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How Urban and Rural Population Growth are Related with Household Consumption?: The Case of Turkey

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ÖZ

Bu çalışmada Türkiye'de kişi başına düşen hanehalkı tüketim artış hızı ile kırsal ve kentsel nüfus artış hızı arasındaki uzun dönemli ilişkiyi ARDL tahmin yöntemi ile 1988'den 2019'a uzanan yıllık veri seti ile belirlemeye çalışılmaktadır. Türkiye'de kentsel nüfus artış hızı, kırsal nüfus artış hızı ve kişi başına hanehalkı tüketim artışı serileri iç içedir ve uzun vadede birlikte hareket ederler. Uzun dönem katsayı tahminleri, kırsal nüfus artış hızının hanehalkı tüketim artışı üzerinde istatistiksel olarak anlamlı bir olumsuz etkiye sahip olduğunu ve kentsel nüfus artış hızının hanehalkı tüketim artış hızı üzerinde istatistiksel olarak anlamlı bir pozitif etkiye sahip olduğunu ortaya koymaktadır. Uzun dönem katsayı tahminlerine göre, kırsal nüfus artış hızındaki yüzde birlik bir artışın hanehalkı tüketim artış hızında yüzde 4.006'lık bir düşüşe neden olduğu ve kentsel nüfus artış hızındaki yüzde birlik artışın Türkiye'de uzun dönemde hanehalkı tüketim artış hızında %1,04 bir artışa yol açtığı söylenebilir.

ABSTRACT

In this study we try to identify the long-run relationship between per capita household consumption growth rate and rural and urban population growth rate in Turkey by means of ARDL estimation method with an annual dataset spanning from 1988 to 2019. Co-integration analysis results show that series of urban population growth rate, rural population growth rate, and per capita household consumption growth are co-integrated and they move together in the long-run in Turkey. Long-run coefficient estimations disclose that rural population growth rate has a statistically significant negative impact on household consumption growth and urban population growth rate has a statistically significant positive impact on household consumption growth rate. According to the long-run coefficient estimations, it can be asserted that a one percent increase in rural population growth rate causes to a drop by 4.006% in household consumption growth rate and that a one percent rise in urban population growth rate leads to an increase by 1.04% in household consumption growth rate in the long-run in Turkey.

Introduction

Population growth is at the heart of economic activities, as it affects the demand for goods and services and creates the supply of labor. Those who are optimistic about population growth emphasize the stimulating effects of the population on economic growth and development and state that the low population growth rate and the very low share of the young population in the total population will lead to economic stagnation and the loss of social dynamism. It is pointed out that the emergence of new needs will not create the necessary environment to encourage production. The pessimists, on the other hand, argue that the increasing population of underdeveloped countries limits economic development, reduces the living standards of individuals provided that capital goods remain constant, decreases savings by increasing the marginal consumption tendency, causes no capital accumulation and increases unemployment (Özgüven, 1988; Lebe et al., 2014).

As we enter the twenty-first century, one of the important problems facing humanity is the increase in population and the ability to keep the natural resources in balance with the needs of the increasing population. As everywhere else, economic factors lie at the root of the relationship between population and environment in Turkey (Toros, 1997). In the 1990-2000 period in Turkey, the increase in the rural population was very limited, and rural evacuation continued to a significant extent in the majority of the provinces in the Black Sea, Central Anatolia and Eastern Anatolia regions, and in some provinces of other regions (Özgür, 2003).

The rural population, which included the majority of the total population until 1980, entered the process of absolute decline after this year due to the migration to the cities. As a result of this process, which also affected the research area, the number of families who spent the winter in the villages decreased significantly. The decrease in the rural population stands out as a

phenomenon that Turkey has experienced in the development process. The decrease in the rural population may vary according to regions, provinces, districts and even different parts of the same district.

Another important variable that needs to be addressed in terms of demographics is urbanization. Uysal et al. (2016) determined that there is a positive relationship between housing demand and per capita income, urbanization rate and interest rate. The history of Turkey can be considered as the migration history of the population from the rural areas to the cities. Migration that accelerates urbanization is not only from the village to the city, but also from the city to the city. In parallel with economic development, economic activities concentrated in cities and metropolises attract the population to cities. Especially in Turkey, this phenomenon is very common. Mortality rate, birth rate, marriage rate, divorce rate and average life expectancy are important demographic variables that affect the population growth rate. The increase or decrease in these variables affects the population growth positively or negatively. Therefore, although the annual natural population growth in Turkey is gradually decreasing, the decrease in infant mortality and marriage rates, and the increase in divorce rate supports the idea that the population is in a continuous increase trend.

The policies implemented in the economic development processes of the rural and urban population have a significant impact on the distribution of the population in these areas. The job and employment opportunities created have an impact on the income level of the shortened and urban population and, consequently, on the expenditure levels. According to Sugözü (2017), developed countries that are aware of the importance of the agricultural sector have not neglected agriculture while investing in the industrial sector and have made their farmers the most respected producers of the society by structuring their support on productivity. In the continuation of the same study, Sugözü (2017) draws attention to the fact that as developed countries globally, it is the pioneer of various agreements on the need to reduce agricultural supports, and emphasizes that these agreements made the agricultural sectors of the countries in question shrink and eventually become dependent on imports.

The country's population must be balanced with the country's economic resources. The population that achieves this equilibrium is called the optimal population. Optimal population is the amount of population that can best use the country's natural resources with the available capital. Population is the source of the country's workforce. For this reason, it forms the human basis of economic development (Karluk, 1996). In this context, as the population increases, the share of a country's people in national income will decrease. As the population growth rate increases, more of the resources go to consumption. This leads to a decrease in the resources to spend on investments, thus reducing the rate of development. As a result, per capita income will decrease (Yumuşak and Kar, 2000).

Households expect that as their wealth accumulation increases, their earnings and incomes will also increase. According to the life cycle hypothesis developed by Modigliani (1986), he stated that age plays a very important role in the relationship between consumption and income and wealth. It should be expected that an economy with a young population structure will need loans to meet its needs such as housing, vehicles or white goods and will have a relatively high debt level (Modiglian, 1986; Tekirdağ, 2009).

This study focuses on the relationship between rural and urban population and consumption expenditures. It examines the long-term relationship between the per capita household consumption growth rate and the rural and urban population growth rate in Turkey with the data 1988-2009. Long-term coefficient estimates reveal that rural population growth rate has a statistically significant negative effect on household consumption growth, and urban population growth rate has a statistically significant positive effect on household consumption growth rate.

Related Literature

There are many studies in the literature on rural and urban population and household consumption expenditures. Some of the studies on urban and rural populations are regional (see: Gebreegziabher, 2007; De Brauw et al., 2014; Tao and Zhou, 1999), some are sectoral (see: Wang et al., 2021, Niu et al., 2019), some are relationship between poverty and urbanization (see: Liddle,2017; Özen, 2020) deals with the relationship between consumption expenditures. Hazell and Haggblade (1990) examine the rural-urban growth links in India in their book. Luo et al. (2019) considers e-commerce development and growth in household consumption in China. While Wang et al., (2021) make a regional assessment of urban and rural disparities and household energy consumption in China, Satterthwait (20019) examines the effects of population growth and urbanization on climate change. Padoch et al., (2008) examines the relationship between multi-residential households, consumption patterns, urban forests and rural cities in Amazonia.

Becker (1960) emphasizes that the increase in income should increase the number of children and expenditures for children, and states that there is no definite linear relationship between income growth and the number of children, and that high-income households make expenditures to increase the quality of children rather than increase the number of children in response to the increase in income. He states that the prolongation of the education period increases the opportunity cost of having children and accordingly decreases the fertility. He states that the costs of raising children differ in rural and urban areas; these costs are lower in rural areas, so fertility is higher in rural areas than in urban areas.

Stahl (1989), in his study for the USA and West Germany, focused on the housing consumption of the elderly by using variables such as household type, age of the head of the family, household income, living in rural or urban areas. As a result of the analysis, it has been

revealed that there is a significant latch effect in housing consumption with the increase in the elderly population in the United States and West Germany. In these countries, a decrease in income due to retirement or death does not generally result in a decrease in household consumption of housing. Moreover, despite the decline in income, resident households maintain their consumption pattern.

Bodkin (1959), in his study, tested the Permanent Income Hypothesis with the data he obtained from 1414 families with temporary income in the USA to investigate the response of consumer units to temporary income change. The study includes families whose head of household is between the ages of 21 and 45 and the number of members is between 2 and 4. The temporary income discussed in the study, II. Bonus payments received by soldiers who participated in World War II. Bodkin's findings, based on the Consumer Expenditure Survey, reveal that the marginal propensity to consume of temporary income and the marginal propensity to consume of current income are almost equal. As a result, it is seen that temporary income affects consumption and therefore the findings are not compatible with Friedman's Permanent Income Hypothesis.

According to Batırel (1986), health expenditures are not only a fundamental right, but also an economically important one as they form the basis of a person's income-generating productive activities. It is essential for each individual to benefit from health services equally by making the least sacrifice of their individual freedoms. Education expenditures are closely related to the population. The restrictive conditions of getting higher education in a family with many children also apply to crowded societies. Rapid population growth will not only increase education expenditures, but also negatively affect the quality of education. Education is an integral part of economic development. A well-educated and sufficient number of manpower is considered one of the prerequisites for rapid economic development. Health expenditures, which can be closely related to development, consist of protection of the population from disease, treatment services, protection from occupational and occupational diseases, social security, and public health expenditures. They are expenditures that increase the quality of life as they directly affect people's life. By causing a change in the size of the household, fertility affects the consumption and saving decisions of the households, as well as the distribution of time within the household, such as the time devoted to housework and childcare. Changing the consumption and saving decisions of households is an issue that concerns not only households but also the whole society. The increase in fertility, on the one hand, increases the consumption levels of the households, on the other hand, it causes the savings of especially low and middle-income households to decrease or to be unable to save. In his article Roy (2011) aims to capture the changing consumption expenditure patterns of three broad classes, 'upper' 'middle' and 'lower' classes in rural and urban India. Contrary to what is generally accepted that the differences in consumption of essential goods between classes decrease as the economy grows, the article argues that there is almost no sign of convergence. In addition, consumption expenditures in real terms in most food and non-food items, especially education and health services, show a widening gap between the upper and lower classes.

Demographic characteristics of Turkey show that the population will continue to increase and the increasing trend will continue in the near future. It has been determined that the rate of urbanization in Turkey is higher than the natural population growth rate, although its acceleration decreases, Turkey continues to urbanize, parallel to this, internal migration not only from the village to the city, but also from the city to the city, and the direction of these developments is primarily Istanbul, the Marmara Region and the Aegean Region. It turns out that capital movements in Turkey are focused on Istanbul and concentrated in the Marmara and Aegean Regions. Other regions and provinces are experiencing the consequences of income inequality and unbalanced development between regions in terms of investments and housing production. It turns out that capital movements in Turkey are focused on Istanbul and concentrated in the Marmara and Aegean Regions. Other regions and provinces are experiencing the consequences of income inequality and unbalanced development between regions in terms of investments and housing production. In their study, Henderson and Wang (2005) model the rural-urban transformation that occurs with urbanization driven by economic and population growth. Changsheng (2008) shows that the natural population growth rate is in a significant and positive relationship with real household consumption both in the long run and the short run. According to Changsheng (2008), results also suggest that the decline in natural population growth rate may be an important factor leading to the decline in the ratio of real household consumption to real GDP in China in the long run, and the same is also true for the short run.

In the study conducted by Çolak, Öztürkler and Tokatlıoğlu (2008), the consumption function for Turkey was estimated with both the classical linear regression model and the slice regression model, with the data obtained from the Household Budget Surveys conducted by TÜİK (TURKSTAT) for 2005. In the study, the effects of age, education level, having social security of people, wealth, being residing in rural or urban areas on the relationship between per capita consumption expenditures and disposable income were tried to be revealed. According to the results of the study, it has been determined that the Keynesian consumption function is more valid for Turkey, the effect of age on consumption expenditures per capita is negative, the existence of social security of individuals and the effect of reducing the marginal consumption tendency of wealth. In addition, it has been determined that residing in rural or urban areas does not significantly affect the marginal consumption propensity.

Özer (2013) examined the household consumption patterns using the data obtained from the household

consumption expenditures survey applied for the province of Erzurum and aimed to determine the model that best explains the consumption trends of the households. The results of the study show that Engel's law is valid for the province of Erzurum; In addition to income, demographic factors and climate are the main factors affecting consumption. In addition, it was found that the model that best explains the consumption trends of households is the linear model.

Çağlayan and Astar (2012) used household consumption expenditure data collected by TUIK in 2009 to investigate the determinants of household consumption expenditures in Turkey. In addition, in this study, models were estimated separately for urban and rural areas. The results of the study revealed that as income increases, consumption expenditures increase. Consumption expenditures of urban settlements were found to be about two times higher than rural settlements, and expensive and difficult living conditions in urban settlements were seen as the reason for this excess. The findings revealed that age increase increases consumption expenditures in urban areas while decreasing consumption expenditures in rural areas.

Data and Methodology

In this study the long-run relationship between household consumption and rural and urban population growth rate in Turkey is examined by means of ARDL estimation technique with an annual dataset running from 1988 to 2019. Since living in urban area is more costly than living in rural area, a positive association between urban population growth rate and household consumption and a negative association between rural population growth rate and household consumption are expected. As indicator of household consumption (HHOLDCON), we use annual growth rate of households and NPISHs final consumption expenditure per capita gathered from WDI. Annual growth rate of rural population growth (RURPOPGR) and annual growth rate of urban population growth (URBPOPGR) data were collected from WDI.

Firstly co-integration analysis is implemented via ARDL boundary test to figure out if HHOLDCON, RURPOPGR, and URBPOPGR series are co-integrated. For co-integration analysis the following ARDL models are estimated:

$$\Delta \text{HHOLDCON}_t = \gamma_0 + \sum_{i=1}^{p} \alpha_i \Delta \text{HHOLDCON}_{t-i} + \sum_{i=0}^{q} \theta_i \Delta \text{RURPOPGR}_{t-i} + \phi_0 \text{HHOLDCON}_{t-1} + \phi_1 \text{RURPOPGR}_{t-1} + \varepsilon_t \quad (1)$$

$$\Delta \text{HHOLDCON}_t = \gamma_0 + \sum_{i=1}^{p} \alpha_i \Delta \text{HHOLDCON}_{t-i} + \sum_{i=0}^{q} \theta_i \Delta \text{URBPOPGR}_{t-i} + \phi_0 \text{HHOLDCON}_{t-1} + \phi_1 \text{URBPOPGR}_{t-1} + \varepsilon_t \quad (2)$$

In Equation 1 and 2, ϕ_0 and ϕ_1 notations stands for the long-run coefficients; α_i and θ_i notations display short-run coefficients; Δ notation represents first degree difference operator; γ_0 is intercept term of the model, and ε_t is white noise error term of the model.

Following the g co-integration analysis relying on ARDL boundary test, we formed and estimated the error correction models below in order to obtain short-run and long-run coefficients of the models:

$$\text{HHOLDCON}_t = \beta_0 + \sum_{i=1}^{p} \lambda_i \Delta \text{HHOLDCON}_{t-i} + \sum_{i=0}^{q} \varphi_i \Delta \text{RURPOPGR}_{t-i} + \varsigma ECM_{t-1} + \varepsilon_t \quad (3)$$

$$\text{HHOLDCON}_t = \beta_0 + \sum_{i=1}^{p} \lambda_i \Delta \text{HHOLDCON}_{t-i} + \sum_{i=0}^{q} \varphi_i \Delta \text{URBPOPGR}_{t-i} + \varsigma ECM_{t-1} + \varepsilon_t \quad (4)$$

In

Equation 3 and 4, λ_i and φ_i notations indicate the dynamic coefficients bringing back the model to the balance in the long-run; ECM notation shows error correction term; ς notation represents the speed of adjustment at which the series return back to long-run path in response to a shock taken place in the short-run. We should get a statistically significant negative sign for the coefficient of speed of adjustment.

Empirical Results

ARDL boundary test for co-integration is valid only for the series having integration order no more than two (i.e., not more than I(2)). Therefore we investigated the stationarity status of series by conducting Phillips-Perron (PP) unit root test for three distinct models, namely none, constant, and constant and trend. The null hypothesis of the PP unit root test asserts the non-stationarity of series whereas the alternative hypothesis of the PP unit root test claims the stationarity of series. PP unit root test findings are given in Table 1 below.

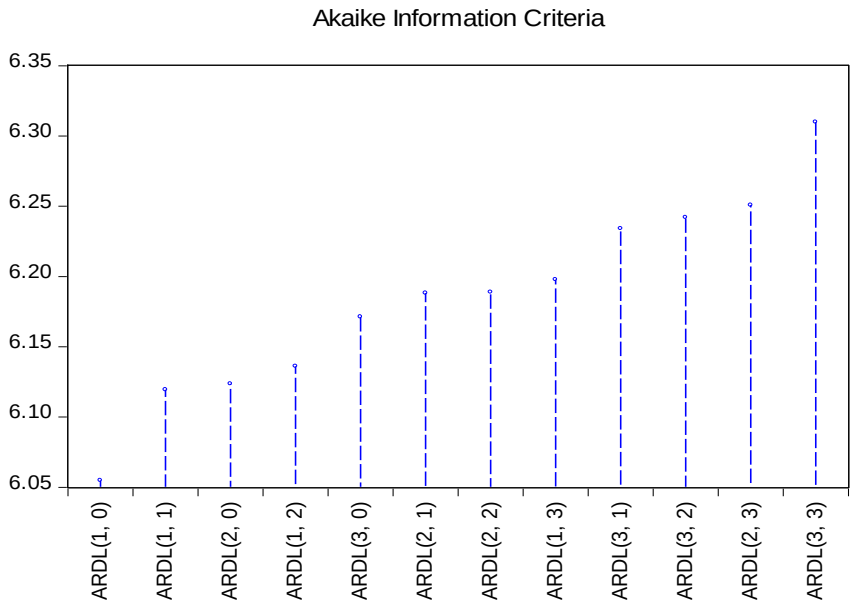
Table 1: PP Unit Root Test Results

Variable	Model	Test Statistic (P-value)
HHOLDCON	None	-4.582165 *(0.0000)*
	Constant	-6.810878 *(0.0000)*
	Constant&Trend	-6.755207 *(0.0000)*
RURPOPGR	None	-1.818584 *(*0.0660*)*
	Constant	-1.861088 *(* 0.3475*)*
	Constant&Trend	-1.953825 *(*0.6113*)*
Δ RURPOPGR	None	-4.755051 *(*0.0000*)*
	Constant	-4.753756 *(*0.0003*)*
	Constant&Trend	-4.651818 *(* 0.0026*)*
URBPOPGR	None	-1.226255 *(*0.1990*)*
	Constant	-1.548018 *(*0.5012*)*
	Constant&Trend	-2.207442 *(*0.4749*)*
Δ URBPOPGR	None	-4.632349 *(0.0000)*
	Constant	-4.626759 *(*0.0005*)*
	Constant&Trend	-4.572458 *(*0.0032*)*

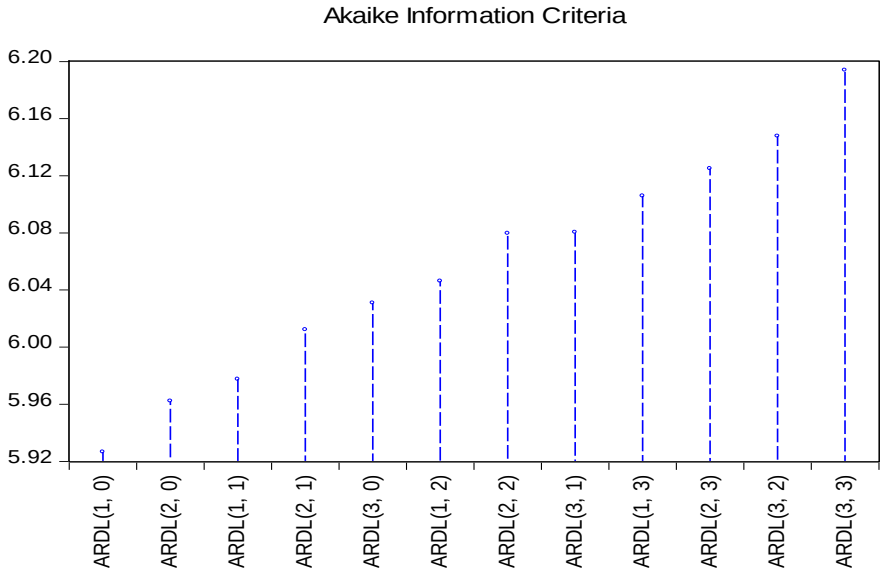
As seen from PP unit root test findings in Table 1, HHOLDCON variable is stationary at level and thus it is integrated order zero (i.e., I(0)). RURPOPGR and URBPOPGR variables are stationary at first differences and hence they are integrated order one (i.e., I(1)). As a result PP unit root test results unveil that HHOLDCON variable is integrated order zero and RURPOPGR and URBPOPGR variables are integrated order one, therefore none of the variables contradict with the integration order requirement of ARDL boundary test. Given the series with integration order no more than two, we are able to conduct co-integration test via ARDL boundary test in order to find out the co-integration association between HHOLDCON, RURPOPGR, and URBPOPGR series.

AIC criterion was utilized to determine the optimal lag lengths for the models given in Equation 1 and 2. The results for optimal lag selection for the models are shown in Graph 1 and 2. ARDL(1,0) model was chosen as the optimal model for the models given in Equation 1 and 2 out of twelve possible models. Therefore we use ARDL(1,0) model for conducting our analyses in both cases.

Graph 1: Lag Selection for the Model in Equation 1



Graph 2: Lag Selection for the Model in Equation 2



Co-integration test findings of ARDL boundary test are reported in Table 2. Panel A and B give the co-integration test results for the models in Equation 1 and 2 respectively, As seen from Panel A, F-statistic value of 13.36152 exceeds the upper bound critical values at all significance levels and thus we say that there is a co-integrating association between HHOLDCON and RURPOPGR series. Moreover as indicated by Panel B, F-statistic value of 16.29068 is higher than the upper bound critical values at all significance levels and hence we state that there is a co-integrating relationship between HHOLDCON and URBPOPGR series. In overall we infer that household consumption growth rate moves together with rural population growth rate and urban population growth rate in the long-run in Turkey.

Table 2: Co-integration Test Results

Panel A: ARDL Boundary Test Results for Model in Equation 1		
F-statistic: *13.36152*	**Critical Values**	
Significance	***Lower Bound***	***Upper Bound***
10%	2.44	3.28
5%	3.15	4.11
2.5%	3.88	4.92
1%	4.81	6.02
Panel B: ARDL Boundary Test Results for Model in Equation 2		
F-statistic: *16.29068*	**Critical Values**	
Significance	***Lower Bound***	***Upper Bound***
10%	2.44	3.28
5%	3.15	4.11
2.5%	3.88	4.92
1%	4.81	6.02

Estimation results of long-run coefficients are provided in Table 3 and Panel A and B display long-run coefficient estimation findings for the models in Equation 3 and 4 respectively. As can be deducted from Panel A, rural population growth rate has a statistically significant negative impact on household consumption growth rate at 5% significance level and thus we can state that a one percent increase in rural population growth rate leads to a reduction by 4.006% in household consumption growth rate in the long-run in Turkey. On the other hand as implied by Panel B, urban population growth rate has a statistically significant positive impact on household consumption growth rate at 1% significance level and hence we can express that a one percent increase in urban population growth rate induces to a jump by 1.04% in household consumption growth rate in the long-run in Turkey. The findings show that decreasing effect of rural population growth rate on household consumption is larger than increasing effect of urban population growth rate on household consumption.

Table 3: Long-run Coefficients of ARDL (1,0) Models in Equation 3 and 4

Panel A: Results for Model in Equation 3			
Variable	*Coefficient*	*t-statistic*	*Prob.*
RURPOPGR	-4.006645	-2.110664	0.0435
Panel B: Results for Model in Equation 4			
Variable	*Coefficient*	*t-statistic*	*Prob.*
URBPOPGR	1.040714	3.188899	0.0034

In Table 4 we display short-run coefficient estimations and diagnostic test results for the models in Equation 3 and 4 in Panel A and B respectively. As seen from Panel A and B, short-run coefficients are statistically insignificant for the both models. Meanwhile the error correction terms,

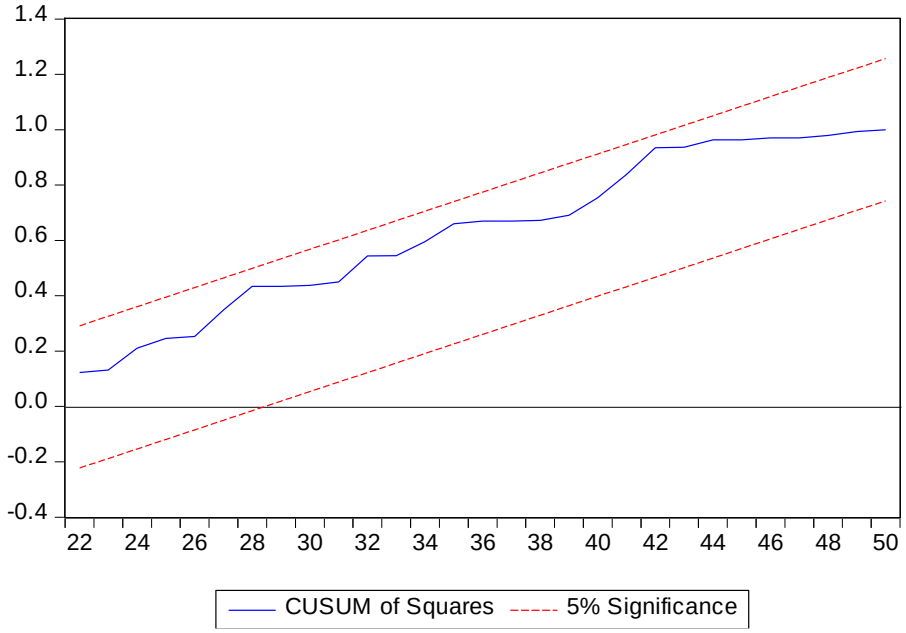
as expected, possess statistically significant negative signs. We also conducted econometric diagnostic tests for both models and diagnostic test findings point out that none of the models contain any problem in terms of autocorrelation, heteroscedasticity, non-normality, and model specification error.

Table 4: Short-run&Diagnostic Results of ARDL (1,0) Models in Equation 3 and 4

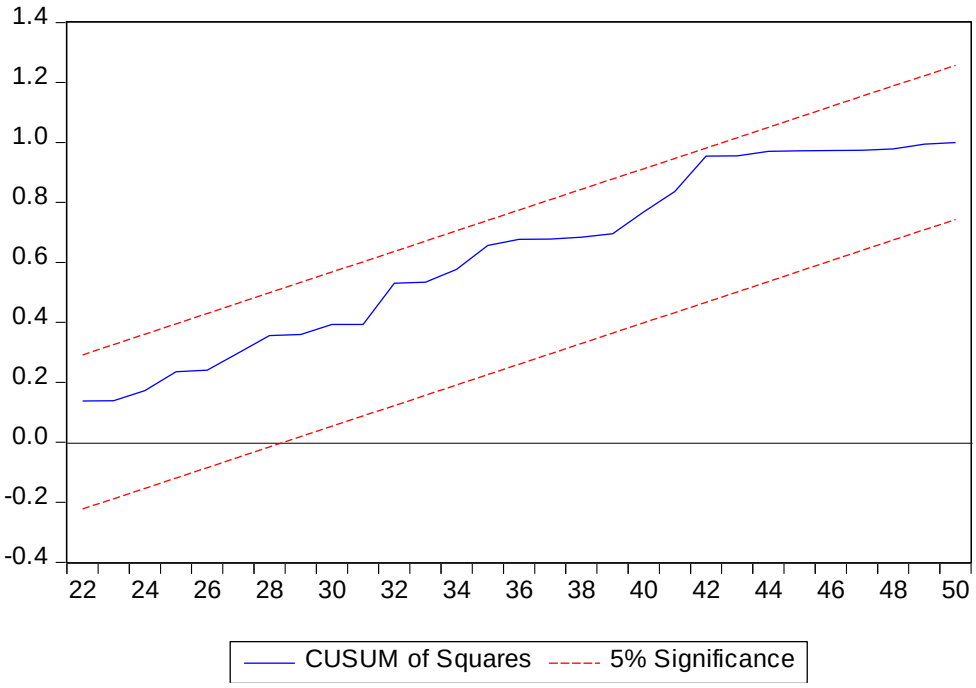
Panel A: Results for Model in Equation 3			
	Coefficient	*t-Statistic*	*Prob.*
RURPOPGR	-2.244442	-0.609733	0.5468
ECM_{t-1}	-0.920816	-4.982850	0.0000
ECM = HHOLDCON - (-4.0066 * RURPOPGR)			
Diagnostic Tests			
Tests			Test Value (Prob.)
Breusch-Godfrey Serial Correlation LM Test			1.010997 *(0.3772)*
ARCH Heteroskedasticity Test			1.708455 *(0.2018)*
Ramsey RESET Test			0.397822 *(0.5333)*
Jarque-Bera Test			*1.540173 (0.462973)*
Panel B: Results for Model in Equation 4			
	Coefficient	*t-Statistic*	*Prob.*
URBPOPGR	3.617114	0.878495	0.3869
ECM_{t-1}	-1.024840	-5.597902	0.0000
ECM = HHOLDCON - (1.0407*URBPOPGR)			
Diagnostic Tests			
Tests			Test Value (Prob.)
Breusch-Godfrey Serial Correlation LM Test			1.594782 *(0.2215)*
ARCH Heteroskedasticity Test			0.080741 *(0.7784)*
Ramsey RESET Test			0.019804 *(0.8891)*
Jarque-Bera Test			*0.954121 (0.620605)*

We implemented Cusum-square test of model stability and the findings are provided in Graph 3 and 4 for both models. We can conclude from Graph 3 and 4 that the models do not suffer from model instability.

Graph 3: Cusum-square Test for Model in Equation 3



Graph 4: Cusum-square Test for Model in Equation 4



Conclusion

This study analyzes the long-run association between per capita household consumption growth rate and rural and urban population growth rate in Turkey by utilizing ARDL method with an annual dataset covering years from 1988 to 2019. Since the living cost in urban area is far beyond the living in rural area, we anticipated finding a positive relationship between urban population growth rate and per capita household consumption growth and a negative relationship between rural population growth rate and per capita household consumption growth. Co-integration analysis results reveal that series of urban population growth rate, rural population growth rate, and per capita household consumption growth move together in the long-run in Turkey and thus they are co-integrated. These findings are confirmed by long-run coefficient estimations.

According to estimation results of long-run coefficients, rural population growth rate has a statistically significant negative impact on household consumption growth rate at 5% significance level and urban population growth rate has a statistically significant positive impact on household consumption growth rate at 1% significance level. Based on long-run coefficient estimations, it can be stated that a one percent increase in rural population growth rate causes to a drop by 4.006% in household consumption growth rate and that a one percent rise in urban population growth rate leads to an increase by 1.04% in household consumption growth rate in the long-run in Turkey. Meantime we can emphasize that decreasing impact of rural population growth rate on household consumption is almost four times larger than increasing impact of urban population growth rate on household consumption.

We also conducted econometric diagnostic tests for both models and diagnostic test findings unveil that the models do not have any problem in terms of autocorrelation, heteroscedasticity, non-normality, and model misspecification.

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