısmının işgücüne katılım oranlarının yükselmesinden ve 4,59 puanlık bölümünün ise üniversite mezunlarının sayısının artmasından kaynaklanacağı öngörülmektedir. Elde edilen bulgular üniversite mezunlarının oranının artmasının hanehalkı tasarrufları üzerinde nüfus yapısındaki değişime ve işgücüne katılım oranının yükselmesine kıyasla daha yüksek katkı sağladığını ortaya çıkarmıştır.

TÜRKİYE'NİN NÜFUS VE SOSYAL YAPISINDAKİ DEĞİŞİMLERİN HANEHALKI TASARRUFLARI ÜZERİNDEKİ ETKİLERİ

JEL D12, J11

Anahtar Kelimeler Hanehalkı tasarrufları, Nüfus yapısındaki değişim, Üniversite eğitimi, İşgücüne katılım oranları, Tasarruf öngörülleri

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1. Introduction

This paper analyzes the impact of demographic change, the rise in the share of people with college degree or more in adult population and the expected increases in labor force participation rates on household savings in Turkey. The structure of population is expected to change, which will be accompanied with rising labor force participation rates and increasing share of college graduates in the following years. Hence, our primary aim is to quantify the direction and the size of the change in household saving ratios. For this purpose, we predict the effects of demographic and social changes on household saving ratios by aggregating individual contributions to household disposable income and savings. Moreover, the surge in the urbanization rate due to the continuance of internal migration from rural areas to urban regions on household savings is investigated.

The share of young individuals in total population is expected to decline, while the respective shares of individuals who are at working age and pensioners in total population will increase as the growth rate of population slows down in Turkey between 2011 and 2050. As a result, average age will increase; but the percentage of working age individuals, whose income levels rise as they age, will increase at the same time. Thus, they will be able to contribute more to their family budgets, which will create a positive effect on total household savings. Therefore, it is estimated that the expected change in the structure of the population will raise household saving ratio in the coming years.

According to the Turkish Statistical Institute (TURKSTAT) Household Budget Surveys, the ratio of people with college graduates to adult population of 20 years and older is 8.5% for men and 5.1% for women as of 2010, which is a significantly low level compared to developed countries.¹ Turkey is considered one of the fastest growing emerging market economies. Although economic growth is not within the scope of this paper, this process is expected to continue in the subsequent years, which will certainly lead to an expansion in the ratio of college graduates as observed in the last decade. Hence, this ratio is projected to converge to that of the developed countries as households become more prosperous. Therefore, the

¹ We do not include graduates from 2-year vocational schools of higher education in the category for people with college degree or more. Instead, they are added to the group of people with high school degree or less.

impact of such a positive transformation on the evolution of household saving ratio is taken into consideration.

Moreover, labor force participation rates are expected to increase among all age, education and labor force participation categories for both men and women during the period of analysis. The rise in the share of college graduates and also the gradual increase in the retirement age due to the recent social security reform will raise labor force participation rates significantly. The gradual rise in retirement age is directly reflected in our labor force participation rate projections for each age group and gender type. Young individuals will join the labor market at growing rates provided that the percentage with a college degree continues to increase, which will allow them to make greater contributions to household disposable income and savings. However, the aging of population will have a decreasing effect on labor force participation rates.

The potential effects of demographic and social changes on household saving ratios are analyzed using a regression model, which is based on the age structure of population, under the assumption that major policy changes will not take place during the projection horizon in Turkey. Hence, household saving ratio projections will be independent from the direct effects of main macro-economic variables and policy changes. Mankiw and Weil (1989) estimated housing demand for the U.S. economy, while Deaton and Paxson (2000) analyzed household savings in Taiwan and Thailand. However, Poterba (2001) associated demand for financial assets with cohort effects in addition to age variables, which is different from Mankiw and Weil (1989) paper, since demand for financial assets might change between cohorts.

Previous empirical papers for the Turkish economy found that there is a direct and significant relationship between household head's permanent income and household savings as expected. Moreover, empirical findings showed that household savings increase with the age and education levels of household heads (Aktaş et al., 2012; Ceritoğlu, 2013). Van Rijckeghem and Üçer (2009) study, which is prepared by using the TURKSTAT Household Budget Survey for 2005 and follows Deaton and Paxson (2000) closely, indicates that household saving ratios will be higher thanks to demographic change in the coming years.

This paper mainly concentrates on the prediction of the direction and the size of the change in household saving ratios rather than their levels. If only demographic change is taken into consideration, then household saving ratio is predicted to increase by 1.17 percentage points from 2010 to 2025 and

2.21 percentage points between 2010 and 2050. Urbanization has a negative, but limited effect on household saving ratios. Under the assumption that demographic change will be accompanied with rising labor force participation rates and increasing ratio of college graduates, household saving ratio is projected to surge by 3.60 percentage points between 2010 and 2025 and 7.61 percentage points between 2010 and 2050.

The Second Section describes the Household Budget Surveys, which are prepared by TURKSTAT. The Third Section explains the regression model, which is based on the age structure of population. The Fourth Section presents the fundamental assumptions on urbanization, college graduation and labor force participation rates. The Fifth Section discusses the econometric results and household saving ratio projections. Finally, the last section concludes the paper.

2. Data and Household Savings in Turkey

The TURKSTAT Household Budget Surveys are repeated cross-sectional surveys, which lack panel dimension, since they do not follow the same households over time. The surveys provide detailed data on household disposable income and consumption expenditures. Household saving is defined as the difference between household disposable income and consumption expenditures. Household saving ratio is calculated as the ratio of household saving to household disposable income. Moreover, the surveys provide information about age groups, labor force participation preferences and education levels of family members. Although the surveys differentiate between rural areas and urban regions, they do not provide information for geographical regions.² Empirical analysis is performed by pooling data from 8 consecutive cross-sectional surveys together for the period between 2003 and 2010 in this paper.

The significant fall of private saving ratios in recent years emerges as a striking and negative development in Turkey. Household saving ratios and private saving ratios moved parallel to each other apart from the global economic crisis period (Figure 1). Moreover, household saving ratios dropped below its long-term (2003-2010) average level in the period of analysis.³ As a result, how to raise household saving ratios in the following

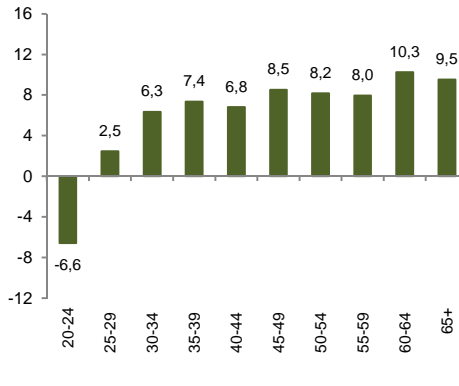
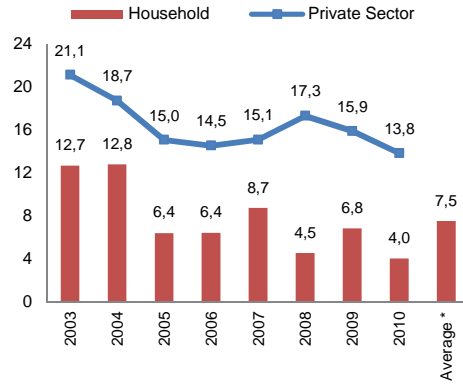
² Only the TURKSTAT Household Budget Survey for 2003, which has a significantly higher number of observations, provides information about geographical location of households at NUTS1 and NUTS2 codes.

³ Households tend to under-report their disposable income level in micro-economic surveys for various reasons, which is a common problem especially for developing countries. Van Rijckeghem ve Üçer (2009) argue that a similar problem exists in the TURKSTAT Household Budget Surveys. Therefore, it is necessary to consider the possibility that this situation might lead to the under-estimation of household saving ratios in Turkey.

years in Turkey becomes a contemporary and serious research question (World Bank, 2012).

Figure 1. Saving Ratios (%)

Figure 2. Household Saving Ratios (%), with respect to the household head's age



Source: Ministry of Development, TURKSTAT Household Budget Surveys, Authors' calculations.

Source: TURKSTAT Household Budget Surveys, Authors' calculations.

* 2003-2010 period average.

If household saving ratio is analyzed with respect to the age of the household head, then it is observed that household saving ratio increases with the age of household head contrary to the theoretical premises (Figure 2). Aktaş et al. (2012) also found that household saving ratios increase with the age of the household head.⁴ However, from a theoretical perspective, household saving ratios should be lower or negative among old households, since they are expected to finance consumption in the retirement period with previously accumulated financial assets. This empirical observation, which seems counter-intuitive at first look, suggests that household consumption and saving behavior must be analyzed comprehensively. Nevertheless, there

⁴ According to the Theory of Life-Cycle Saving, individuals are expected to have negative saving levels at the initial years of their working lives, since their income levels will be low at this stage. However, they will have positive saving levels in their mature ages in order to cover their debts from the previous periods and to finance their consumption expenditures in the retirement years. In this respect, it is expected that individuals' saving levels will decrease and/or become negative in their elderly years. However, it is observed that individuals still have high saving ratios during their retirement periods for various reasons such as bequests or health risks (Modigliani, 1986).

are only few, though high quality empirical papers, which use micro-economic data sets for the Turkish economy.⁵

3. Simple Demographic Model of Household Savings

In this paper the respective contributions of family members to their household disposable income and household savings is estimated using a simple regression model, which is based on the age structure of the household. The regression model is expressed in its purest form in Equations 1 and 2.

In Equations 1 and 2 m denotes men, f denotes women, y_h is household disposable income and s_h is household savings, whereas n_{gah} shows the number of individuals that belong to gender type g and age group a in household h . In this framework, β_{yga} parameter represents respective contributions of family members from gender type g and age group a to household disposable income, while β_{sga} parameter indicates their contributions to household savings. Once the regression coefficients (β) are estimated for each age group and gender type, they are multiplied with the number of individuals in each category. If these obtained values are summed up, then disposable income and savings estimates for the household sector can be calculated easily with this approach.

$$y_h = \sum_{g \in \{m, f\}} \sum_{a=1}^N \beta_{yga} n_{gah} + \epsilon_{y_h} \quad (1)$$

$$s_h = \sum_{g \in \{m, f\}} \sum_{a=1}^N \beta_{sga} n_{gah} + \epsilon_{s_h} \quad (2)$$

Moreover, the above equations are enhanced by taking the geographical locations of households (rural vs. urban) into consideration in order to reveal the effect of urbanization on total savings. In this case, Equation 3 assumes the following shape. Here household disposable income and household savings are expressed with a single equation rather than two separate equations. In this framework, $x \in \{y, s\}$ represents household disposable income and household savings at the same time. Furthermore, k parameter shows whether the household lives in urban regions (t) or in rural areas (r).

$$x_h = \sum_{g \in \{m, f\}} \sum_{k \in \{t, r\}} \sum_{a=1}^N \beta_{xgka} n_{gk ah} + \epsilon_{x_h} \quad (3)$$

⁵ See Yükseler and Türkan (2008), Cilasun and Kırdar (2009), Van Rijckeghem and Üçer (2009), Aktaş *et al.* (2012), Ceritoğlu (2013), Özel and Yalçın (2013) and Üngör and Kalafatçılar (2013).

In order to be able to perform a more detailed analysis, individuals are separated into two more categories in addition to age group and gender type. Individuals are also classified according to their education levels and labor force participation choices. Hence, the extended regression model becomes Equation 4.

$$x_h = \sum_{g \in \{m,f\}} \sum_{e \in \{u,d\}} \sum_{l \in \{i,o\}} \sum_{a=1}^N \beta_{x_{gela}} n_{gela} + \epsilon_{x_h} \quad (4)$$

In this equation, u denotes college graduates and postgraduates, d denotes people with high school degree or less; i represents labor force participants, while o indicates individuals, who do not join the labor force. In other words, $\beta_{x_{gela}}$ parameter shows the average contribution of each category to household disposable income and household savings, respectively.

4. Fundamental Assumptions

Household saving ratios are predicted from 2010 to 2050 using the regression coefficients, which are estimated from the equations that are mentioned in the previous section by employing the TURKSTAT Household Budget Surveys for the Turkish economy. The most important assumption in this paper is that the regression coefficients remain constant throughout the forecast horizon. Hence, it is assumed that saving ratios for each age group, gender type, education level and labor force participation choices remain constant in the period of analysis. Although the regression coefficients are constant, the number of individuals in each category changes, which in turn makes household disposable income and savings, vary over time.

TURKSTAT prepares population projections for Turkey with respect to age group and gender type from 2013 to 2050. Total population and the distribution of population to age groups are presented in Figure 3. The ratio of individuals between the ages of 0 to 14 to total population will decline significantly from 2013 to 2050, whereas the percentage of individuals, who are 65 and older, will surge remarkably at the same time. Thus, total population is expected to continue to increase at a decreasing rate according to the TURKSTAT population projections.⁶ Moreover, average age will rise, but the percentage of individuals that are at the working age (between 25-64 years old); whom we can call prime savers for the purposes of this study will remain relatively stable from 2013 to 2050.

⁶ In this paper, a total of 12 age groups are used: 0-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64 and 65+.

Urbanization rate is estimated using TURKSTAT Province/District Centers and Towns/Villages Population statistics by age groups and gender types from 2008 to 2012. The speed of internal migration towards urban areas during this period is calculated for each age group and gender type separately. Furthermore, it is assumed that the urbanization rate will increase at the same rate from 2013 to 2050 for each category.⁷ It is predicted to be 90.1 % by the end of forecast period (Figure 4).

Figure 3. Total Population (Millions, %)

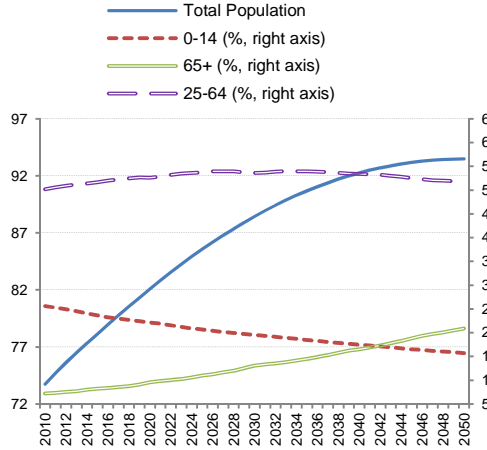
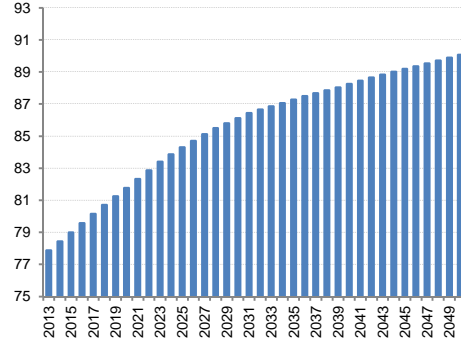


Figure 4. Urbanization Rate (%)



Source: TURKSTAT.

Source: TURKSTAT, Authors' calculations.

In addition to age groups and gender types, individuals are classified according to their education levels. The percentages of people with college degree or more in each age group and gender type are calculated for all survey years separately using the TURKSTAT Household Budget Surveys from 2003 to 2010.⁸ Under the assumption that the trend in the college graduation rates during the 2003-2010 period will continue, the percentages of college graduates in each age group and gender type are predicted from 2011 till 2050 (Figure 5). As a result, the numbers of people with college

⁷ Moreover, once urbanization rate for an age group reaches 90 percent level, it is assumed that the rise in urbanization rate will be only 0.1 percentage points per annum in the following years. The main reason behind this assumption is to emphasize that urbanization rate will slow down in time and also to make sure that urbanization rate does not transcend 100 percent level for any age group.

⁸ Only individuals, who are 20 and older, are classified according to their education level. Individuals are separated into two categories; college graduates and postgraduates constitute the first category, while people with high school degree or less make up the second category. For this reason, 0-14 and 15-19 age groups are only classified with respect to their gender.

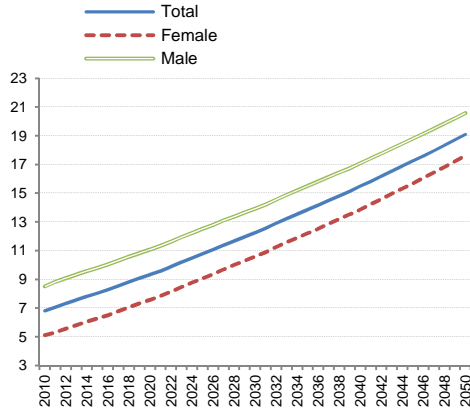
degree and people with high school degree or less are projected separately for each age group and gender type using these predicted percentages. We do not include graduates from 2-year vocational schools of higher education in the category for people with college degree or more. Instead, they are added to the group of people with high school degree or less.

In the next step individuals are classified with respect to their labor force participation choices in addition to their age groups, gender types and education levels.⁹ Their labor force participation rates are obtained from the TURKSTAT Household Budget Surveys from 2003 to 2010. Labor force participation rates are calculated for people with college degree and people with high school degree or less separately according to their age groups and gender types. Labor force participation rate projections from 2011 till 2050 are generated under the assumption that the trends in each category between 2003 and 2010 will remain approximately the same.

Moreover, labor force participation rates are already high among men, who are between 20 and 45 years old. The main increase in labor force participation rates are expected to take place among men, who are older than 45 because retirement age will gradually rise in the following years as a result of the recent social security reform in Turkey. Labor force participation rates of women with college degree or more are comparable to those of men. We predict that labor force participation rates of those women, who are between 20 and 45 years old, will increase to a certain extent. Labor force participation rates of women with college degree, who are older than 45 are expected to increase considerably due to the gradual rise in retirement age. In contrast, there is a significant room for improvement in labor force participation rates of women with high school degree or less for all age groups. For this reason, we project that their labor force participation rates will climb up among all age groups in the following years. Finally, we must emphasize that we prefer to be conservative in our projections for both labor force participation and college graduation rates for all age groups and gender types.

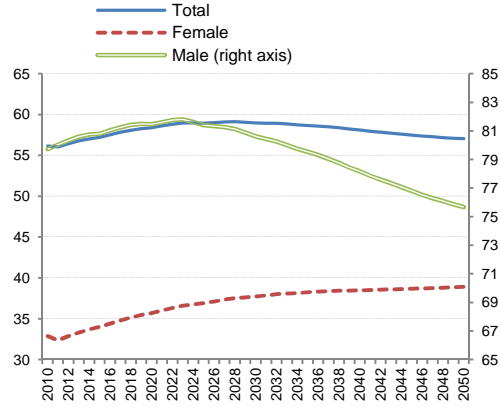
⁹ Tansel (2012) presents both male and female labor force participation rate projections, but the potential effects of demographic change on labor force participation are not taken into account in the analysis.

Figure 5. The Ratio of College Graduates (20+, %)



Source: TURKSTAT, Authors' calculations

Figure 6. Labor Force Participation Rate (20+, %)



Source: TURKSTAT, Authors' calculations

Total labor force participation rate projections, which are acquired by aggregating all categories, are presented in Figure 6. According to our projections labor force participation rates increase continuously for each age group, gender type and education category throughout the forecast horizon, but the aggregated male and total labor force participation rates start to decrease after 2023. This stems from the expected change in the age distribution of population and dominates the trend increases in each category. In an alternative scenario, if the age distribution of population is kept unchanged at its 2023 level, then it is observed that both male and total labor force participation rates will continue to increase steadily. Under the assumption that the age distribution of men is assumed to remain constant after 2023, male labor force participation rate is estimated to be 84 percent in 2050, which is almost 9 percentage points higher than the main scenario. However, in the case of women, demographic change is only slowing down the rise in female labor force participation rate rather than changing its direction as in the case of men, since the rate of increase almost in each sub-category is quite high for them.¹⁰

5. Econometric Results

In this section three separate models, which are previously discussed in the theory section, are analyzed successively. In the first model only the potential effects of demographic change on household saving ratios are

¹⁰ Among other factors, the rise in life expectancy might raise labor force participation rates in Turkey, but this point is not taken into consideration directly in our labor force participation rate projections.

examined. Second, in addition to demographic change, the effects of the trend increase in the urbanization rate due to the continuance of internal migration from rural areas to urban regions are investigated. Finally, the effects of demographic change and the rise in the number of college graduates in adult population and labor force participation rates on household saving ratios are analyzed jointly.

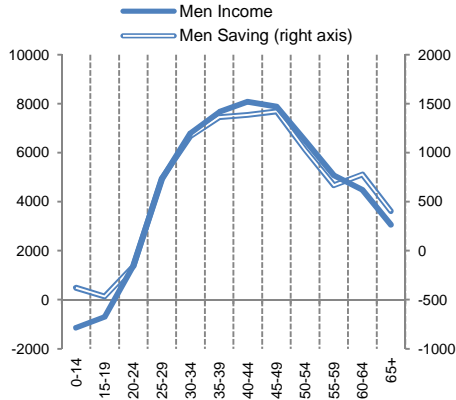
5.1. The Age Distribution of Population

All econometric estimations are carried out using Ordinary Least Squares (OLS) regressions with 88,600 individual observations and household weights. The R-squared values of the household disposable income and savings regressions are 0.54 and 0.02, respectively. In the first stage, the estimated regressions include a total of 24 age variables for men and women. In the household savings regression all age groups apart from 20-24 and 25-29 categories for women and 20-24 category for men are statistically significant at 1% confidence level. Moreover, all age groups have statistically significant regression coefficients at 1% confidence level in the household disposable income equation.

The regression coefficients indicate that the contributions of men to household disposable income and savings are higher than those of women (Figure 7 and Figure 8). They are multiplied with the number of individuals in each category and then summed up to reach household disposable income and savings estimates for entire population for each year in the projection horizon. TURKSTAT population projections for each age group and gender type are used for this purpose. Hence, household disposable income and household savings projections from 2010 to 2050 are generated by aggregating individual contributions. The rise in the percentage of prime savers thanks to demographic change will induce a steady and positive trend in household savings in the following years.¹¹ Therefore, household saving ratio is predicted to keep increasing even after 2040, when the growth rate of population starts to slow down noticeably (Figure 9).

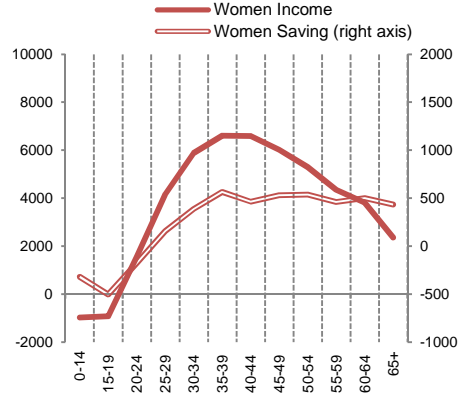
¹¹ At this point, it is assumed that macro-economic variables that might be effective on household saving ratios will remain constant in the period of analysis.

Figure 7. Regression Coefficients (2003 prices, TL)



Source: TURKSTAT Household Budget Surveys, Authors' calculations.

Figure 8. Regression Coefficients (2003 prices, TL)



Source: TURKSTAT Household Budget Surveys, Authors' calculations.

The regression coefficients imply that individual savings will assume a humped shape over the life cycle in accordance with the theoretical premises (Figure 7 and Figure 8). This empirical observation indicates that household saving ratios should not be analyzed only with respect to the age of the household head, but it is necessary to consider the age distribution of the remaining family members. In this respect, if the sole effect of demographic change is taken into consideration, then it is predicted that saving ratio will increase by 1.17 percentage points from 2010 to 2025 and 2.21 percentage points from 2010 to 2050. As a result, household saving ratio might reach 11.24 percent by 2050 (Figure 9).¹²

At this point, it is necessary to emphasize that this paper mainly concentrates on the prediction of the direction and the size of the change in household saving ratios rather than the levels of projections. As econometric estimations are performed using a pooled data set from available surveys, household saving ratio projections represent long-term averages and start from a higher level than the realized level in 2010. The difference between the starting point of household saving ratio projections and long-term averages stem from two main reasons. First, projections are based on the

¹² Econometric estimations are realized for each survey year separately to compare the results with the findings from the pooled data set. If only the TURKSTAT Household Budget Survey 2003 is included in the empirical analysis, then it is predicted that household saving ratio will increase 2.03 percentage points from 2010 to 2050 and reach 17.24 percent in 2050. Moreover, if the TURKSTAT Household Budget Survey 2010 is used, then it is predicted that the rise in household saving ratio will be 2.96 percentage points from 2010 to 2050 and reach 7.61 percent in 2050.

regression coefficients from econometric estimations and thus, the formation of such a difference is considered as normal. Van Rijckeghem and Üçer (2009) experienced a similar problem and authors scaled household saving ratio projections downwards to make them compatible with observed values. Second, demographic structure of population differs between the TURKSTAT Household Budget Surveys and TURKSTAT population projections.

5.2. Demographic Change and Urbanization

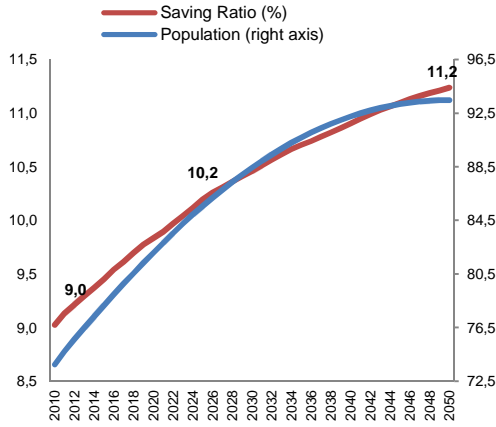
In a similar fashion, econometric estimations are realized for individuals with respect to their geographical locations (urban vs. rural) in addition to their age groups and gender types. The R-squared values of the household disposable income and savings regressions are 0.55 and 0.02, respectively. At this stage, the estimated regressions include a total of 48 age variables for men and women. In the household disposable income regressions, all age groups are statistically significant at 1% confidence level apart from 15-19 category for men and women, who live in rural areas. However, the regression coefficients of age variables especially for women from rural areas are not statistically significant in the household savings equation.

Household disposable income and savings projections are obtained by multiplying the regression coefficients with the number of individuals in each category and then summing them up as before. It is observed that the rise in the urbanization rate has a negative, but negligible effect on household saving ratios. If the urbanization rate is assumed to remain constant in 2012 level, then household saving ratio projection for 2050 will be 0.05 percentage points higher, which is in fact a very small difference (Figure 10).¹³ Thus, it is thought that the effect of urbanization on household savings can be left aside at this point.¹⁴

¹³ TURKSTAT announces province/district centers and towns/villages population by age group and gender from 2007 to 2012. At this point, it is assumed that urbanization rate will remain constant at its 2012 level in order to find its effect on household saving ratios.

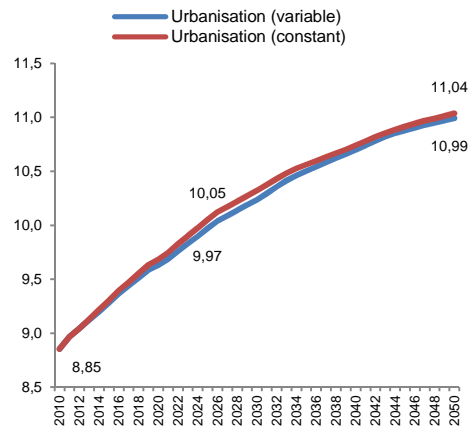
¹⁴ The starting points of household saving ratio projections differ from each other as a result of the rise in the number of explanatory variables in the estimated equations.

Figure 9. Saving Ratios (%) and Population (Millions)



Source: TURKSTAT Household Budget Surveys, Authors' calculations.

Figure 10. Saving Ratios (%) and Urbanization *



Source: TURKSTAT Household Budget Surveys, Authors' calculations.

* It is assumed that urbanization rate will remain constant at its 2012 level.

In the literature, it is mentioned that urbanization diminishes the precautionary motive for saving, which leads to the fall of household saving ratios. This situation might stem from the fact that especially in developing countries urbanization reduces the importance of agriculture income, which is more uncertain (Loayza et al., 2000). Özel and Yalçın (2013) found a negative and significant relationship between the rise in urbanization rate and household saving ratios from a sample of developing countries. The fact that public services such as health and education are more widespread in urban regions than rural areas might decrease household saving ratios by weakening the precautionary motive for saving. Econometric results show that the contributions of individuals, who are between the age of 0 and 24 to household disposable income and savings are negative, which becomes even stronger in urban regions. Empirical analysis suggests that it is necessary to raise labor force participation rates among young individuals in urban regions to elevate household saving ratios.

5.3. Demographic Change, Labor Force Participation and College Graduation

Finally, the effects of the increase in the ratio of college graduates in adult population and the rise in labor force participation rates on household saving ratios are analyzed together with demographic change. The R-squared

values of the household disposable income and savings regressions are 0.62 and 0.05, respectively. In the final stage, the estimated regressions include a total of 84 age variables for men and women, since they also reflect individuals' education levels and labor force participation preferences. The explanatory powers of the regressions increase due to the inclusion of social characteristics in addition to demographic features. In household disposable income equation, age variables of men with college degree or more, who do not participate in the labor market, are not statistically significant. In this case, cells contain fewer observations, since age groups are also divided into labor force participation and college education categories. This situation might lead to the rise in the standard errors of dummy variables for age groups, which might render them statistically insignificant.

Empirical findings indicate that the increase in the percentage of college graduates will make the highest contribution to the upsurge in household saving ratios, which will be followed by demographic change and then the rise in labor force participation rates (Figure 11 and Figure 12). This stems from the fact that college graduates make significantly higher contributions to household disposable income and savings than the rest of the individuals in all other categories. Moreover, previous empirical studies for the Turkish economy support the idea that college graduates have greater permanent income levels and also families, whose heads are college graduates have higher saving ratios (Ceritoğlu, 2013).

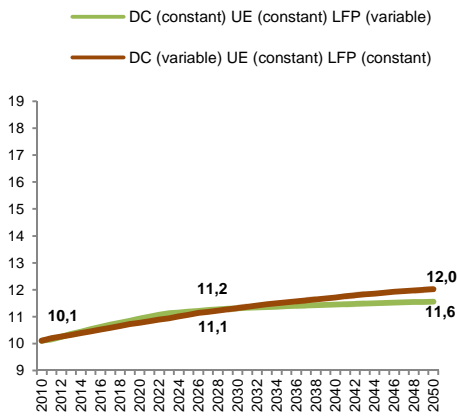
The contributions of individuals to household disposable income and savings are aggregated according to their age groups, gender types, education levels and labor force participation choices in order to generate saving ratio projections for the household sector. In this respect, household saving ratio is projected to increase by 3.60 percentage points between 2010 and 2025 and by 7.61 percentage points between 2010 and 2050. As a result, it is estimated that household saving ratio might reach 17.72 percent by 2050 (Figure 12). The sole contribution of demographic change will be 1.91 percentage points, while the contributions of the increases in labor force participation rates and the percentage of college graduates are expected to be 1.45 and 4.59 percentage points, respectively.¹⁵ Moreover, the contribution of the cross effect, which emerges due to the joint evaluation of the rise in

¹⁵ In section V.1 we find that saving ratio will increase by 2.21 percentage points from 2010 to 2050 if only demographic change is analyzed. The all-inclusive model in this section suggests that the sole contribution of demographic change will be 1.91 percentage points during the same period, which is fairly close to our initial prediction. Therefore, the econometric results show the consistency of our empirical findings.

labor force participation rates and the increase in the ratio of college graduates is negative 0.35 percentage points.¹⁶

Our projections are based on the assumption that labor force participation rates and the percentage of college graduates will continue to rise in the following years. However, despite demographic change, if labor force participation rates and the number of college graduates are kept at their observed levels in 2010, then household saving ratio is predicted to rise by 0.96 percentage points from 2010 to 2025 and to reach 12.02 percent in 2050 by increasing 1.91 percentage points from 2010 to 2050 (Figure 11).¹⁷

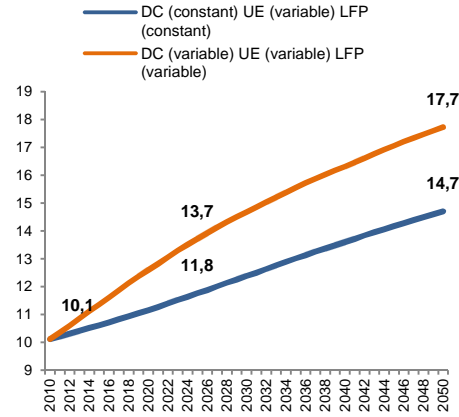
Figure 11. Demographic Change, College Education and Labor Force Participation * (%)



Source: TURKSTAT Household Budget Surveys, Authors' calculations

* DC, UE and LFP represent demographic change, college education and labor force participation variables.

Figure 12. Demographic Change, College Education and Labor Force Participation * (%)



Source: TURKSTAT Household Budget Surveys, Authors' calculations

* DC, UE and LFP represent demographic change, college education and labor force participation variables.

¹⁶ If only the TURKSTAT Household Budget Survey 2003 is used in the empirical analysis, then it is predicted that household saving ratio will increase 6.60 percentage points from 2010 to 2050. The sole contribution of demographic change will be 1.53 percentage points, while the contributions of the increases in labor force participation rates and the percentage of college graduates are expected to be 1.80 and 4.18 percentage points, respectively. In this case, the contribution of the cross effect is 0.91 percentage points. Moreover, if only the TURKSTAT Household Budget Survey 2010 is used, then it is projected that the rise in household saving ratio will be 10.32 percentage points from 2010 to 2050. The sole contribution of demographic change will be 2.34 percentage points, while the contributions of the increases in labor force participation rates and the percentage of college graduates are expected to be 1.44 and 7.15 percentage points, respectively. In this case, the contribution of the cross effect is negative 0.60 percentage points.

¹⁷ Although the predicted increases in household saving ratios using 2003 and 2010 surveys are different than the pooled sample, empirical findings are inherently consistent with each other. The contribution of the expected rise in the ratio of college graduates on household savings is greater than demographic change and the rise in labor force participation rates according to all econometric estimations.

However, the contribution of the rise in labor force participation rates to household savings will begin to slow down in 2023 and will fall below that of demographic change after 2030 (Figure 6 and Figure 11). Hence, demographic change will dominate labor force participation after 2030. The aging of population will enable individuals to contribute more to their family budgets, which will also positively influence household savings. On the other hand, average age will rise, which will constrain the upsurge in household saving ratios by decreasing labor force participation rates.¹⁸

6. Conclusion

This paper analyzes the impact of demographic change, the rise in the share of people with college degree or more in adult population and the expected increases in labor force participation rates on household savings. We estimate the contributions of individuals to household disposable income and savings by using the TURKSTAT Household Budget Surveys between 2003 and 2010. Subsequently, we generate saving ratio projections for the household sector from 2010 to 2050 by aggregating the estimated individual contributions under the assumption that they will remain constant over the forecast horizon. First, the potential effects of demographic change on household saving ratios are examined. If only demographic change is taken into account, then household saving ratio is expected to increase by 1.17 percentage points from 2010 to 2025 and 2.21 percentage points between 2010 and 2050. However, we must emphasize that this paper mainly concentrates on the prediction of the direction and the size of the change in household saving ratios rather than the level of projections.

Second, we investigate the effects of the increase in the urbanization rate due to the continuance of internal migration from rural areas to urban regions in addition to demographic change. Urbanization has a negative, but limited effect on household saving ratios. Finally, we analyze the effects of demographic change and the rise in the percentage of college graduates in adult population and labor force participation rates on household saving ratios jointly. Household saving ratio is projected to increase by 3.60

¹⁸ Moreover, household saving ratio projections are performed controlling for cohort effects following Deaton and Paxson (2000), Demery and Duck (2006a and 2006b) as robustness check. At this point, it is necessary to underline that the primary aim of this paper is to prepare household saving ratio projections rather than a more theoretical analysis. Although cohort effects statistically significant in the econometric estimations, their contribution to household saving ratios appears limited during the projection horizon as in Demery and Duck (2006a). With this approach, household saving ratio is expected to increase 7.20 percentage points from 2010 to 2050, which is quite close to our main findings. The individual contribution of demographic change will be 1.46 percentage points, while the contributions of the increases in labor force participation rates and the number of college graduates are expected to be 1.43 and 4.76 percentage points, respectively. The contribution of the expected rise in the ratio of college graduates on household savings is greater than both demographic change and the rise in labor force participation rates.

percentage points from 2010 to 2025 and by 7.61 percentage points from 2010 to 2050 under the assumption that demographic change will be accompanied with rising labor force participation rates and increasing ratio of college graduates. According to our empirical findings, the increase in the ratio of college graduates will make the highest contribution to the upsurge in household saving ratios, which will be followed by demographic change and then the rise in labor force participation rates. Consequently, the proliferation of college education emerges as the most significant factor, which is expected to stimulate household savings more than demographic change and the rise in labor force participation rates.

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