

Household Expectations and Household Consumption Expenditures: The Case of Turkey

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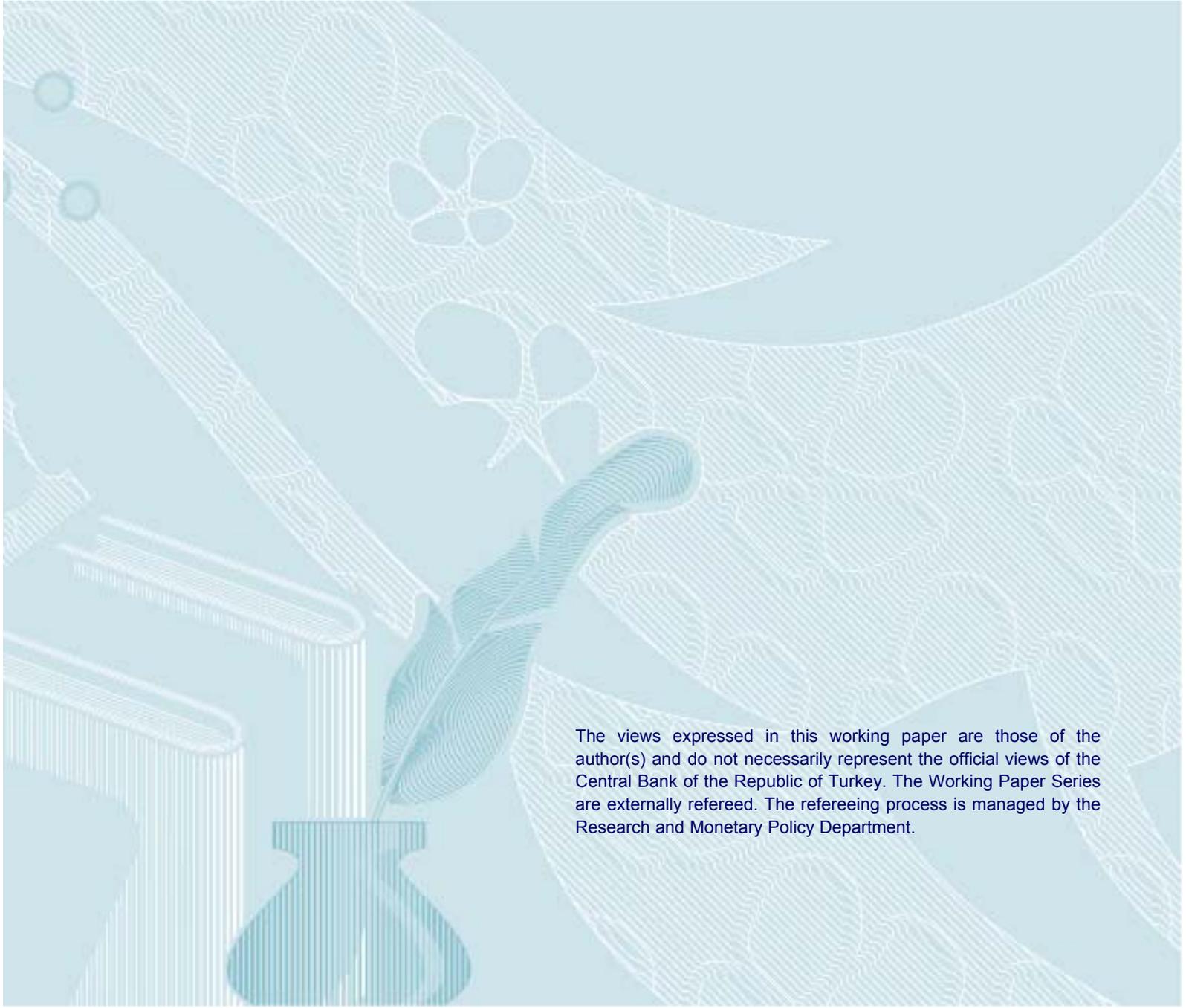
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**Household Expectations and Household Consumption Expenditures:
The Case of Turkey^{a b}**

Evren Ceritođlu^c

Abstract

The empirical analysis confirms that household expectations have a direct role on their consumption and saving behaviour in addition to their indirect influence through the income channel. The econometric results show that there is a positive and statistically significant relationship between the growth of consumption and expected income changes. Therefore, the strict version of the rational expectations permanent income hypothesis (REPIH) is rejected for the Turkish economy. The empirical analysis reveals that the expansion of the real consumer credit volume is more important on the growth of consumption than the real interest rates. Moreover, there is a positive and statistically significant relationship between the Job Opportunities Index from the TURKSTAT-CBRT Consumer Tendency Survey and the growth of consumption. Household expenditures on durable goods are more sensitive to changes in household expectations, the real interest rates and consumer credits than household expenditures on non-durable goods and services. As a result, the econometric results are in favour of the precautionary saving hypothesis.

Key words: Household expectations, Household consumption and Durable goods

JEL Classification: D81, D84 and E21

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I. Introduction

Economists and policy-makers need to have a good understanding of the current situation and the future course of the economy to make healthy and sound decisions. Moreover, they must be able to predict fundamental economic variables such as consumer prices inflation and the growth rate of the economy precisely. Sinclair *et al.* (2010) demonstrate that additional news and information about the level of economic activity in the current period raises the accuracy of forecasts significantly. At this point, the analysis and the evaluation of economic agents' expectations become crucially important. The contribution of business and consumer tendency surveys is often measured by the improvement in the consumer expenditure forecasts, but these surveys can also be used to reveal the rationale behind economic agents' decisions.

According to the Rational Expectations Permanent Income Hypothesis (REPIH), the growth of consumption should be independent of expected income changes (Deaton, 1992). However, empirical research for developed economies rejects the empirical validity of the strict version of the REPIH (Hall, 1978; Flavin, 1981; Campbell and Mankiw, 1989; Attanasio and Weber, 2010). Moreover, previous empirical studies for the Turkish economy find that there exists a positive and statistically significant relationship between the growth of consumption and expected income changes (Akçin and Alper, 1999; Ceritoğlu, 2003). The presence of liquidity-constrained households in the economy is generally considered as a plausible explanation for the empirical failure of the REPIH. However, there might be different underlying reasons for the empirical failure of the REPIH such as the bequest motive or myopia (Modigliani, 1986; Garcia *et al.*, 1997; Attanasio and Weber, 2010). To illustrate, Zeldes (1989) shows that even if the liquidity constraints are not binding in the current period, the possibility that they might bind in the future can force households postpone their consumption expenditures and raise their saving level.

In addition, future labour income uncertainty might have a similar effect on household consumption and saving decisions (Browning and Lusardi, 1996). For instance, if households' expectations about their income and employment prospects deteriorate, then they might not demand credit from financial institutions for consumption purposes, especially for durable goods, since such large purchases require long-term planning and commitment (Carroll and Dunn, 1997; Carroll *et al.*, 2003). Instead, households might try to finance consumption with their current income and previously accumulated savings such as financial assets. Therefore, households increase their saving ratio to safeguard themselves against future labour income uncertainty. The additional rise in household saving level due to future labour income uncertainty is defined as *precautionary saving*.

The contribution of consumer confidence indices to household consumption expenditure forecasts is an important topic, especially from the point of view of the policy-makers. Consumer confidence indices are not only used to forecast future consumption realisations, but they are also publicised prior to the national income figures. There is a rich literature about this issue for developed countries, *e.g.* Carroll *et al.* (1994), Acemoğlu and Scott (1994), Bram and Ludvigson (1998), Madsen and McAleer (2000), Ludvigson (2004), Cotsomitis and Kwan (2006) and Déés and Brinca (2011). However, empirical research on the Turkish economy is developing only recently. Aslanoğlu and Çelik (2010) find that the CNBC-e Consumption Index, which is acquired from a privately-owned consumer tendency survey, predicts economic growth significantly. They observe that there is a statistically significant relationship between the CNBC-e Consumption Index and the growth of household consumption expenditures, but the predictive power of the index remains limited. Kurul (2011) analyses the information potential of the CBRT Loan Tendency Survey about credit growth and economic activity to explore the relationship between lending, borrowing willingness and monetary policy. Her empirical findings suggest that credit supply is important on the next period's credit growth and also credit supply indicators have a significant predictive power on economic activity.

This paper analyses the empirical relationship between household consumption expenditures, financial market developments and household expectations. In particular, the aim of this paper is to try to understand the influence of household sentiment on their consumption and saving behaviour. To shed light on this issue, I use the Consumer Tendency Survey, which is prepared jointly by the Turkish Statistical Institute (TURKSTAT) and the Central Bank of the Republic of Turkey (CBRT) to monitor household expectations and their consumption patterns. The findings of this empirical paper are three-fold. First, household expectations about their employment and income prospects play an important role on their consumption and saving behaviour. Second, the empirical analysis indicates that the credit channel is more important than the interest rate channel for household consumption expenditures. Finally, there are significant differences between the sub-items of household consumption expenditures. Household expenditures on durable goods are more sensitive to changes in household expectations, the real interest rates and consumer credits than household expenditures on non-durable goods and services.

The outline of the paper is as follows. The second section of the paper presents the augmented REPIH with consumer confidence. The third section analyses the relationship between national income aggregates and the diffusion indices from the TURKSTAT-CBRT Consumer Tendency Survey for a better understanding of the role of household expectations on their consumption and saving behaviour. The fourth section presents the

econometric results, which are conducted to test the empirical validity of the augmented REPIH with consumer confidence for the Turkish economy. Finally, the fifth section concludes this paper.

II. The Rational Expectations Permanent Income Hypothesis with Consumer Confidence

II. 1 – A Formal Interpretation of the Permanent Income Hypothesis

The REPIH has several fundamental assumptions about consumer preferences. First, it is assumed that there is a rational and risk-averse consumer, who is considered as representative for all individuals in the society. Furthermore, the strict version of the REPIH has strong assumptions concerning the structure of the economy. It is assumed that there is *perfect foresight* in the economy. Thus, the representative consumer is able to predict his/her future labour income accurately. It is also assumed that the representative consumer does not suffer from liquidity constraints.¹ This strict version of the REPIH, which is abstracted from economic uncertainty and liquidity constraints, is referred to as the *certainty-equivalent* version of the REPIH.

The aim of the representative consumer is to maximize utility from consumption with respect to the budget constraint. The utility function is assumed to be separable over time and goods and services. The level of marginal utility is the same in each period provided that the utility function is quadratic and the real interest rate is equal to the subjective time discount rate. As a result, the level of current consumption is equal to the level of future consumption (1). In this equation, E is the expectations operator, C is consumption and t denotes time.

$$E_t C_{t+k} = C_t \quad (1)$$

According to the REPIH, the life-time consumption of the representative individual must be equal to his/her life-time wealth, which is shown by equation (2). In this equation, r is the real interest rate, A is financial wealth and real labour income is denoted by Y . The life-time wealth of the representative consumer is defined as the present value (PV) of his/her financial wealth and total real labour income as in Campbell (1987) and Deaton (1992).

¹ It is assumed that the real interest rates for borrowing (*consumption*) and lending (*saving*) are equal to each other. Moreover, the representative consumer can borrow as much as he/she needs.

$$\sum_{k=0}^{T-t} (1+r)^{-k} C_{t+k} = A_t + \sum_{k=0}^{T-t} (1+r)^{-k} Y_{t+k} \quad (2)$$

If the expectation of equation (2) is taken conditional on information available at time t and expected consumption is assumed constant as shown in equation (1) and finally, if T is assumed to reach infinity, then equation (3) is derived. The representative consumer forms his/her expectations about future labour income prospects conditional on the information matrix Ω , which shows all information available to him/her at time t .

$$C_t = \frac{r}{1+r} A_t + \left(\frac{r}{1+r} \sum_{i=0}^{\infty} (1+r)^{-i} E_t(Y_{t+i} | \Omega_t) \right) \quad (3)$$

The evolution of financial wealth is shown by equation (4). The sum of financial wealth and labour income from the last period is total cash on hand, which can be used for consumption and saving purposes. The representative consumer invests his/her savings in financial assets once consumption is realised and then transfer his/her total savings, which includes interest income, to the next period.

$$A_t = (1+r)[A_{t-1} + Y_{t-1} - C_{t-1}] \quad (4)$$

If the right hand side of equation (3) is substituted for financial wealth in period t with equation (4), then equation (5) is reached:

$$C_t = r(A_{t-1} + Y_{t-1} - C_{t-1}) + \left(\frac{r}{1+r} \sum_{i=0}^{\infty} (1+r)^{-i} E_t(Y_{t+i} | \Omega_t) \right). \quad (5)$$

If equation (5) is lagged one period, then equation (6), which is shown below is reached.

$$(1+r)C_{t-1} = rA_{t-1} + rY_{t-1} + \left(\frac{r}{1+r} \sum_{i=0}^{\infty} (1+r)^{-i} E_{t-1}(Y_{t-i} | \Omega_t) \right) \quad (6)$$

The difference of equation (5) and equation (6) is equation (7), which is growth of the consumption. This equation shows that the growth of consumption must be dependent only on new information about future labour income prospects.

$$\Delta C_t = \frac{r}{1+r} \sum_{i=0}^{\infty} (1+r)^{-i} (E_t - E_{t-1}) Y_{t+i} \quad (7)$$

II.2 – The Presence of Liquidity Constraints in the Economy

Hall (1978) is the first empirical paper, which tests the hypothesis that the growth of consumption must follow a random walk by using time-series data for the U.S. economy with equation (8).

$$\Delta C_t = \varepsilon_t \quad (8)$$

Hall (1978) found that there is a statistically significant relationship between the growth of consumption and the lagged values of the stock market. Thus, Hall (1978) concluded that the strict version of the REPIH is not empirically valid. Many empirical research papers such as Flavin (1981) rejected the empirical validity of the strict version of the REPIH, since a statistically significant relationship between the growth of consumption and the lagged values of the growth of current income is established. The dependence of the growth of consumption to the growth of current income is defined as *excess sensitivity* in this literature.

Hall and Mishkin (1982) observed that the marginal propensity to consume (MPC) out of current income is around 20% level using several waves of the Panel Study of Income Dynamics (PSID) for the U.S. economy. However, PSID provides data only on food consumption, which is less sensitive to expected income changes compared to other sub-items of household consumption expenditures such as on durable goods. The sensitivity of the growth of consumption to expected income changes could be even higher if a more general definition of consumption was used in the empirical analysis. Hence, Hall and Mishkin (1982) claimed that the unexpectedly high value of the MPC stems from the existence of liquidity-constrained consumers in society.

Campbell and Mankiw (1989) analysed the relationship between the growth of consumption and the growth of current income for the U.S. economy to test the empirical validity of the REPIH by using equation (9). Campbell and Mankiw (1989) observed that there is a positive and statistically significant relationship between

the growth of consumption and the growth of income. Moreover, the authors estimated that the range of the λ coefficient is between 0.40 and 0.50, which is highly important.

$$\Delta C_t = \alpha + \lambda E_{t-1} \Delta Y_t + v_t \quad (9)$$

Campbell and Mankiw (1989) argued that a certain percentage of consumers make their consumption and saving decisions with respect to their life-time wealth level as proposed by the REPIH, but the rest of the consumers suffer from liquidity constraints that prevail in the economy as Hall and Mishkin (1982) previously maintained. Therefore, the liquidity-constrained consumers were able to spend only their current income and previously accumulated financial assets for consumption purposes. Campbell and Mankiw (1989) argued that the strong relationship between the growth of consumption and the growth of income indicates the high percentage of the liquidity-constrained consumers in the economy. They interpreted the estimated λ coefficients as the percentage shares of the liquidity-constrained consumers in the society. As for Campbell and Mankiw (1989), 40% to 50% of all consumers were liquidity-constrained during that time period in the U.S. economy.

Moreover, Campbell and Mankiw (1991) analysed the relationship between the growth of consumption and the growth of current income for six developed economies (Canada, France, Japan, Sweden, U.K. and U.S.) with the same approach. They observed a positive and statistically significant relationship between the growth of consumption and the growth of income in all countries, except for Japan. Thus, they confirmed the previous empirical findings of Campbell and Mankiw (1989) for other developed countries. Japelli and Pagano (1989) tried to explain the dependence of the growth of consumption on the growth of current income with the level of financial development for seven selected developed economies (Greece, Italy, Japan, Spain, Sweden, U.K. and U.S.). Japelli and Pagano (1989) revealed that the sensitivity of the growth of consumption to the growth of income is higher in countries, where the level of financial development were lower compared to the rest of the sample. Credit market developments were considered as an important indicator of financial deepening in selected countries.

II.3 – The Role of Consumer Confidence on Household Behaviour

There is a rich literature, which searches the influence of household expectations on their consumption and saving decisions in developed countries. For this purpose, the lagged values of household expectations are

included in the estimations, as shown in equation (10), where S denotes household expectations. Carroll *et al.* (1994) showed that the *Index of Consumer Sentiment* (ICS), which is prepared by the University of Michigan, makes a significant contribution to the growth of consumption equations.

$$\Delta C_t = \alpha + \lambda \Delta Y_t + \sum_{i=1}^N \beta_i S_{t-i} + u_t \quad (10)$$

Acemođlu and Scott (1994) observed that there is a statistically significant relationship between the growth of consumption and the *Consumer Confidence Index*, which is performed by Gallup and commissioned by the European Commission for the U.K. economy. Acemođlu and Scott (1994) concluded that the relationship between the growth of consumption and the Consumer Confidence Index cannot stem from liquidity constraints. They evaluated their empirical findings as evidence in favour of the precautionary saving hypothesis.²

Bram and Ludvigson (1998) and Ludvigson (2004) reached mixed econometric results on this issue. They observed that the consumer confidence indices prepared by the University of Michigan and the Conference Board make positive and significant contributions to the forecasts of household consumption expenditures for the U.S. economy. However, the explanatory power of the consumer confidence indices decrease significantly, when the growth of current income and financial variables are included together in the estimations. They argued that the information about household consumption patterns that is possessed by these surveys is already passed on the financial markets through economic activities. Therefore, it is necessary to test the forecast performance of the consumer confidence indices once the financial variables are controlled for in the empirical analysis.

III. Household Expectations and Household Consumption Expenditures

The Consumer Tendency Survey is prepared by TURKSTAT and CBRT jointly to monitor household expectations and household consumption patterns. The survey is also consistent with the consumer confidence surveys, which are realised for European Union (EU) countries, but different questions are used to calculate the CBRT Consumer Confidence Index (European Commission, 1997). The survey questionnaire includes fifteen questions about *households' financial situation, general economic situation, household expenditures* and

² Moreover, it is necessary to mention that the Consumer Tendency Survey, which is prepared for the Turkish economy by TURKSTAT and CBRT jointly, is parallel to the Consumer Confidence Index of the U.K. economy in terms of questions and survey methodology.

consumer price expectations. Moreover, the survey is implemented using the same sample set with the TURKSTAT Household Labour Market Survey.³

The CBRT Consumer Confidence Index is calculated as a diffusion index by taking arithmetic averages of five selected indices about general economic situation, purchasing power, job opportunities and timing of durable goods purchases (Table 1). The difference of the percentages of positive and negative answers given by the respondents to the survey questions is taken and then one hundred (100) is added to this difference to turn it into a diffusion index. Household expectations are considered as optimistic if the CBRT Consumer Confidence Index is greater than one hundred (100) and as pessimistic if the CBRT Consumer Confidence Index is smaller than one hundred (100).

Table 1 – TURKSTAT and CBRT Consumer Tendency Survey (December 2012)

	<i>Index</i>				<i>Annual</i>	<i>Monthly</i>	<i>Monthly</i>
	12/2011	10/2012	11/2012	12/2012	<i>Difference</i>	<i>Difference</i>	<i>Change</i>
					<i>(percentage points)</i>		
Consumer Confidence Index	92.0	85.7	89.2	89.0	-0.2	-3.0	-0.2
Purchasing power (current period)	87.1	83.4	86.3	84.9	-1.4	-2.2	-1.6
Purchasing power (next 6 months period)	90.0	83.8	87.6	87.1	-0.5	-2.9	-0.6
General economic situation (next 3 months period)	93.4	81.0	86.3	86.6	0.3	-6.8	0.3
Job opportunities (next 6 months period)	93.5	89.1	90.4	91.3	0.9	-2.2	1.0
Buying time condition of durable goods (current period)	96.2	91.4	95.3	95.2	-0.1	-1.0	-0.1

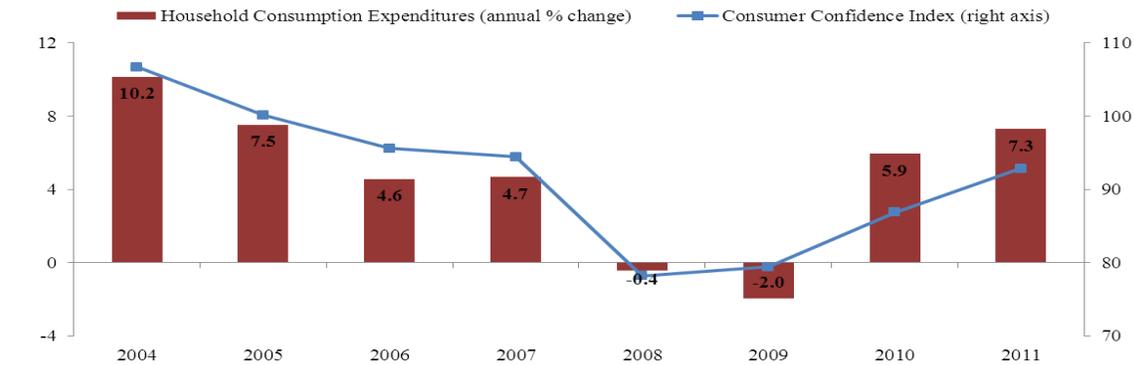
Source: TURKSTAT and CBRT

The precautionary saving hypothesis asserts that consumer confidence is negatively associated with the level of uncertainties that exist in the economy (Ludvigson, 2004). For that reason, the deterioration of consumer confidence is seen as an indication of the rise of uncertainties in the economy. Moreover, this proposition implies that there should be a positive link between the growth of consumption and the changes in consumer confidence. For instance, it is observed that the CBRT Consumer Confidence Index decreased below its long-term average level in the second quarter of 2006, when the CBRT implemented a monetary tightening policy due to the financial turmoil in the economy. Moreover, the CBRT Consumer Confidence Index dropped to its historically lowest levels in the second half of 2008 during the global economic crisis. Household expectations improved in the second quarter of 2009 after the government reduced the Value Added Tax (VAT) and Special Consumption

³ However, TURKSTAT changed the sample and the questionnaire of the Consumer Tendency Survey and also the questions that constitute the Consumer Confidence Index as of January 2013 according to the European Union Harmonized Joint Business and Consumer Surveys. See http://www.turkstat.gov.tr/PreTablo.do?alt_id=21 for more information.

Tax (SCT) rates on durable goods temporarily to stimulate domestic demand and economic recovery.⁴ However, household expectations continued to remain pessimistic despite positive economic growth rates even in 2010 and the CBRT Consumer Confidence Index was significantly below its pre-crisis values (Figure 1).

Figure 1 – Household Consumption Expenditures and Consumer Confidence



Source: TURKSTAT and CBRT

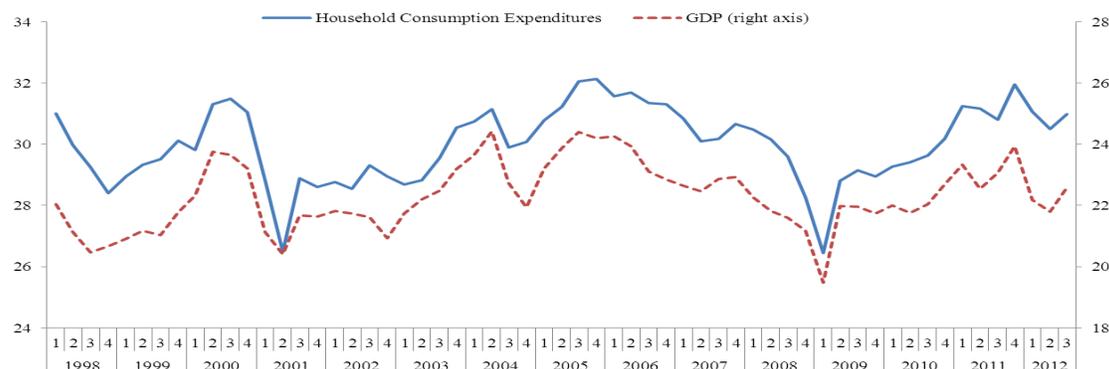
The classification of the sub-items of household consumption expenditures is done with respect to the United Nations (UN) classification of individual consumption according to purpose (COICOP). Household consumption expenditures are *Final Consumption Expenditures of Resident and Non-Resident Households*, which is one of the main National Income Accounts figures. Household consumption expenditures are analysed under two separate categories. First, household consumption demand is calculated as the sum of household consumption expenditures on non-durable goods and services. Second, household expenditures on durable goods are defined as durable consumption demand. *Furnishing, household equipment and routine household maintenance, Transportation and communication and Recreation and culture* sub-items are considered as household expenditures on durable goods. It can be seen from the TURKSTAT Household Budget Surveys that these sub-items of household consumption expenditures are mainly constituted by durable goods.

The ratios of household expenditures on durable goods to Gross Domestic Product (GDP) and also to household consumption expenditures decrease rapidly during crisis periods. This is especially the case for the economic crises in 2001 and in 2009 (Figure 2). The volatility of durable consumption demand is exceptional, but the sources of its volatility are not completely understood. It is often cited in the literature that the adjustment costs and the uncertainties that exist in the economy are the main reasons behind this situation (Bernanke, 1985; Attanasio and Weber, 2010). In particular, household expectations about their employment and income prospects

⁴ See 2010 Annual Programme Chapter III Section I.A.1 for detailed information on revenue and expenditure measures, which are taken against the global economic crisis and have an effect on the central government budget.

such as a spell of unemployment and its implications on household consumption patterns and saving decisions are analysed in the literature (Carroll and Dunn, 1997; Carroll *et al.*, 2003). Demand side developments in the credit markets are also discussed (Ludvigson, 1999).

Figure 2 – The Share of Household Expenditures on Durable Goods in Total Consumption and GDP (%)
(Seasonally adjusted)

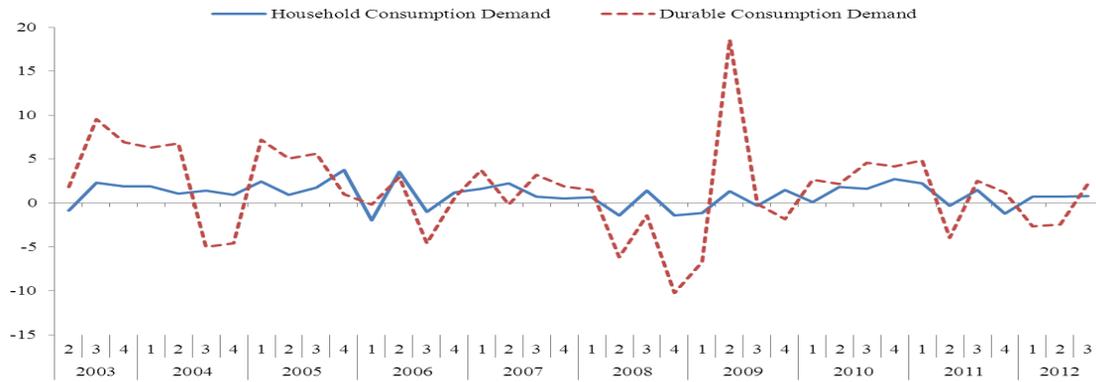


Source: TURKSTAT and CBRT

There are important differences between the sub-items of household consumption expenditures. The most notable difference is between household consumption demand and durable consumption demand. Durable consumption demand is often considered as household saving or investment. For this reason, it is not included in the analysis of the empirical validity of the REPIH (Campbell and Mankiw, 1989; Akçin and Alper, 1999 and Ceritoğlu, 2003). The growth of household consumption expenditures is highly volatile and tracks the growth of income closely, which conflicts with the predictions of the theory. However, household consumption demand is expected to be smoother compared to durable consumption demand and current income changes. The empirical analysis indicates that the high degree of volatility in household consumption expenditures mainly stems from durable consumption demand (Figure 3).⁵

⁵ Moreover, the standard deviation of the growth of durable consumption demand, which is calculated as 5.2, is almost four times higher than the standard deviation of the growth of household consumption demand, which is calculated as 1.4, for the period of analysis. The standard deviation of the growth of durable consumption demand is almost three times higher even when the global economic crisis period is left out of the sample.

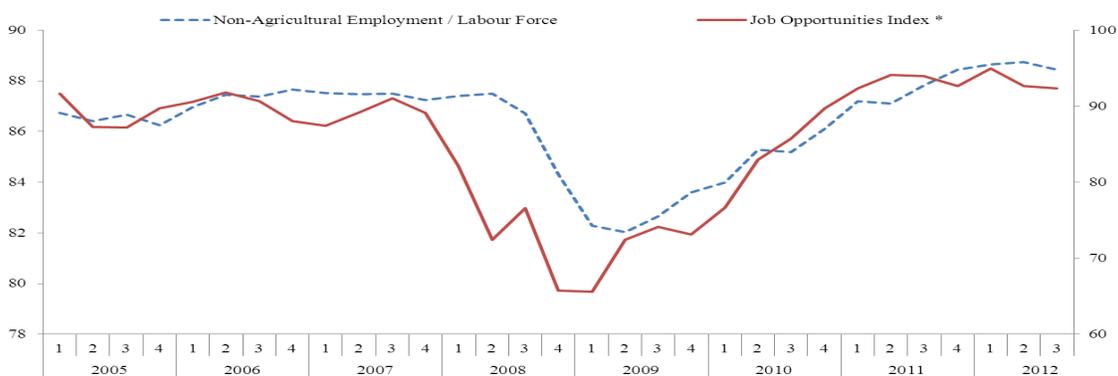
Figure 3 – The Growth Rates of the Sub-Items of Household Consumption Expenditures
(Seasonally adjusted, quarterly % change)



Source: TURKSTAT and CBRT

The Job Opportunities Index reveals household expectations about employment and income prospects. There exists a positive and statistically significant relationship between the growth of Gross Domestic Product (GDP) and the Job Opportunities Index (Table 3). The growth of GDP and the Job Opportunities Index moved in the same direction during the global economic crisis. In addition to that, the Job Opportunities Index is a useful leading indicator of employment ratio (*the ratio of non-agricultural employment to labour force*) in the non-agricultural sectors (Figure 4). In a similar way, Carroll (1992) selected survey responses to questions regarding unemployment under the assumption that household responses reflect their beliefs about future labour income uncertainty. Therefore, the Job Opportunities Index is seen as a promising candidate for a proxy variable to capture future labour income uncertainty in the empirical analysis.⁶

Figure 4 – The Job Opportunities Index (Seasonally adjusted)



Source: TURKSTAT and CBRT

⁶ I also experimented with the CBRT Consumer Confidence Index and different sub-indices of consumer confidence to capture household expectations, but the Job Opportunities Index proved to have more explanatory power on the growth of household consumption expenditures in the econometric estimations.

Albayrak (2011) analyses the effects of the change in the tax policy on income distribution using the TURKSTAT Household Budget Surveys during the global economic crisis period. Household expenditures on durable goods increased substantially in the second quarter of 2009 with respect to the previous quarter (Figure 3). Hence, temporary reductions in the tax rates raised domestic demand and contributed to the swift recovery of the Turkish economy in 2010. However, she criticises the tax policy, since higher income groups benefitted from the VAT and SCT rate reductions more than lower income groups, which worsened income distribution in 2009. Moreover, she mentions that the CBRT Consumer Confidence Index improved together with temporary tax rate reductions, which reveals that the stabilisation programme was successful in creating domestic demand. Thus, she highlights the direct relationship between household expectations and household consumption expenditures in Turkey.⁷

IV. Econometric Results

All economic variables are adjusted for seasonality and calendar effects using Demetra plus software in the first phase of the empirical analysis. The growth rate of GDP, the real interest rates, the Job Opportunities Index and the growth of the real consumer credit volume are the explanatory variables, which are used in the econometric investigation process. The annualised and weighted nominal interest rates that emerge from the Treasury auctions are deflated by annual consumer price inflation rate expectations from the CBRT Survey of Expectations. Consumer credits extended by the Deposit Banks to households are divided by the GDP deflator. Moreover, the natural logarithms of all the explanatory variables are taken, except for the real interest rate. In addition to that, all the explanatory variables are first-differenced because of the presence of unit root in the time series (Table 2).⁸ A unit root is discovered in the real interest rates because of the dramatic fall that occurred after 2009.

⁷ The *Buying Time Condition of Durable Goods Index*, which is one of the sub-items of the CBRT Consumer Confidence Index, realised a remarkable rise in the second quarter of 2009, when temporary tax reductions were effective. In this respect, the contemporaneous rise in the Buying Time Condition of Durable Goods Index and household expenditures for durable goods underlines the positive relationship between household expectations and household consumption expenditures in Turkey.

⁸ The unit root tests are carried out using EViews software.

Table 2 – Unit Root Tests⁽¹⁾

	ADF Stat.	Lag length	1 % Critical value	5 % Critical value	Number of obs.
ΔY	-4.509	0 (intercept)	-3.633	-2.948	35
ΔC	-5.748	0 (intercept)	-3.633	-2.948	35
ΔNC	-7.339	0 (intercept)	-3.633	-2.948	35
ΔD	-5.430	0	-2.633	-1.951	35
Δr	-4.750	0	-2.633	-1.951	35
ΔS	-5.180	0	-2.637	-1.951	33
ΔV	-6.352	0 (intercept)	-3.633	-2.948	35

(1) The unit root tests are carried out for the time period from 2004Q1 to 2012Q3.

The relationship between the growth of GDP and the selected explanatory variables is evaluated in the second phase of the empirical analysis. The preliminary econometric results show that there is not a statistically significant relationship between the growth of GDP and the change in the real interest rates in equations 1 and 2 in Table 3, contrary to the initial expectations. The expansion of the real consumer credit volume, which is denoted by V , has a positive and significant effect on the growth of GDP. In addition to that, there is a positive and statistically significant relationship between the growth of GDP and the Job Opportunities Index, denoted by S , in equations 2 and 3. Moreover, the size of its regression coefficient is greater than those of other explanatory variables and the explanatory powers (\bar{R}^2) of the second and the third regressions are significantly higher than that of the first regression (Table 3).⁹

Table 3 – Econometric Results^{(1) (2) (3)}

$$\Delta Y_t = \alpha + \delta_1 \Delta r_t + \delta_2 \Delta S_t + \delta_3 \Delta V_t + v_t$$

	δ_1	δ_2	δ_3	\bar{R}^2	D-W	Number of Obs.
(1)	-0.002	-	0.143 *	0.59	1.61	35
(2)	-0.0005	0.179 *	0.127 *	0.70	1.83	34
(3)	-	0.181 *	0.128 *	0.74	1.85	34

(1) The equations are estimated for the time period from 2004Q1 to 2012Q3.

(2) The equations are estimated using Ordinary Least Squares (OLS).

(3) Dummy variables for the first and the second quarters of 2009 are included to capture the effects of global economic crisis and the changes in the VAT and SCT rates on economic growth.

*, **, *** significant at 1%, 5% and 10%, respectively

⁹ I also regressed the change in the Job Opportunities Index on the growth of GDP, the first difference of the real interest rate and the expansion of the real consumer credit volume. The adjusted R^2 of the regression is 0.29 and the growth of GDP is positively correlated with household expectations and statistically significant at 1% level, while the first difference of the real interest rate is negatively correlated with household expectations and statistically significant at 5% level. However, the expansion of the real consumer credit volume has a negative sign, but it is not statistically significant.

IV.1. Household Consumption Expenditures

All the equations are estimated using the Generalised Method of Moments (GMM) methodology using EViews software. The lagged values of the growth of GDP, the change in the Job Opportunities Index, first difference of the real interest rate, the growth of household consumption demand and the expansion of the real consumer credit volume are used as instruments in the GMM estimations. The explanatory variables are lagged two to four quarters to eliminate the possibility of serial correlation in the GMM estimations following Campbell and Mankiw (1989). The dependent variable is the growth of household consumption expenditures compared to the previous quarter (Table 4). However, the numbers of observations in the estimated equations are limited, since the TURKSTAT-CBRT Consumer Tendency Survey starts in the first quarter of 2004.

Table 4 – Econometric Results ⁽¹⁾

$$\Delta C_t = \alpha + \sigma \Delta r_t + \lambda \Delta Y_t + \beta \Delta S_t + \gamma \Delta V_t + v_t$$

	σ	λ	β	γ	\bar{R}^2	D-W	J-test	Number of obs.	Instrument set
(1)	-	0.895 *	-	-	0.55	1.99	(0.277)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}$
(2)	-0.002	0.867 *	-	-	0.59	2.07	(0.432)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}$
(3)	-0.004	0.726 *	-	0.081 *	0.64	2.05	(0.623)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(4)	-0.003 *	0.461 *	0.177 *	0.099 *	0.64	2.40	(0.818)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(5)	-	0.326 *	0.264 *	0.078 *	0.56	2.32	(0.887)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(6)	-	0.267 **	0.338 *	-	0.42	2.11	(0.829)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta NC_{t-2} - \Delta NC_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$

(1) The equations are estimated for the time period from 2004Q1 to 2012Q3. The probability values of the J-tests for the over-identifying restrictions are presented in the parenthesis. *, **, *** significant at 1%, 5% and 10%, respectively

The econometric results show that there is a positive and statistically significant relationship between the growth of household consumption expenditures and the growth of GDP in all six equations, while the change in the real interest rates is marginally significant in equation 3 and its regression coefficients are quite small. The regression coefficients on the change in the Job Opportunities Index are statistically significant and have the expected positive sign in equations 4, 5 and 6. Moreover, the expansion of the real consumer credit volume is statistically significant in equations 3 to 5. According to the econometric results, the strict version of the REPIH is rejected, since the growth of consumption is linked to expected income changes. However, it is necessary to separate household expenditures on durable goods from the rest of household expenditures on non-durable goods and services to check the robustness of the econometric results. Household expenditures on durable goods show

a higher degree of volatility compared to household expenditures on non-durable goods and services as discussed previously (Figure 2).

According to the econometric results, there is a negative relationship between the growth of household consumption expenditures and the changes in the real interest rates; however, it is only marginally significant. Moreover, the regression coefficient on the change in the real interest rates is negligible. The size and the direction of the relationship between the growth of consumption and the real interest rates is considered as ambiguous in modern consumer theory, since the income effect and the substitution effect can move in opposite directions. The observed negative sign on the change in the real interest rates indicates that the substitution effect dominates the income effect in the period of analysis in Turkey.

IV.2. Household Consumption Demand

The econometric results show that there is a positive and statistically significant relationship between the growth of household consumption demand, which is household expenditures for non-durable goods and services, and the growth of GDP (Table 5). The observation of a positive and significant relationship between household consumption demand and expected income changes is interpreted as evidence for the presence of liquidity-constrained households in the Turkish economy. In addition to that, the growth of the real consumer credit volume has a positive and statically significant regression coefficient in equations 3 to 5. However, the size of the regression coefficients on the growth of GDP is actually smaller than the previous estimates for the Turkish economy in the literature (Akçin and Alper, 1999; Ceritoğlu, 2003). These empirical findings indicate that the importance of the liquidity constraints diminished in Turkey compared to the past decade. Even if liquidity constraints prevail in the economy, there were also positive developments in the financial markets such as the decline in the public sector borrowing requirement ratio, which might have helped consumers access to credit easily.

Moreover, there is a positive and statistically significant relationship between the growth of household consumption demand and the change in the Job Opportunities Index in equations 4 to 6. It is thought that households raise their consumption expenditures compared to the previous periods, when their expectations about future employment and income prospects are positive. Moreover, the growth of GDP is not statistically significant or marginally significant, if the change in the Job Opportunities Index is included in the estimation. Therefore, the econometric results are in favour of the precautionary saving hypothesis. Previously, Madsen and

McAleer (2000) found that the excess sensitivity of the growth of consumption to expected income changes ceases to be significant, when uncertainty and credit growth are accommodated in the models. However, it is observed that the explanatory powers (\bar{R}^2) of the estimated equations remain relatively small (Table 5).

Table 5 – Econometric Results ^{(1) (2)}
 $\Delta NC_t = \alpha + \sigma \Delta r_t + \lambda \Delta Y_t + \beta \Delta S_t + \gamma \Delta V_t + v_t$

	σ	λ	β	γ	\bar{R}^2	D-W	J-test	Number of obs.	Instrument set
(1)	-	0.476 *	-	-	0.41	1.92	(0.506)	34	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta D_{i-2} - \Delta D_{i-4}$
(2)	-0.003	0.555 **	-	-	0.41	2.37	(0.542)	34	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta D_{i-2} - \Delta D_{i-4}, \Delta r_{i-2} - \Delta r_{i-4}$
(3)	-0.003 ***	0.446 **	-	0.050 **	0.51	2.04	(0.631)	34	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta D_{i-2} - \Delta D_{i-4}, \Delta r_{i-2} - \Delta r_{i-4}, \Delta V_{i-2} - \Delta V_{i-4}$
(4)	0.001	0.039	0.117 **	0.101 ***	0.57	2.39	(0.615)	30	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta S_{i-2} - \Delta S_{i-4}, \Delta V_{i-2} - \Delta V_{i-4}$
(5)	-	0.070	0.101 **	0.113 **	0.63	2.38	(0.671)	30	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta S_{i-2} - \Delta S_{i-4}, \Delta V_{i-2} - \Delta V_{i-4}$
(6)	-	0.157 ***	0.119 **	-	0.45	2.29	(0.885)	30	$\Delta Y_{i-2} - \Delta Y_{i-4}, \Delta NC_{i-2} - \Delta NC_{i-4}, \Delta D_{i-2} - \Delta D_{i-4}, \Delta S_{i-2} - \Delta S_{i-4}, \Delta V_{i-2} - \Delta V_{i-4}$

(1) The equations are estimated for the time period from 2004Q1 to 2012Q3.

(2) Dummy variables for the first quarter of 2006 and the third quarter of 2009 are included in the regressions.

The probability values of the J-tests for the over-identifying restrictions are presented in the parenthesis.

*, **, *** significant at 1%, 5% and 10%, respectively

IV.3. Durable Consumption Demand

There is a positive and strong relationship between durable consumption demand and expected income changes. The empirical results show that there is a positive and statistically significant relationship between the growth of household expenditures on durable goods and the growth of GDP (Table 6). The regression coefficient on the growth of GDP is greater than one in equations 1, 2 and 6, which is counter-intuitive at first sight. Carroll *et al.* (1994) also reached similar econometric results. Durable goods purchases are discrete unlike household consumption demand, which is assumed to be continuous. It is thought that households postpone expenditures on durable goods and realise their demand only when there is high income growth or favourable conditions in the markets. Therefore, the growth of household expenditures on durable goods is more sensitive to the growth of GDP than household consumption expenditures for non-durable goods and services. As a result, the growth of household expenditures on durable goods is stronger at times when there are significant increases in current disposable income level.

In contrast to the initial expectations, a significant relationship between the growth of household expenditures on durable goods and the changes in the real interest rates cannot be observed in the econometric results (Table 6). Although, the relationship between the growth of household expenditures on durable goods and

the changes in the real interest rates is negative as expected, it is marginally significant in equation 2 and not statistically significant in equations 3 and 4. The inclusion of a dummy variable to capture the effects of the reduction in the VAT and SCT rates on durable goods mainly in the second and the third quarters of 2009 partly leads to this outcome. The regression coefficient on the change in the real interest rates becomes statistically significant, if the dummy variable is removed from the estimations, but its regression coefficients remain negative and small. In this case, the explanatory power of the estimated regressions (\bar{R}^2) decrease significantly, which indicates the necessity of the inclusion of the dummy variable for the VAT and SCT tax rate reductions. Moreover, it is observed that there is a positive and statistically significant relationship between the growth of household expenditures on durable goods and the expansion of the real consumer credit volume in equations 3 to 5. The regression coefficients on the expansion of the consumer credit volume are also sizeable.

Table 6 – Econometric Results ^{(1) (2)}
 $\Delta D_t = \alpha + \sigma \Delta r_t + \lambda \Delta Y_t + \beta \Delta S_t + \gamma \Delta V_t + v_t$

	σ	λ	β	γ	\bar{R}^2	D-W	J-test	Number of obs.	Instrument set
(1)	-	1.695 *	-	-	0.60	2.03	(0.325)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}$
(2)	-0.006	1.789 *	-	-	0.57	2.07	(0.635)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}$
(3)	-0.002	1.225 **	-	0.158	0.66	2.04	(0.662)	34	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(4)	0.002	0.353	0.499 *	0.191 *	0.61	1.89	(0.730)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(5)	-	0.455 **	0.455 *	0.192 *	0.66	1.96	(0.808)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$
(6)	-	0.633 *	0.446 *	-	0.63	1.75	(0.812)	30	$\Delta Y_{t-2} - \Delta Y_{t-4}, \Delta C_{t-2} - \Delta C_{t-4}, \Delta r_{t-2} - \Delta r_{t-4}, \Delta S_{t-2} - \Delta S_{t-4}, \Delta V_{t-2} - \Delta V_{t-4}$

(1) The equations are estimated for the time period from 2004Q1 to 2012Q3.

(2) A dummy variable for the second quarter of 2009 is included to capture the changes in the VAT and SCT rates.

The probability values of the J-tests for the over-identifying restrictions are presented in the parenthesis.

*, **, *** significant at 1%, 5% and 10%, respectively

There is a positive and statistically significant relationship between the change in the Job Opportunities Index and the growth of household expenditures on durable goods in equations 4 to 6. Moreover, the change in the Job Opportunities Index remains statistically significant at 5 percent level, even if the real consumer credit volume is introduced into equations 4 and 5. The regression coefficient on the growth of GDP falls below one, when the change in the Job Opportunities Index and the expansion of the real consumer credit volume are jointly estimated in equations 4 and 5. In addition to that, the explanatory powers (\bar{R}^2) of the estimated regressions are higher than the estimations without these two variables (equations 1 and 2).

In the light of these findings, we can state that household expectations about their employment and income prospects have a direct role on their consumption and saving behaviour in addition to their indirect

influence through the income channel. The lagged values of the change in the Job Opportunities Index is used as an instrumental variable, while it is introduced to the econometric estimations as an explanatory variable.¹⁰ The Job Opportunities Index is selected as an instrumental variable due to its strong relationship with the growth of GDP. At the same time, the change in the Job Opportunities Index is positively and significantly related to the growth of household consumption expenditures and its sub-components.

The econometric results show that there are important differences between the sub-items of household consumption expenditures. Household expenditures on durable goods are more sensitive to changes in household expectations, the real interest rates and consumer credits than household expenditures on non-durable goods and services as expected. It is reasonable to think that household expectations have a similar role in the housing market, since house purchases also require steady income growth, favourable conditions in the financial markets, long-term planning and commitment. Moreover, the empirical analysis indicates that the credit channel is more important than the interest rate channel for household consumption expenditures. The expansion of the real consumer credit volume has a sizeable and significant effect on the growth of household consumption expenditures and its sub-components, but the change in the real interest rates are insignificant in the econometric estimations. For that reason, it could be more effective to control consumer credits rather than raising the interest rates to restrain domestic demand, especially for durable goods in Turkey.

V. Conclusion

The empirical analysis confirms that household expectations have a direct role on their consumption and saving behaviour in addition to their indirect influence through the income channel. The econometric results show that there is a positive and statistically significant relationship between the growth of consumption and expected income changes. Therefore, the strict version of the rational expectations permanent income hypothesis (REPIH) is rejected for the Turkish economy. Moreover, the econometric results reveal that there is a positive and significant relationship between the growth of consumption and the change in the Job Opportunities Index from the TURKSTAT-CBRT Consumer Tendency Survey, which reflects household expectations about their employment and income prospects. Household expectations affect household consumption and saving decisions directly in addition to its indirect influence through the income channel. As a result, the econometric results are in favour of the precautionary saving hypothesis.

¹⁰ The Instrument Orthogonality tests of a sub-set of the instruments after the GMM estimations demonstrate that the lagged values of the change in the Job Opportunities Index are accepted as valid instruments.

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