



THE EFFECT OF CONSUMER LOANS ON DURABLE CONSUMER GOODS  
EXPENDITURES

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THE EFFECT OF CONSUMER LOANS ON DURABLE CONSUMER GOODS  
EXPENDITURES

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Approval of the Graduate School of Social Sciences

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## ABSTRACT

### THE EFFECT OF CONSUMER LOANS ON DURABLE CONSUMER GOODS EXPENDITURES

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This thesis analyzes the effect of consumer loans on durable goods consumption expenditures. In the study, the theories of consumption and determinants of durable goods consumption are explained and a literature review is presented. A multiple regression model is used to analyze the relationships between consumer loans, which are a method of purchasing durable goods, and durable consumer goods expenditures. In the analysis dependent variable is durable consumer goods expenditures while independent variable is total consumer loans extended. Furthermore, the real gross domestic product, the real interest rate, the rate of inflation and the real effective exchange rate index are used as control variables. Results show that there is a significant relationship between consumer loans and durable consumer goods expenditures. Regarding the effect of control variables on durable consumer goods expenditures, real GDP and real interest rate are found significant however the rate of inflation and exchange rate are insignificant. In contrast to other variables, the inflation and exchange rates have negative effects. The effect of consumer loans on durable consumer goods expenditures becomes more important when control variables are included to the model.

Keywords: consumer loan, durable goods, household consumption

ÖZET

TÜKETİCİ KREDİLERİNİN DAYANIKLI TÜKETİM MALI HARCAMALARI  
ÜZERİNDEKİ ETKİSİ

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Bu tez tüketici kredilerinin dayanıklı tüketim malı harcamaları üzerindeki etkisini analiz etmektedir. Çalışmada tüketim teorileri, dayanıklı tüketim malı harcamalarının belirleyicileri anlatılmakta ve bir literatür taraması sunulmaktadır. Dayanıklı mal satın almak için bir finansman yolu olan tüketici kredileri ile dayanıklı tüketim malı harcamaları arasındaki ilişki çoklu regresyon yöntemi ile analiz edilmektedir. Analizde bağımsız değişken kullanılan toplam tüketici kredileri iken bağımlı değişken dayanıklı tüketim malı harcamalarıdır. Ayrıca reel gayri safi yurtiçi hasıla, reel faiz oranı, enflasyon oranı ve reel efektif döviz kuru endeksi kontrol değişkenler olarak kullanılmaktadır. Sonuçlar, tüketici kredileri ile dayanıklı tüketim malı harcamaları arasında anlamlı bir ilişki olduğunu göstermektedir. Kontrol değişkenlerin dayanıklı tüketim malı harcamaları üzerindeki etkisine ilişkin, enflasyon oranı ve reel efektif döviz kuru önemsiz bulunurken reel gayri safi yurt içi hasıla ve reel faiz oranı önemli bulunmuştur. Diğer değişkenlerden farklı olarak enflasyon oranı ve reel efektif döviz kurunun etkisi negatiftir. Kontrol değişkenler modele dahil edildiğinde, tüketici kredilerinin dayanıklı tüketim malı harcamalarındaki etkisi daha önemli olmaktadır.

Anahtar Kelimeler: tüketici kredileri, dayanıklı mallar, hanehalkı tüketimi

To My Parents

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## ABBREVIATIONS

ADF : Augmented Dickey Fuller

BAT : The Banks Association of Turkey

CBRT : Central Bank of Republic of Turkey

CPI : Consumer Price Index

DCE : Durable Consumption Expenditures

DF : Dickey Fuller

GDP: Gross Domestic Product

IMF: International Monetary Fund

SPO: State Planning Organization

TURKSTAT: Turkish Statistical Institute

## INTRODUCTION

Consumption expenditure is the value of payment made by households for consumption goods and services in a given time period. Private final consumption expenditures, a subcategory of gross domestic product (GDP), includes food and beverages, semi-durable and non-durable goods, such as food, fuel, cosmetics and cleaning products and durable goods such as cars, electronic equipment, houseware and accessories, energy, transportation and communication, house ownership, and services.<sup>1</sup> In this study household expenditure on durable goods are examined.

In any society, the household is the basic socio-economic unit; therefore the household consumption is important while analyzing a country's socio-economic structure. The economic performance of a country can be evaluated by considering consumption level. According to Smith (1970) "The sheer magnitude of consumer spending indicates that changes in such spending may have profound effects on economic conditions." Consumption is normally the largest component of GDP; especially private final consumption expenditures constitute the greatest demand component of GDP.<sup>2</sup> Increase in consumption expenditures affects national income

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<sup>1</sup> <http://www.turkstat.gov.tr>

<sup>2</sup> According to the data taken from Turkstat, between the years 1998-2007 private consumption expenditures constituted 67,5%- 70% of GDP.

Source: <http://www.turkstat.gov.tr> last visited on 22.04.2009

positively by the multiplier effect –equilibrium expenditure increases by more than the increase in autonomous expenditure.

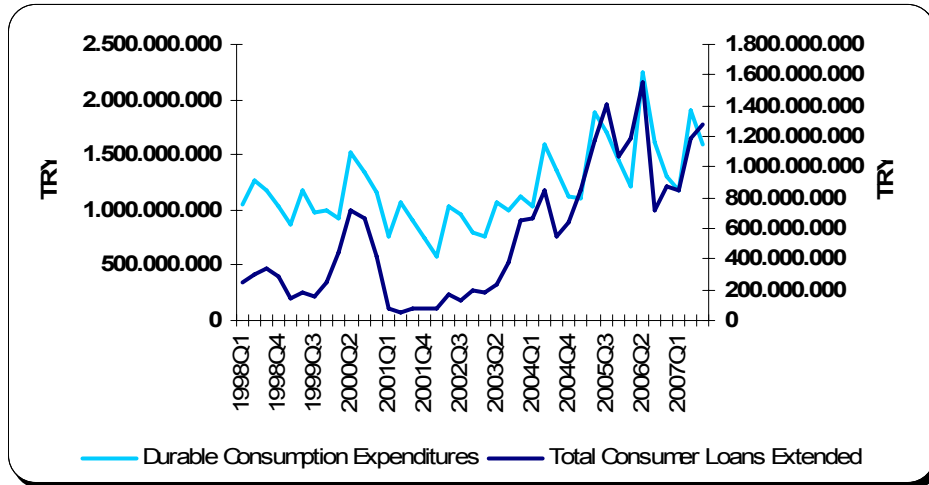
Every society has different consumption and saving attitudes in the world. In developed countries where people have high per capita income, heavy budget consumers are able to spend more. On the other hand, people in under-developed countries have limited resources, because these people's income is limited and family budgets are tight.

There are two ways for people to finance their expenditures; spending accumulated savings and using consumer loans. Banks lend consumers a large amount of money, and consumers guarantee pay it back at a certain time in the future, in other words people use their future income while using consumer loan. Moreover, people also use consumer loans for urgent needs in case of lack of money. Consumer loans may induce people to spend more. Figure 1.1 shows the relationship between consumer loans extended and household's durable consumption expenditures.

In Figure 1.1, consumer loans include automobile and housing loans, general purpose loans (loans borrowed for durable and semi-durable consumer goods, education, marriage and health purposes), others (loans which can not be grouped in the other three types of loans).



**FIGURE 1.1 COMPARING TOTAL CONSUMER LOANS EXTENDED TO DURABLE CONSUMPTION EXPENDITURES**



Source: The Banks Association of Turkey (BAT) and Turkish Statistical Institute (Turkstat).

As seen above, when households consume more, they also use more credit. Sharp movements can be seen in consumer loans curve. From this graph alone, it is possible to demonstrate a clear relation between durable consumption expenditures and total consumer loans extended.

Consumer loan is one of the most important factors affecting consumption, specifically durable consumer goods expenditures. In the literature, there has been much research into the relationship between consumer loans and consumer durables, however these studies, only consider the effects of credit conditions (the length of maturity, interest rate, down payment), availability of credit and credit limit.<sup>3</sup>

<sup>3</sup> See Suits (1958), Fisher (1963), Ball and Drake (1963), Evan and Kisselgoff (1968), Eastwood and Anderson (1976), Ludvigson (1999) and Soman and Cheema (2002).

Apart from consumer loans there are many factors influencing household consumption expenditure decisions and saving. Disposable income is the most effective factor. Furthermore, the real interest rate, expected future income, liquid assets of household, the purchasing power of net assets (assets minus debts), consumer attitudes and future expectations; distribution of income, exchange rate, real GDP, inflation and credit card utilization are other factors affecting household consumption expenditures (Parkin, Powell and Matthews: 1998).

This study aims to examine the influence of consumer loans on financing durable consumption expenditures. The figures in the following chapters and the reports prepared by Central Bank of Republic of Turkey (CBRT)<sup>4</sup> show that consumers finance a part of private final consumption expenditures by consumer loans, when economic conditions are adequate. The results will show the relationship between consumer loans and durable consumption expenditures controlling the effects of main economic indicators; the real interest rate, the rate of inflation, the real GDP and the real effective exchange rate.

In this thesis in order to measure the effect of consumer loans on durable consumption expenditures, multiple regression models are built by considering variables above. In the analysis, I use quarterly data covering 1998-2007 periods. Although other determinants of durable consumption are available, they can not be used due to inadequate data.

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<sup>4</sup> <http://www.tcmb.gov.tr> 2007 Financial Stability Report.

Chapter 1 is a literature review. Recent studies into the determinants of consumption, effect of these determinants on durable goods consumption, and also consumption theories and reports are presented in this chapter.

Chapter 2 consists of methodology and analysis. In this chapter explanations can be found about all data which are collected from several sources. The method for analyzing variables; time series and multiple regression analysis, is explained.

Conclusion part looks at whether consumer loans and the other factors affect household's durable goods consumption. I believe that the main benefit of this study will be to reveal the influence of consumer loans on financing durable goods consumption.

## **CHAPTER 1.**

### **LITERATURE REVIEW**

Much research has been conducted into the macroeconomic relationships between household consumption on durable goods and the factors influencing these expenditures. In the following sections, research relating to determinants of durable goods consumption is discussed.

#### **SECTION 1. INCOME**

Disposable income and consumption are interrelated; indeed, consumption expenditures ordinarily depend on the level of income. In emerging economies, as earnings increase, firstly there is a transition from consumption of non-durable goods to semi-durable and durable goods. Subsequently an increase in consumption begins to slowdown. In time, if income continues to increase, savings also grow.

Individuals use disposable income either for consumption expenditure or for saving. Hence, income is the basic factor influencing consumption. People have different structures of consumption systematically, in respect to their income level. Those with

lower income spend a higher percentage on food and other basic needs, and less on other goods (Sevindirici: 2001).<sup>5</sup>

Distribution of income determines household's consumption expenditure forms. For instance, according to 2007 Household Budget Survey, prepared by Turkstat<sup>6</sup>, households with lower income spend twice as much on food as those with higher income. Expenditure patterns also change according to households' main source of income. Unfortunately, the household budget survey has only been prepared since 2003. Therefore it is impossible to use distribution of income data in this study.

Keynes (1936) discussed consumption expenditures psychologically. He claimed that individuals have consumption habits link to their income, in other words they adopt a life standard parallel to their income. According to this basic psychological rule which Keynes discusses, when individuals have more income, they consume more. However increase in consumption and saving is less than the overall increase in income. In line with Keynes's argument, Ludvigson (1999) improved The Time-Varying Liquidity Constraints Model and explained the correlation between increase in consumption and income growth. Lusardi (1996) also revealed that consumption is strongly sensitive to increase in income. Similarly, Lee (1964) analyzed the relationship between durable consumer good demand and various income groups for

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<sup>5</sup> Ibrahim Sevindirici (2001) compares the member countries of European Union with Turkey and explains why Turkish households portion two times more on food with two reasons; firstly households have tight budget. Secondly; although European Union countries' households have one, two or three members, Turkish families have usually five or six members. He also says that households in Turkey benefit less and inefficiently from energy, transportation and communication services. Therefore, EU countries expend 3-5 times more money than Turkey for these services.

<sup>6</sup> <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=2070>

the years 1954-1961. Results show that increase in income makes consumers adjust their durable good purchase upward, however if income decreases, they resist adjusting durable good purchase downward.

*Relative Income Hypothesis*, proposed by Duesenberry (1949), states that an individual's consumption and saving attitude is predicated on his income in relation to standard of living. In addition, he claims that people affect each other's consumption. According to him, people who want a higher life standard would consume more than their disposable income to reach consumption levels of upper-income groups. In any particular society, especially middle-income consumer behavior follows consumption form of upper-income groups.

*Life-Cycle Hypothesis*<sup>7</sup> (LCH) states that individuals consider future income beyond current income to afford their consumption expenditures. In the basic point of this approach, individuals prefer a stable consumption form. That is, when an individual has a transitory income, it does not make consumption increase suddenly, but will be divided equally over rest of his life. Thus, whole life consumption will increase.

According to Modigliani (1957), an individual's saving depends on his psychological tendency and varies in youth, middle age and old age. In youth, individuals have lower income (almost zero) but consumption is greater. Saving is negative due to zero income. In middle age period, individuals tend to save more because of old

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7 Irving Fisher (1867-1947) and Roy Harrod (1900-1978) developed LCH that comprises the analysis of individual consumption. Later it is extended by Japanese economist Albert Ando (1929-2001) and Italian-born economist Franco Modigliani (1918-2003).

debts and the need to cover consumptions for old age period. In old age, individuals spend their savings and make negative saving by retirement.

Krueger (2001) says that people accumulate financial assets for retirement. At this point, durable goods are important because 35% of households' total assets is real estate and other durables, while only 28% of total asset is equity. He also claims that although young households have less liquid assets, they keep greater part of it as durable goods.

*Permanent Income Hypothesis (PIH)*, developed by American economist Milton Friedman (1957), states that while consumers make choices regarding their consumption patterns, they consider not only current income but also longer-term income expectations. Friedman's consumption function analysis assumes that average propensity to consume is determined by interest rate, income, fortune and consumer's age.

LCH and PIH, aggregate wealth or consumer net worth directly into the consumption function. Consumption expenditure is a function of not only income, size of assets and holding type but also their distribution type. According to Modigliani's LCH, an individual who was born in a wealthy family spends more than individuals with no inherited wealth.

According to Friedman (1957), an individual's consumption does not change in relation to changes in current income level. The factor that changes individual's

consumption is permanent income, which is not as floating as current income. Also, in price level the permanent rather than current price is important. Permanent prices are expected prices by individuals. Permanent income and permanent prices depend on observation relating to income and prices formed in the past.

Friedman's opinion, which states the higher the income, the higher the consumption/income ratio, was verified by cross-section analyzing by Groen (2000). Stephens (2001) analyzed "the response of consumption to job displacement and disability" by using "Panel Study of Income Dynamics". He calculated that in short term, household consumption is not significantly effected by the changes in householder's income; although in the long term, household consumption reduces significantly. Moreover, Carroll and Hopkins (1997) discussed "buffer-stock" saving and the LC/PIH, and concluded that household's saving behavior is better described by the "buffer-stock" model and confirmed that a consumer's average consumption increase is equal to average income increase. Dornbusch (1998) claims an individual can finance his consumption expenditures with his whole life income and original wealth. According to him, the factor that determines consumption expenditures is consumers' existing income and whole life resources.

Hamburger (1967) analyzed the relationship between interest rates and durable consumption –automobiles and parts, furniture and household equipments-. He concluded that income has a major effect on automobile expenditures. Moreover, income influences the purchase of a new car more than that of other durables. Indeed, when there is a change in income, consumers begin to adjust their



expenditures other than automobile in the current period, however, they do not begin to adjust automobile expenditures until one period later.

## **SECTION 2. INTEREST RATE**

In consumption function, only income and liquid assets have been considered as monetary variables. Keynes (1936) claimed that interest rate is a secondary factor affecting individual's short-term consumption expenditures. Furthermore, in the long-term, any change in interest rate would cause changes in people's habits, so they save more and consume less in the long-term. Considering interest rate has an effect on increasing bank deposit, value of stocks; it can be said that interest rate has a long run influence on consumption and saving (Katona: 1960, Parkin, Powell and Matthews: 1998).

In his study, Hamburger (1967) claims that one of the significant determinants of durable consumption is monetary variables; firstly interest rates and the rate of change in money supply, the aggregate money supply, and the consumer stock of liquid assets. In conclusion he discovered that interest rates influence other durables more than automobiles. Regarding the relation between consumers' liquid assets, interest rates and durable consumption; it takes time for interest rates to affect consumers' liquid assets and their durable consumption expenditures, indirectly. Thus, interest rates affect durable consumption in long term, but not in the short term.

A variance analysis study made by Erceg and Levin (2006) confirmed that the durable consumption goods sector is more sensitive to interest rates than non-durable consumption goods sector. In contrast, Baum (1988) claims real interest rates have very small and statistically an insignificant effect on consumption-saving decisions. A study by Zhang and Wan (2002) in China, concludes that real interest rates create a weak substitution effect on a household's consumption expenditures. Inflation rate is more related to household's consumption expenditure decisions.

Mishkin (1976) examined the effect of monetary policy on durable consumption, and concluded that tight monetary policy increases interest rate and high interest rate disinclines consumers from buying durables. Another research was made by Mankiw (1985) using the U.S.A. data for the years 1950-1981. According to the estimated model in this study, durable goods are excessively sensitive to interest rates. Also, fluctuations in durable consumption expenditures are related to fluctuations in the economy.<sup>8</sup>

### **SECTION 3. CONSUMER ATTITUDES AND EXPECTATIONS**

One of the important determinants of durable consumption expenditures is consumer attitudes and expectations about future (Katona: 1960). Traditional consumption functions based on the LCH and PIH consider that consumption expenditures are

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<sup>8</sup> In the study, durable goods include motor vehicles and their parts (45%), furniture and housing equipment (35%), and exclude housing.

influenced by consumers' future income expectations (Dion: 2006). Hall (1978) states that consumers consider their future revenue while spending.

Expected future income influences household consumption. As far as income expectations are concerned, studies show that those who expect their incomes to increase have a tendency to spend more and save less, in contrast those who expect their incomes to decline, for example if their job is at risk, save more. In particular, if people expect their future income to rise, they spend more on durable goods such as new cars or furniture. However, these expectations are subjective and therefore difficult to evaluate.

Individuals also consider price expectations while consuming. Studies indicate that price expectations are unstable and change frequently. The reasons for people having price expectations are usually superficial. There are indicators, when people expect prices to fall; they buy more because falling prices are associated with healthy economic conditions. On the other hand, in times when there are strong expectations for rising prices, consumption expenditures may increase sharply (Zurawicki and Braidot: 2005).

It is usually said that changes in the expected level of inflation will alter consumers' planned expenditure programs. Where increase in prices is expected, consumption is expected to decline in the same period. High inflation rate affects consumer durables mostly, because when people expect a high rate of inflation, they feel uncertain about future. This affects consumers' disposable income expectations and they consume

less. “In line with the well-known income elasticities for the components of consumer expenditures, this “income effect” should be strongest with respect to durables. To the extent that a higher expected rate of inflation stimulates current consumer expenditures, it is probable that this effect will be most noticeable in the durable goods categories” (Springer: 1977).

According to the University of Michigan Survey Research Center, consumer sentiment and expectations are important, because they influence demand for durable goods and housing. In the same study, regression analysis also shows that consumer attitudes have a significant effect on forecasting durable consumption expenditures (Adams: 1964).

A survey was prepared in Britain by Pickering and Isherwood (1975), who interviewed 386 households to evaluate their attitudes, expectations, socio-economic status and to predict their durable goods expenditures. Interviews were repeated after a 14 month interval. Discriminant analysis, multiple regression and difference of means were used in the survey in which expenditure levels constituted dependent variables, socio-economic and psychological information constituted independent variables. Results show that consumers’ buying behavior and other attitudes might be related to particular economic conditions, since the survey was prepared in an inflationary period. Another study was conducted by Kwan and Cotsomitis (2004). They claim that consumer confidence indices reveals consumers’ future expectations for economic conditions, and that future growth of consumption can be construed, using indices.

In Turkey, Turkstat and CBRT evaluate consumer behaviour and expectations with “Consumer Tendency Survey” every month. Consumer confidence index contains sub-indices; purchasing power, general economic situation, job opportunities, buying time condition of durables. This index gives clues about consumers’ expectations. If there were sufficient data, we could use them in the analysis; however, unfortunately the consumer tendency survey has only been conducted since 2003.

#### **SECTION 4. RATE OF INFLATION AND EXCHANGE RATE**

The exchange rate is an important factor for household consumption on durable goods. In emerging economies exchange rate is a key for pricing and in those countries production usually depends on imports. Exchange rate causes uncertainty in import prices. Rising exchange rate means that other prices are likely to rise also if they are related to foreign trade. In this case, exchange rate volatility affects imported durable consumer goods and has a negative effect on the demand for imported durables.

Exchange rate affects foreign trade prices and expectations and thus also inflation. In emerging economies inflation is more sensitive to exchange rates, compared to developed countries. Because of this, both exchange rate and inflation rate affect durable consumption expenditures; therefore in long term consumption inflation is as important as income (Davidson: 1978).

Turkstat publishes the consumer/producer price index every month. The inflation level depends on the change in index, so the base year is important. When inflation is falling, backward looking indexation makes individuals' wages more valuable (higher disposable income). In other words, more goods can be purchased with the same money compared to the past.

In his study, Végh (1998) researched the relationship between exchange rate-inflation and timing of durable goods consumption. He claims that in countries with an inflationary economy, exchange rate based stabilizations generate a consumption boom, after a while recession occurs (called boom-recession cycle). The falling rate of inflation creates wealth effect. As mentioned above, backward-looking indexation creates boom-recession cycle; consumers increase durable good consumption; hence aggregate consumption boom falls out. Later, consumption slows down because people do not need to replenish their durable goods.

Similarly, Juster and Wachtel (1972) examined the effect of inflation on consumption. Their study is based on data on individuals' expectations about the future inflation rate. They discovered that a higher expected rate of inflation results in a decline durable goods consumption. Likewise, Burch and Werneke (1975) reached the same conclusion; unforeseen increases in inflation rate results in higher saving and decrease in durable good expenditures.

Springer (1977) examined Juster's and Wachtel's results, but he used different data; inflationary expectations based on past actual rates of inflation, in other words he

compared “objective” and “subjective” measures of inflationary expectations and concluded that, with the exception of automobiles, the purchase of durables were not affected by inflationary expectations (either objective or subjective means).

## **SECTION 5. CONSUMER LOANS**

Consumer loan is one of the most important factors affecting consumption, specifically durable consumer goods expenditures. In the development of the durable consumer goods sector, consumer loans play an important role through generating adequate payment conditions for customers. According to researches, in the early 18<sup>th</sup> century, durable goods were already being sold in instalment bonds, which were a kind of consumer loans. Since then, consumption patterns changed with development of industrial production (Vorstermans: 1966).

The arrangement of consumer loans, such as hire-purchase sale, became wide spread with urbanization and socialization (Gelpi and La Bruyere: 1994). In the 19<sup>th</sup> century furniture and house equipment were sold in instalments. Finally, in the 20<sup>th</sup> century, credit bureau was affiliated with car producers such as the Ford Credit Company (Vorstermans: 1966, Gelpi and La Bruyere: 1994).

## **5.1 THE DEVELOPMENT PROCESS OF CONSUMER LOANS AND CONSUMER DURABLES MARKET IN TURKEY**

In Turkey, the durable goods sector was an emerging market in 1960's and was sustained by "import substituting industrialization strategy". In the development process of the market, economic conditions seemed appropriate for domestic producers compared to the western countries. When domestic production started, however it was ascertained that market conditions were not convenient for customers. Although prices of domestic durable goods were lower than imported durables, the majority of wage/salary earners still were not able to afford them. In this case, to increase durable consumer goods sale and demand, there had to be suitable payment conditions. However, institutional and legal framework of consumer loans was under-developed.

Arrangement of consumer loans legislation was therefore an important issue in the development of durable consumer goods market. In development of this sector the government plays an important role through regulating legislation of consumer loans and providing the stability of employment and income.

In Turkey, consumer loans were arranged by the Loan Act in 1926. But the law provided a limited protection for sellers in sales by instalments. The Loan Act did not constitute an institutional basis for the development of consumer durables sector. Furthermore, the law disrupted arrangement of credit agencies that provides consumer credit. In 1969, the State Planning Organization (SPO) accepted the



necessity of specialized consumer credit institutions and The Central Bank was given the responsibility of creating these institutions. Eventually the Bank Act was revised in 1994 and the Koc Group started a company to finance consumer expenditures on their products. However arrangements of instalment sales were not satisfactory.

In 1986 the Central Bank regulated the sales with pre-payments. Managers of Arçelik were unsatisfied by this legislation since it provides no protection to the seller (Solakoğlu: 1987). At this point, Arçelik -the first manufacturer of consumer durables in Turkey- created a nation-wide network of dealer that played a crucial role in shaping consumer spending. Accordingly, “the sales agents have assumed a vital market-forming role by organizing a largely informal mechanism of consumer credit on the basis of the first-hand personal information that they had on the economic means and reliability of their potential customers” (Buğra: 1998). The sales agents worked as fund managers to their customers. Firstly they convinced customers to buy durables and offered them reasonable and flexible payment conditions.

Consumer credit has had a great effect on household’s increasing consumption expenditures. Thus people are becoming accustomed to consumption using debt. Hence, consumer loans are increasing domestic demand drastically. Besides, banks commercialize greater amounts of consumer loans more easily through the medium of credit card.

There are two sources of consumer loans; commercial banks and consumer finance companies. Commercial banks are the most important institutions in Turkish

economy, operating as universal banks offering a wide range of products and services using developing technology today. Their basic duty is take deposits and give loans. Consumer finance companies are known as a small credit companies since they extend many types of individual loans. Automobile and real estate loans have the biggest share of extended loans; in addition, consumer finance companies give loans for health, education, vacation, housing maintenance and energy expenditures. Consumer loans are the most profitable investment method for many financial companies; the loans are more risky and costly, therefore they are subject to high interest rates.

Consumer loans enable consumers to purchase products that cannot be afforded today. On the other hand they increase the ambition of consuming and cause the consumer to buy more than his financial potential. The consumer cannot resist the attraction of loans and mostly do not understand the burden that the debt will bring.<sup>9</sup>

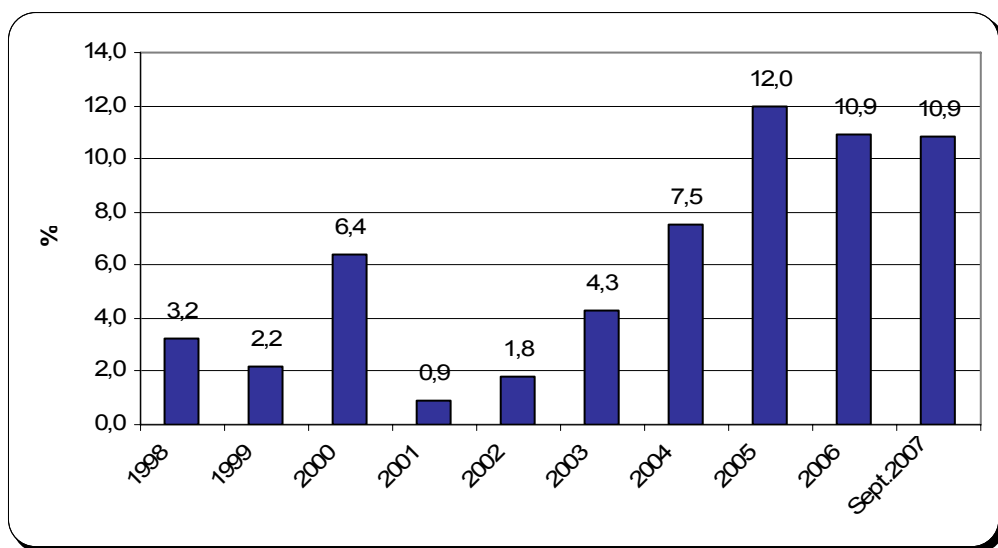
Economic function of consumer loans is also important, since they affect individuals' consumption expenditures. For instance, credit card enables users to change their life style and bring much convenience. Although credit cards benefit users' life in economically developed countries they can negatively affect users' settled purchasing habits in countries such as Turkey where income distribution is disordered, inflation rate is high, propensity to save is low and consumption habits are different (Kırçova: 2007).

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<sup>9</sup> Edward V. Donnell observed that; regular customers (shopping by credit) buy 2.5-3 times more in a year compared to normal customers. (Donnell quoted in Olney in 1991) (Watkins: 2000).

Figure 2.1 shows that every year, households have financed a greater share of their consumption expenditures by consumer loans. In 2007 the amount of consumer loans to private final consumption expenditure is approximately four times more as much in 2003. This explains why people use consumer loans more and more every year.<sup>10</sup>

**FIGURE 2.1 THE RATIO OF CONSUMER LOANS TO PRIVATE FINAL CONSUMPTION EXPENDITURES**



Source: The BAT and Turkstat.

In the Financial Stability Report-November 2007 CBRT claims that increasing demand of consumer loans depends on falling interest rates and inflation. Due to low interest rates and inflation, consumers financed their delayed consumption demand

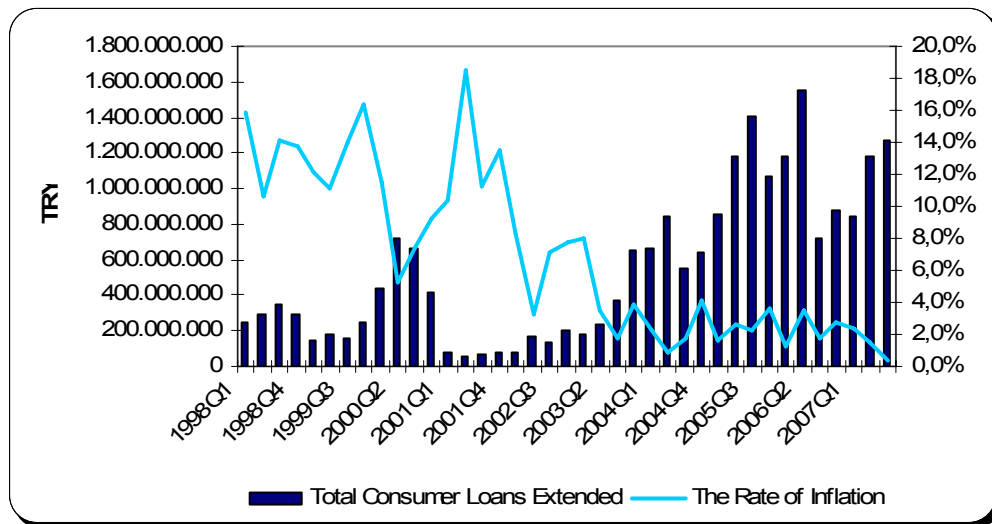
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<sup>10</sup> In Figure 2.1 consumer loans include the loans extended by banks (except for participation banks for 2003 and 2004) and consumer financing companies, and balance of credit cards.

by credit cards and consumer loans. In these processes there is an effect of low interest rates applied to loans<sup>11</sup>.

Indeed, Figure 2.2 and Figure 2.3 both show that the amount of consumer loans extended and rate of inflation/real interest rate move reverse directions. In other words, lower interest rates and inflation cause households be optimistic about the future and thus they get into long term debt.

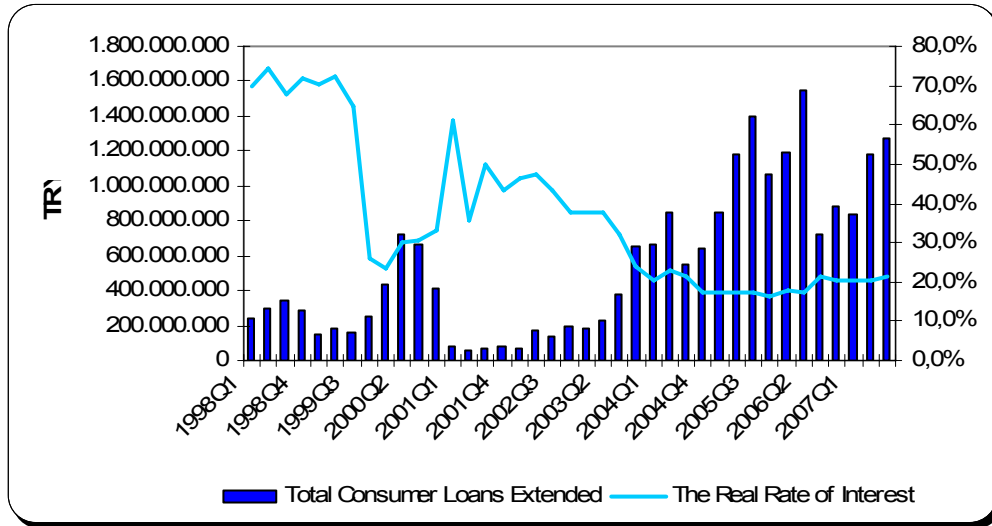
**FIGURE 2.2 THE RELATIONSHIP BETWEEN TOTAL CONSUMER LOANS EXTENDED AND THE RATE OF INFLATION**



Source: The BAT and Turkstat.

11 Central Bank of The Republic of Turkey, Periodic Publications, Financial Stability Report, November 2007, Issue:5

**FIGURE 2.3 THE RELATIONSHIP BETWEEN TOTAL CONSUMER LOANS EXTENDED AND THE REAL INTEREST RATE**



Source: The BAT and CBRT.

## 5.2 RESEARCH RELATING TO CONSUMER LOANS

In the literature, research into consumer loans usually measure the effect of credit conditions, such as availability of credit, the length of maturity, the interest rate applied to loan, average monthly payment and credit limit on consumption. There are also studies into the effect of credit cards, which is a type of consumer loan. In this thesis, consumer loans are discussed as a method of finance that affects households' durable consumption expenditures. Since credit card data has only been available since 2002 by The Interbank Card Center (ICC), we cannot include them in consumer loans.

The first study into consumer loans was made by Feinberg in 1986. He researched the effect of credit cards on consumption. Nevertheless, studies about how credit cards affect total private final consumption in the economy are inadequate. Feinberg started his study from a restaurant in where customers who pay with credit card leave greater tips. In his study, which was not empirical, he claimed that credit card users tend to pay more. Then he supported his thoughts with two following studies in 1987 and 1990 (Feinberg: 1986). Ritzer (2001) claims that credit cards encourage dangerous consumption. According to him, a dangerous consumer is who consume badly, rather than too much.

On the other hand, Bacchetta and Gerlach (1997) prepared a study using data from the U.S.A., the U.K., Canada, Japan and France. They stated that if consumers are liquidity-constrained, aggregate consumption is as sensitive to credit conditions as it is to income. They concluded that, for liquidity-constrained customers, credit conditions are effective on aggregate consumption as much as disposable income.

Ball and Drake (1963) evaluated the impact of credit control on durable consumption expenditures for the years 1957-1961. In the analysis credit conditions -the minimum average deposit rate, the minimum average monthly payment etc.- were considered as control variables. These authors revealed that control variables have a significant effect on durable consumption as long as income is constant. Other research evaluating the influence of credit conditions on consumption were made by Suits (1958) and Evan and Kisselgoff (1968). In these studies length of maturity was used as availability of credit.

Lee (1964) made a study about income change and durable consumption expenditures by using cross-sectional data for the years 1954-1961. He found out that consumer credit has a significant effect that varies with the income groups on durable consumer goods demand. Besides, consumers take advantage of consumer loans while they adjust durable good purchase upward or resist adjusting it downward. In his study Ludvigson (1999) researched the relation between personal income and consumption behavior by using the U.S. aggregate data. Results revealed that consumption growth is related to predictable consumer credit growth. Soman and Cheema (2002) evaluated the effect of credit on spending decisions. They argued that consumers use credit limit as a reference for future income. Anova-Regression analysis shows that in case of being able to use big amount of credit, consumers expect their future income to be high, thus they tend to use more credit and spend more. Fisher (1963) made an analysis by using Surveys of Consumer Finance data for the years 1957-1958. She concluded that credit is an important factor for durable good purchasing behavior. Also credit is an important tool for households to finance durable good purchases.

In Turkey, Altan and Göktürk (2007) conducted a study about consumption expenditures. They carried out a multi-regression analysis using a 15 year series. Results showed that there is a linear relationship between total private final consumption expenditures and credit card expenditures. While credit card and disposable income were the most effective factors influencing consumption; market interest rate and inflation rate were found to be insignificant.

## **CHAPTER 2.**

### **METHODOLOGY AND ANALYSIS**

In this thesis, data were collected from the BAT, CBRT and Turkstat. The analysis includes quarterly data between the years 1998-2007. Detailed information about data is given in Section 1. While analyzing the data, I used unit root test to check stationarity of time series and multiple regression analysis to obtain the model.

#### **SECTION 1. DATA**

In the analysis, the dependent variable is durable consumer goods expenditure, the independent variable is total consumer loans extended and the control variables are the real GDP, the real interest rate, the rate of inflation and the real effective exchange rate. Although “consumer expectations” and “distribution of income” are important determinants of consumption, they cannot be used in the analysis due to inadequate data. As mentioned in chapter 1, consumer expectations are subjective and difficult to evaluate. Furthermore, distribution on income data is not released quarterly.

All data for this study will be utilized as quarterly data covering the 1998:Q1-2007:Q3 period. In statistical reports, data for consumer loans and household



consumption expenditures are given in current prices. Since the analysis covers data from the year 1998, all data were converted into constant prices (1998=100 based) by using consumer price index (CPI). CPI indices are reported monthly and can be found in “inflation and price” link on Turkstat web site.<sup>12</sup> The formula is given below:

$$P_{R_A} = (CPI_{BASE} / CPI_A) * P_{N_A}$$

where;  $P_{R_A}$  : Real price of the good in the year A

$P_{N_A}$  : Nominal price of the good in the year A.

$CPI_{BASE}$  : CPI index in the base year.

$CPI_A$  : CPI index in the year A.

Data table and descriptive statistics are given in Appendix: Table 1. and Table 2.

## 1.1 CONSUMER LOANS

The amount of consumer loans includes both TRY and foreign exchange. Data was collected from statistical reports prepared by the BAT.<sup>13</sup> The BAT collects this data from deposit banks, investment and development banks which extend consumer loans. The number of banks varies each year.

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<sup>12</sup> [http://www.tuik.gov.tr/VeriBilgi.do?tb\\_id=17&ust\\_id=6](http://www.tuik.gov.tr/VeriBilgi.do?tb_id=17&ust_id=6) last visited on 28.04.2009

<sup>13</sup> <http://www.tbb.org.tr/net/donemsel/default.aspx?dil=EN> last visited on 27.04.2009

In the statistical data prepared by the association, consumer loans are broken down by users' demographic features. Thus education level of users is divided into four groups; primary school, secondary school, university-post graduates and unclassified. Similarly age groups are; 18-25, 26-35, 36-55, 56-65, 65+ and unclassified. According to users' occupation there are four groups; employed, self-employed, others and unclassified.

Total consumer loans include automobile loans, housing loans, general purpose loans (loans borrowed for durable and semi-durable consumer goods, education, marriage, education and health purposes) and others (loans which can not be grouped in the other three types of loans).

## **1.2 DURABLE CONSUMER GOODS EXPENDITURE**

Turkstat has evaluated household consumption expenditures by household budget survey every three months since 2001. According to the survey, durable goods consumption is the average value of "automobile, computer, television, camera, furniture, white goods, heating and cooling systems etc." expenditures made by households over a one year period.

Households' consumption reports can be found on the "national accounts" link on the web site of Turkstat. Data used in the analysis was collected from the link "Gross

domestic product by expenditure approach-Data-Statistical Tables-GDP (1987 based-current prices)”.<sup>14</sup>

### **1.3 THE REAL INTEREST RATE**

Before calculating the real interest rates, nominal interest rates on deposits (monthly) were collected from Electronic Data Delivery System of CBRT<sup>15</sup>. Nominal interest rates are weighted averages of 12 month deposit. CBRT notes that: “Averages of maximum deposit rates as reported by banks to be effective during the month of reporting and weighted by volume of deposits and number of days of maturity.” Than using the formula below, real interest rates were calculated.

$$I_R = [I_N - INF] / [1 + (INF/100)]$$

where  $I_R$  : Real interest rate,  $I_N$  : Nominal interest rate,  $INF$ : Rate of inflation.

### **1.4 THE RATE OF INFLATION**

Consumer price indices were collected from Electronic Data Delivery System, in archives section historical CPI index numbers can be found.<sup>16</sup> 1994 based indices are converted to 1998 based indices. Then, the monthly percentage change was calculated for every month. Since quarterly data is used in the analysis, for every quarter the relevant three months’ sum was calculated for each year.

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<sup>14</sup> [http://www.tuik.gov.tr/VeriBilgi.do?tb\\_id=57&ust\\_id=16](http://www.tuik.gov.tr/VeriBilgi.do?tb_id=57&ust_id=16) last visited on 25.04.2009

<sup>15</sup> <http://evds.tcmb.gov.tr/yeni/cbt-uk.html> last visited on 20.04.2009

<sup>16</sup> <http://lmsnt.pub.die.gov.tr/indeksSerileri.xls> last visited on 18.04.2009

## **1.5 THE REAL GDP**

GDP prices, 1998 based, can be found in Turkstat web site. Turkstat releases GDP prices quarterly. From “national accounts” link “GDP by expenditure approach” data can be found.<sup>17</sup>

## **1.6 THE REAL EFFECTIVE EXCHANGE RATE INDEX**

Real effective exchange rate index data is CPI based and was collected from CBRT-Electronic Data Delivery System. CBRT notes that “CPI based real effective exchange rate index calculated using the IMF weights for 19 countries including Germany, the USA, Italy, France, the United Kingdom, Japan, Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Taiwan, Iran, Brazil, China and Greece. (1998=100).”<sup>18</sup>

## **SECTION 2. METHODOLOGY AND ANALYSIS**

In this study, in order to measure the effect of consumer loans with control variables on household’s durable consumption expenditures; a simple multi regression model is built by considering the variables in Section 1.

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<sup>17</sup> [http://www.tuik.gov.tr/PreHaberBultenleri.do?id=3912&tb\\_id=8](http://www.tuik.gov.tr/PreHaberBultenleri.do?id=3912&tb_id=8) last visited on 23.12.2008

<sup>18</sup> <http://evds.tcmb.gov.tr/cbt.html> last visited on 16.04.2009

Since the variables in the analysis are macroeconomic time series, firstly their stationarity is checked. Subsequently, a regression model is formed using stationary time series. At this point, I believe it will be useful to mention the time series' stationarity and how to eliminate it.

## 2.1 STATIONARITY OF A TIME SERIES

Time series consist of random variables. In order to make a valid analysis, the deterministic and stochastic characters of series should be considered. Deterministic characters concern trend, constant and seasonality, whereas stochastic characters concern stationarity. A stationary time series approximates a definite value or reverts around an expected value (Bozkurt: 2007).

The time series analysis aims at future-oriented forecast and to find the general assumption of variable. However if the stochastic process is non-stationary, estimations are valid only for existing periods, not for the future.

To explain stationarity, assume that  $Y_t$  is a time series. If time series  $Y_t$  is stationary,

- Average:  $E(Y_t) = \mu$
- Variance:  $Var(Y_t) = E(Y_t - \mu)^2 = \sigma^2$
- Covariance:  $\gamma_k = E[(Y_t - \mu)(Y_{t+k} - \mu)]$

values of  $Y_t$  is constant for all lags whenever measured. In literature, this kind of stationarity is described as “*weakly stationary*”. Average of series is time

independent and constant in time. Variance is finite and does not change in time systematically (Bozkurt: 2007). In a “strongly stationary” time series, a finite average and variance is not a condition.

Since variance of non-stationary time series depend on time and approaches infinity as number of observations goes to infinity, a classical test method can result in spurious regression. In other words, coefficients and t-test values do not reflect the truth. Moreover, high  $R^2$  values can be obtained even if two variables are totally unrelated (Bozkurt: 2007).

Most of macroeconomic time series are not stationary (mostly integrated of order one) and average of series changes in time. Series usually have an upward/downward trend due to characteristic of variables. Sometimes big shocks eliminate non-stationarity (Kutlar: 2005).

All of these suggest that, before econometric analysis, time series should be tested and be converted into stationary series. In this study, “weakly stationary” is enough for the variables.

## 2.2 UNIT ROOT TEST

Unit root test is the most common and effective method for testing stationarity, although there are several methods. This test can be explained by a simple autoregressive AR(1) process<sup>19</sup>:

$$Y_t = \rho Y_{t-1} + u_t \quad (3.1)$$

where  $u_t$  is white noise (average is zero,  $\sigma^2$  variance is constant, non autoregressive, probabilistic error term.)

If we examine unit root for a simple AR(1) process, hypotheses are:

$$H_0 = \rho \geq 1 \text{ (series is non stationary)}$$

$$H_1 = \rho < 1 \text{ (series is stationary)}$$

If we subtract  $Y_{t-1}$  from both sides of equation:

$$\begin{aligned} Y_t - Y_{t-1} &= \Delta Y_t = (\rho - 1)Y_{t-1} + u_t \\ \rho - 1 &= \delta \Rightarrow \\ \Delta Y_t &= \delta Y_{t-1} + u_t \end{aligned} \quad (3.2)$$

In this case hypotheses are:

$$H_0 = \delta \geq 0 \text{ (Series is non stationary)}$$

---

<sup>19</sup> AR (1) is regression of  $Y_t$  according to  $Y_{t-1}$ .

$H_1 = \delta < 0$  (Series is stationary)

If  $\delta = 0$ , equation (3.2) can be written as:

$$\Delta Y_t = (Y_t - Y_{t-1}) = u_t \quad (3.3)$$

Equation (3.3) shows that first difference of a random walk is a stationary time series; we induced stationarity by differencing once. A time series with unit root is called random walk series.

If first difference form of a time series is stationary, we say that random walk series is integrated of order one, denoted by I(1). Similarly, if a time series has to be differenced two times to reach stationarity, series is integrated of order two, denoted by I(2). In general, if a non-stationary time series  $Y_t$  needs to be differenced  $d$  times to become stationary,  $Y_t$  is integrated of order  $d$ . In other words  $\Delta^d Y_t$  is stationary and denoted by I(d). We can also say that  $Y_t$  contains  $d$  unit roots. Besides, if time series  $Y_t$  is already stationary, it's denoted by I(0).

To examine  $Y_t$  time series' stationarity, equation (3.1) is calculated and  $\rho$  value is checked if it is 1 or not. Other way is calculating equation (3.2) and checking if  $\rho = 0$  according to  $t$  statistics.  $t$  statistics, assuming  $H_0 : \rho = 1$ , is known as  $\tau$  (tau) statistic, test critical values are determined by Dickey and Fuller (Dickey and Fuller: 1979). In literature tau testing is known as **Dickey-Fuller Test (DF)**.



Dickey-Fuller test is applied to regressions in these forms:

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad (\text{No intercept, no trend}) \quad (3.4)$$

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t \quad (\text{Intercept, no trend}) \quad (3.5)$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t \quad (\text{Intercept and trend}) \quad (3.6)$$

If  $u_t$  error value is autoregressive, lagged values of dependent variable is written right side of the equation, so equation (3.6) can be written as follows:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (3.7)$$

If DF test is applied to equations such as (3.7), it is called *Augmented Dickey Fuller (ADF) test*. The critical point in ADF test is whether  $\delta = 0$  or not. Also, it is important to determine optimal lag length (Guajarati: 1999). Lag length of a variable shows which previous period affects variable. When lagged values of time series is used, lagged values of the independent variable are subtracted into equation as independent variables, hence autocorrelation of equation can be remove (Göktaş:2005).

During the evaluation, ADF test results are compared to MacKinnon critical values. If absolute value of test result is superior to critical values,  $H_0$  is rejected. In other words time series is stationary.

### 2.3 TESTING TIME SERIES WITH ADF TEST

In the study there are macroeconomic time series that are examined for stationarity by E-views 6.0 software. The dependent variable is durable consumption expenditures (DCE), the independent variable is total consumer loans extended (CL) and four control variables are the real gross domestic product (GDP), the real interest rate (INT), the real rate of inflation (INF), and the real effective exchange rate index (RER).

Table 1. shows ADF test results. If a time series is stationary, then absolute value of t-statistic is superior to test critical value. Accordingly, CL, INF, INT and RER are integrated of order one, in other words D1CL, D1INF, D1INT and D1RER are stationary (D1 is first difference operator). GDP and DCE are integrated of order two therefore, D2GDP and D2DCE are stationary (D2 is second difference operator). Thus, none of the variables are stationary. Non-stationarity of the variables also can be seen in the Figure 3.1, obviously.

**TABLE 1. ADF TEST RESULTS**

VARIABLES	MODEL 1		MODEL 2		MODEL 3	
	$\eta_\mu$	Lag lenght	$\eta_\mu$	Lag lenght	$\eta_\mu$	Lag lenght
CL	-1,2528	0	-2,5218	0	-0,1714	0
GDP	-0,088	8	-1,6069	8	1,2333	8
INF	-2,1777	0	-4,1031*	0	-1,9213	0
INT	-2,0593	1	-2,4542	1	-1,899	1
RER	-1,4716	0	-3,2025	0	0,6265	0
DCE	-1,3492	4	-2,0675	4	0,2765	4
D1CL	-6,7156*	0	-6,6904*	0	-6,7052*	0
D1GDP	-1,209	7	-2,1941	9	-0,3493	7
D1INF	-7,9331*	0	-7,8058*	0	-7,9526*	0
D1INT	-7,443*	0	-7,4615*	0	-7,354*	0
D1RER	-7,1308*	0	-7,0673*	0	-7,0628*	0
D1DCE	-2,5029	3	-2,4263	3	-2,4665	3
D2GDP	-5,7078*	6	-5,6109*	6	-5,8068*	6
D2DCE	-19,2056*	2	-18,9337*	2	-19,5159*	2
$\alpha$	<b>-2,93</b>		<b>-3,5</b>		<b>-1,95</b>	

Models with intercept, trend and intercept and no trend no intercept are denoted by Model1, Model2 and Model 3 respectively.

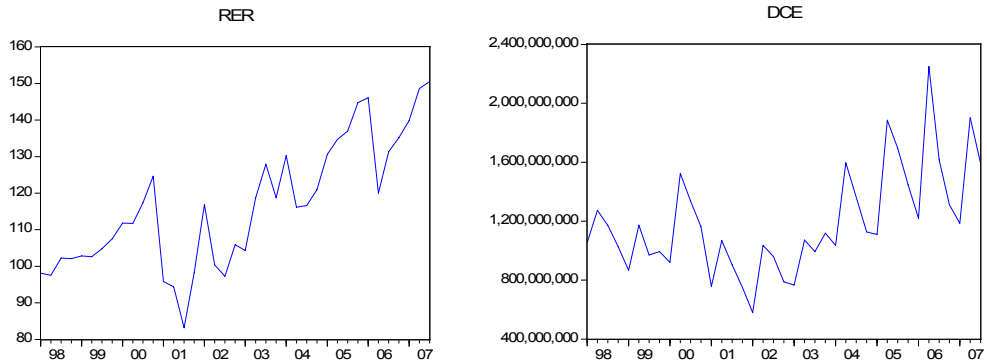
$\eta_\mu$  denotes ADF test values.

$\alpha$  denotes MacKinnon critical test values at the 5% level.

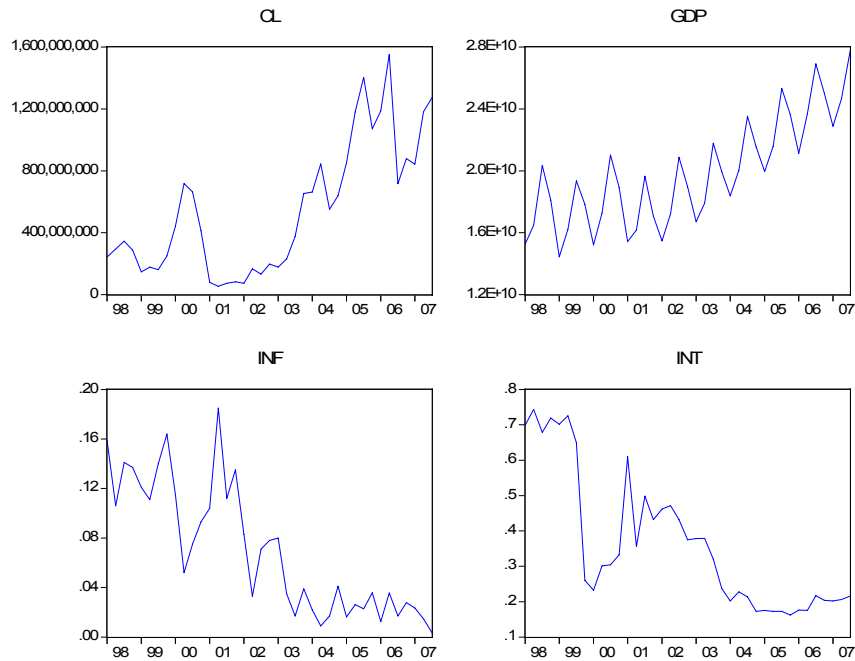
D1 and D2 show first difference and second difference operators respectively.

(\*) shows stationarity at the 5% level.

**FIGURE 3.1 NON-STATIONARY TIME SERIES**



**FIGURE 3.1 (CONT.)**



In fact, even if the ADF test was not applied to the time series, we still would not use them in regression analysis because of multicollinearity between the variables. Table 2. shows the correlation between variables.

As seen in Table 2. all variables are significantly related to each other. This is called multicollinearity.<sup>20</sup> If we ignore the situation and use the variables, then we obtain spurious regression results. Although  $R^2$  value can be high, one or more coefficients' t-statistics might be insignificant (Guajarati: 2006).

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<sup>20</sup> If there is certain multicollinearity in a regression with k variables than  $\lambda_1 X_1 + \lambda_2 X_2 + \dots + \lambda_k X_k + v_i = 0$  where  $\lambda_1, \lambda_2, \dots, \lambda_k$  are constants which are not zero at the same time (Guajarati: 2006).

**TABLE 2. CORRELATIONS BETWEEN VARIABLES**

\*\* Correlation is significant at the 0.001 level (2-tailed).

		<b>DCE</b>	<b>CL</b>	<b>GDP</b>	<b>INF</b>	<b>INT</b>	<b>RER</b>
<b>DCE</b>	Pearson Corr.	1	,848**	,679**	-,522**	-,483**	,561**
	Sig (2-tailed)	,	0,000	0,000	0,001	0,002	0,000
<b>CL</b>	Pearson Corr.	,848**	1	,752**	-,703**	-,707**	,826**
	Sig (2-tailed)	0,000	,	0,000	0,000	0,000	0,000
<b>GDP</b>	Pearson Corr.	,679**	,752**	1	-,675**	-,623**	,726**
	Sig (2-tailed)	0,000	0,000	,	0,000	0,000	0,000
<b>INF</b>	Pearson Corr.	-,522**	-,703**	-,675**	1	,703**	-,763**
	Sig (2-tailed)	0,001	0,000	0,000	,	0,000	0,000
<b>INT</b>	Pearson Corr.	-,483**	-,707**	-,623**	,703**	1	-,734**
	Sig (2-tailed)	0,002	0,000	0,000	0,000	,	0,000
<b>RER</b>	Pearson Corr.	,561**	,826**	,726**	-,763**	-,734**	1
	Sig (2-tailed)	0,000	0,000	0,000	0,000	0,000	,

## 2.4 REGRESSION ANALYSIS WITH NON-STATIONARY VARIABLES: SPURIOUS RESULTS

Multiple regression analysis, by using the enter method, is used to examine the relationship between durable consumer goods expenditures and total consumer loans extended. During regression analysis, control variables are included in the model one by one to check the effect of CL on DCE. Thus, we have five models and are able to obtain the following equations:

$$DCE = \alpha + \beta_1 CL \quad (3.8)$$

$$DCE = \alpha + \beta_1 CL + \beta_2 GDP \quad (3.9)$$

$$DCE = \alpha + \beta_1 CL + \beta_2 GDP + \beta_3 INF \quad (3.10)$$

$$DCE = \alpha + \beta_1 CL + \beta_2 GDP + \beta_3 INF + \beta_4 INT \quad (3.11)$$

$$DCE = \alpha + \beta_1 CL + \beta_2 GDP + \beta_3 INF + \beta_4 INT + \beta_5 RER \quad (3.12)$$

For every regression model null hypothesis is

$H_0$  : There is no linear relationship between durable consumer goods expenditure and independent variables.

Hypotheses for regression coefficients are

$H_{10}$  : The linear relationship between durable consumer goods expenditure and total consumer loans extended is insignificant.

$H_{20}$  : The linear relationship between durable consumer goods expenditure and real GDP is insignificant.

$H_{30}$  : The linear relationship between durable consumer goods expenditure and inflation rate is insignificant.

$H_{40}$  : The linear relationship between durable consumer goods expenditure and real interest rate is insignificant.

$H_{50}$  : The linear relationship between durable consumer goods expenditure and real effective exchange rate is insignificant.

During regression analysis SPSS 11.0 software is used. Table 3. shows summary of five regression results. In analysis t-statistic is significant at the 0.05 level.

**TABLE 3. SUMMARY OF REGRESSION RESULTS**

Dependent variable: DCE Equation:		(3.8)	(3.9)	(3.10)	(3.11)	(3.12)
Constant	809055404 (50056654)	647772083 (231561817)	384799096 (286482386)	201548307 (299294904)	1193765849 (441365538)	
CL	.707* (.073)	.647* (.111)	.720* (.119)	.789* (.123)	.953* (.126)	
GDP		.009 (.014)	.016 (.014)	.018 (.014)	.023 (.013)	
INF			131372109 (869530293)	737308563 (912790138)	-52130442 (874570680)	
INT				407369266 (240240744)	262975502 (224153793)	
RER					-9291467* (3254581)	
Adjusted R <sup>2</sup>	.711	.707	.718	.732	.778	
Standard error of estimate	190872411	192151013	188816792	183952992	167208686	

Numbers in parantheses are standard errors.  
(\*) denotes significance at the 5% level according to t-test.

According to regression results

$$DCE = 809055404 + 0,707 CL \quad (3.8.1)$$

$$DCE = 647772083 + 0,647 CL + 0,009 GDP \quad (3.9.1)$$

$$DCE = 384799096 + 0,72 CL + 0,016 GDP + 131372109 INF \quad (3.10.1)$$

$$DCE = 201548307 + 0,789CL + 0,018GDP + 737308563 INF + 407369266 INT \quad (3.11.1)$$

$$DCE = 1193765849 + 0,953CL + 0,023GDP -52130442INF + 262975502INT - 9291467 RER \quad (3.12.1)$$

In regression analysis adjusted R square increases if only added variable is significant for the model. Putting control variables into regression model one by one, adjusted R<sup>2</sup> value hardly increases. All of the models were found to be significant, statistically. Nevertheless, only “total consumer loans extended” was found to be significant as a determinant of “durable consumer goods expenditures”. In the last model, all control variables were included in the analysis, but the variables GDP, INF and INT were found to be insignificant according to the t-statistic. Table 4. represents hypotheses and results of the models.

**TABLE 4. HYPOTHESES OF REGRESSION ANALYSIS**

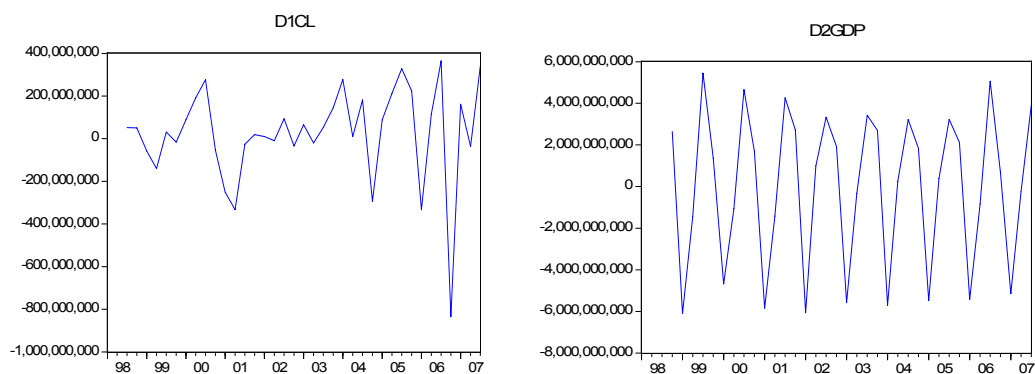
MODELS	H <sub>0</sub>	H1 <sub>0</sub>	H2 <sub>0</sub>	H3 <sub>0</sub>	H4 <sub>0</sub>	H5 <sub>0</sub>
(3.8)	Rejected	Rejected				
(3.9)	Rejected	Rejected	Not Rejected			
(3.10)	Rejected	Rejected	Not Rejected	Not Rejected		
(3.11)	Rejected	Rejected	Not Rejected	Not Rejected	Not Rejected	
(3.12)	Rejected	Rejected	Not Rejected	Not Rejected	Not Rejected	Rejected



Accordingly since time series of variables are not stationary, moreover there is multicollinearity between all variables and regression results are spurious, variables need to be transformed.

As mentioned before the main purpose of the study is to evaluate independent variables' effect on household consumption expenditure, and, more importantly, the magnitude of this effect. At this point, logarithmic forms of variables are more useful for evaluating regression results. When stationary forms of original time series are composed by differencing<sup>21</sup>, characteristics of stationarity cannot be seen in the graphs (See Figure 3.2). For these reasons variables are transformed into more convenient form.

**FIGURE 3.2 STATIONARY TIME SERIES**

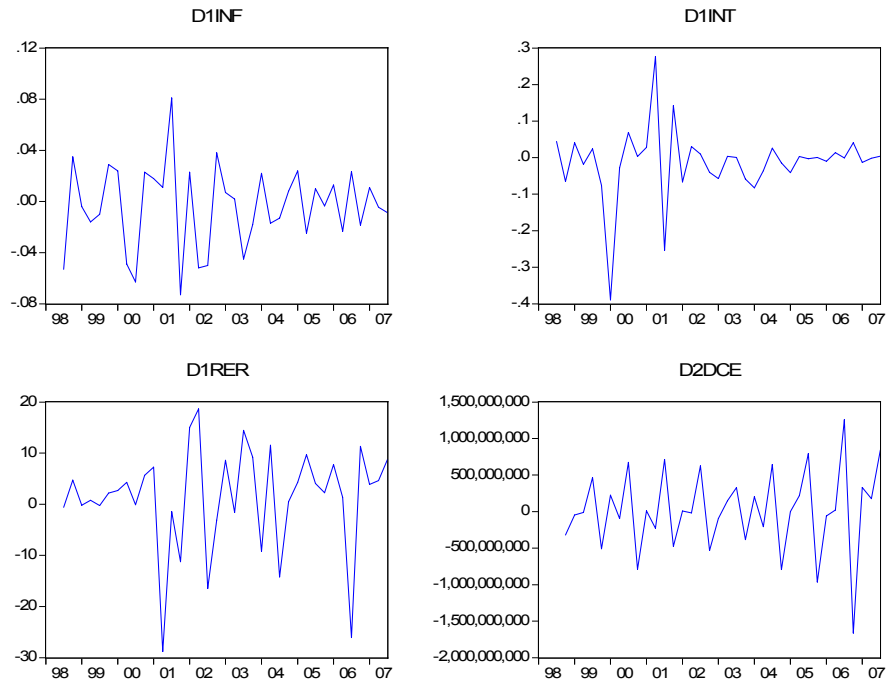


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<sup>21</sup> If a non-stationary time series  $Y_t$  is integrated of order  $n$  or contains  $n$  unit roots (denoted by  $Y_t \sim I(n)$ ), then  $\Delta^n Y_t$  is stationary.

(Source: <http://www.staff.city.ac.uk/d.a.asteriu/NON-STATIONARITYv1.ppt>)

**FIGURE 3.2 (CONT.)**



## 2.5 TRANSFORMING VARIABLES

One of the ways to eliminate multicollinearity between variables is to transform variables to a different form. In this analysis, the effect of consumers loans (CL) on durable goods consumption (DCE) and magnitude of this effect will be evaluated. Thus, log-linear model is more convenient for the variables:

$$\ln Y_i = \ln \beta_1 + \beta_2 \ln X_i + u_i \quad \text{where "ln" is natural logarithm} \quad (3.13)$$

$$\ln Y_i = \alpha + \beta_2 \ln X_i + u_i \quad (3.14)$$

Here  $\ln \beta_1 = \alpha$  and the model is linear, so it can be estimated by ordinary least squares (OLS) regression methods. Due to this linearity, these kinds of models are called *log-log* or *log-linear* models.

Equation (3.9) can be written as:

$$Y_i^* = \alpha + \beta_2 X_i^* + u_i \quad \text{where } \ln Y_i = Y_i^* \text{ and } \ln X_i = X_i^* \quad (3.15)$$

Log-linear model is convenient, since  $\beta_2$  trend coefficient shows elasticity of Y to X. In other words  $\beta_2$  shows percentage change in Y when there's a small 1% change in X (Guajarati: 1999). In this analysis variables are transformed to (3.16) form:

$$GY_T^* = (Y_T^* - Y_{T-1}^*) / Y_{T-1}^* \quad (3.16)$$

In equation (3.16) growth rates of  $Y_T^*$  time series are calculated thus, regression result answer the question “If growth rate of independent variable increases 1%, how does it affect that of dependent variable?”

The main purpose of transforming variables into log form is to omit extreme values. In order to get stationary time series and to evaluate elasticity of growth rate of dependent variable compared to that of independent variables' growth rate, growth

rates of logarithmic forms of variables are composed and then ADF test can be applied. (For new data set, see Appendix: Table 3)

## 2.6 ADF TEST FOR TRANSFORMED TIME SERIES

In this part, ADF test was applied to transformed time series to check stationarity.

Accordingly null hypothesis for each time series is:

$H_0$ : Time series  $GY_T^*$  is non-stationary.

Table 5. shows ADF test results. Accordingly,  $GCL^*$ ,  $GINF^*$  and  $GRER^*$  are already stationary;  $H_0$  is rejected. Besides  $GINT^*$  and  $GDCE^*$  time series are integrated of order one ( $D1GINT^*$  and  $D1GDCE^*$  are stationary), while  $GGDP^*$  is integrated of order two ( $D2GGDP^*$  is stationary).

These time series' stationarity can be denoted by  $GCL^* \approx I(0)$ ,  $GINT^* \approx I(1)$ ,  $GINF^* \approx I(0)$ ,  $GRER^* \approx I(0)$ ,  $GGDP^* \approx I(2)$  and  $GDCE^* \approx I(1)$ . The graphs of stationary time series are presented in Figure 3.3. Stationary data set is given in Appendix: Table 4.

**TABLE 5. ADF TEST RESULTS FOR TRANSFORMED TIME SERIES**

VARIABLES	MODEL 1		MODEL 2		MODEL 3	
	$\eta_\mu$	Lag lenght	$\eta_\mu$	Lag lenght	$\eta_\mu$	Lag lenght
<b>GCL*</b>	-4,9695*	0	-4,9415*	0	-5,0012*	0
<b>GGDP*</b>	-1,0238	9	-2,1031	9	-0,5803	9
<b>GINF*</b>	-7,7477*	0	-7,6949*	0	-7,3624*	0
<b>GINT*</b>	-2,1233	5	-4,9228*	4	-1,7436	5
<b>GRER*</b>	-7,0067*	0	-6,9231*	0	-6,947*	0
<b>GDCE*</b>	-2,3209	3	-2,2216	3	-2,267	3
<b>D1GGDP*</b>	-2,4642	8	-2,359	8	-2,5921	8
<b>D1GINT*</b>	-5,2144*	4	-5,1381*	4	-5,3108*	4
<b>D1GDCE*</b>	-19,1593*	2	-18,9164*	2	-19,4609*	2
<b>D2GGDP*</b>	-6,6357*	7	-6,4890*	7	-6,7495*	7
<b><math>\alpha</math></b>	<b>-2,9</b>		<b>-3,5</b>		<b>-1,9</b>	

Models with intercept, trend and intercept and no trend no intercept are denoted by Model1, Model2 and Model 3 respectively.

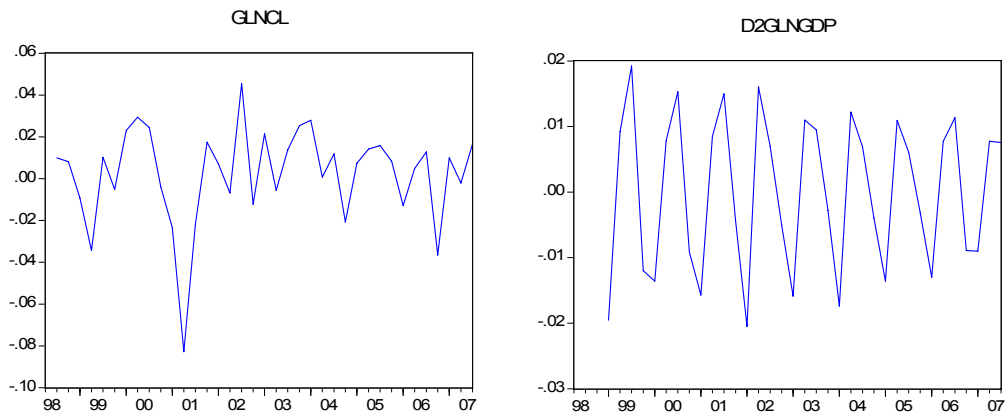
$\eta_\mu$  denotes ADF test values.

$\alpha$  denotes MacKinnon critical test values at the 5% level.

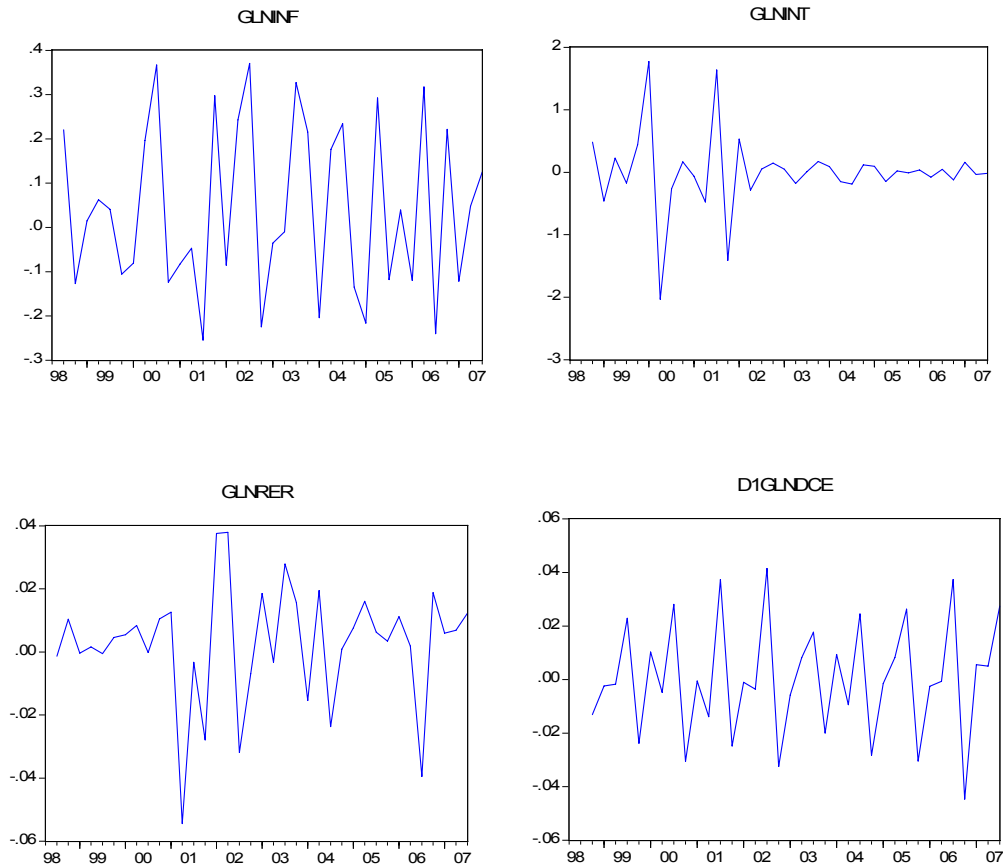
D1 and D2 show first difference and second difference operators respectively.

(\*) shows stationarity at the 5% level.

**FIGURE 3.3 TRANSFORMED STATIONARY TIME SERIES**



**FIGURE 3.3 (CONT.)**



GLNCL:  $GCL^*$  , D2GLNGDP: 2<sup>nd</sup> difference form of  $GGDP^*$ , GLNINF:  $GINF^*$  ,  
 GLNINT:  $GINT^*$  , GLNRER:  $GRIR^*$  and D1GLNDCE: 1<sup>st</sup> difference form of  $GDCE^*$ .

Before regression analysis is applied to transformed stationary time series, correlations between variables need to be checked. Table 6. shows the correlations between variables.

**TABLE 6. CORRELATIONS BETWEEN TRANSFORMED STATIONARY VARIABLES**

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

		<b>D1GDCE*</b>	<b>GCL*</b>	<b>D2GGDP*</b>	<b>GINF*</b>	<b>GINT*</b>	<b>GRER*</b>
<b>D1GDCE*</b>	Pearson Corr.	1	,430*	,462**	0,073	0,212	-0,213
	Sig (2-tailed)	,	0,016	0,005	0,676	0,221	0,219
<b>GCL*</b>	Pearson Corr.	,430*	1	-0,001	0,296	-0,074	0,147
	Sig (2-tailed)	0,016	,	0,997	0,085	0,673	0,398
<b>D2GGDP*</b>	Pearson Corr.	,462**	-0,001	1	,441**	-0,172	-0,178
	Sig (2-tailed)	0,005	0,997	,	0,008	0,324	0,307
<b>GINF*</b>	Pearson Corr.	0,073	0,296	,441**	1	-,448**	0,118
	Sig (2-tailed)	0,676	0,085	0,008	,	0,007	0,501
<b>GINT*</b>	Pearson Corr.	0,212	-0,074	-0,172	-,448**	1	0,151
	Sig (2-tailed)	0,221	0,673	0,324	0,007	,	0,386
<b>GRER*</b>	Pearson Corr.	-0,213	0,147	-0,178	0,118	0,151	1
	Sig (2-tailed)	0,219	0,398	0,307	0,501	0,386	,

According to Table 6. D2GGDP\* and GINF\*, GINF\* and GINT\* are highly correlated, so when they are both included to regression model one of them is expected to be insignificant. In general, if there are correlated variables in the model, to eliminate the insignificance, only one should be included in the model.

## **2.7 REGRESSION ANALYSIS WITH TRANSFORMED STATIONARY VARIABLES**

In order to examine the relationship between the growth rates of “durable consumer goods expenditures” and “total consumer loans extended”, multiple regression analysis is employed, using SPSS 11.0 software. The control variables growth rates

of “the real GDP”, “the real rate of interest”, “the inflation rate” and “the real effective exchange rate” are included in the model one by one. Thus, we are able to obtain five models and the following five equations as we did before.

$$D1GDCE^* = \alpha + \beta_1 GCL^* \quad (3.17)$$

$$D1GDCE^* = \alpha + \beta_1 GCL^* + \beta_2 D2GGDP^* \quad (3.18)$$

$$D1GDCE^* = \alpha + \beta_1 GCL^* + \beta_2 D2GGDP^* + \beta_3 GINT^* \quad (3.19)$$

$$D1GDCE^* = \alpha + \beta_1 GCL^* + \beta_2 D2GGDP^* + \beta_3 GINT^* + \beta_4 GINF^* \quad (3.20)$$

$$D1GDCE^* = \alpha + \beta_1 GCL^* + \beta_2 D2GGDP^* + \beta_3 GINT^* + \beta_4 GINF^* + \beta_5 GRER^* \quad (3.21)$$

For every regression model null hypothesis is

$H_0$  : There is no linear relationship between growth rates of durable consumer goods expenditure and independent variables.

Hypotheses for regression coefficients are

$H1_0$  : The linear relationship between growth rates of durable consumer goods expenditure and total consumer loans extended is insignificant.

$H2_0$  : The linear relationship between growth rates of durable consumer goods expenditure and real GDP is insignificant.

$H3_0$  : The linear relationship between growth rates of durable consumer goods expenditure and real interest rate is insignificant.

$H4_0$  : The linear relationship between growth rates of durable consumer goods expenditure and inflation rate is insignificant.



H5<sub>0</sub> : The linear relationship between growth rates of durable consumer goods expenditure and real effective exchange rate is insignificant.

Table 7. shows summary of regression results. In equation (3.17) only growth rate of total consumer loans was used as independent variable. Considering t-statistic GCL\* was found significant at the 5% level. Thus H1<sub>0</sub> is rejected. The value of R<sup>2</sup> is 16,3% which means only 16,3% of durable goods consumption growth can be explained by growth rate of total consumer loans extended. According to Table 7.,

$$D1GDCE^* = 1,085 + 0,371 GCL^* \quad (3.17.1)$$

While transforming variables to “ln” form, we said log-linear models show the elasticity of dependent variable to independent variable. Accordingly,  $\beta_1$  coefficient is 0,371; if growth rate of “total consumer loans extended” increases 1%; that of “durable goods consumption expenditures” increases 0,37%. Figure 3.4 certifies that result.

In equation (3.18) growth rate of GDP was included in the model as a control variable. D2GGDP\* and GCL\* were found to be significant for the model, thus H1<sub>0</sub> and H2<sub>0</sub> are rejected. According to standardized coefficient  $\beta$  which shows the importance of variables for the model, the real GDP is more effective than total consumer loans on durable goods consumption.

**TABLE 7. SUMMARY OF REGRESSION RESULTS**

	(3.17)	(3.18)	(3.19)	(3.20)	(3.21)
Dependent variable: D1GDCE*					
Equation:					
Constant	1.085 (.003)	-1.896 (.003)	3.831 (.003)	.0008 (.003)	.001 (.003)
GCL*	.371** (.147)	.372** (.129)	.394** (.119)	.450** (.125)	.464** (.122)
D2GGDP*		.847** (.256)	.951** (.240)	1.108** (.263)	.994** (.265)
GINT*			.011** (.005)	.008 (.005)	.010** (.005)
GINF*				-.025 (.019)	-.017 (.019)
GRER*					-.245 (.149)
Adjusted R <sup>2</sup>	.137	.337	.433	.448	.478
Standard error of estimate	0.0202731573	0.017767925	0.016432202	0.016210578	0.015769126

Numbers in parantheses are standard errors.

(\*\*) denotes significance at the 5% level according to t-test.

D1 and D2 show first and second difference operators respectively.

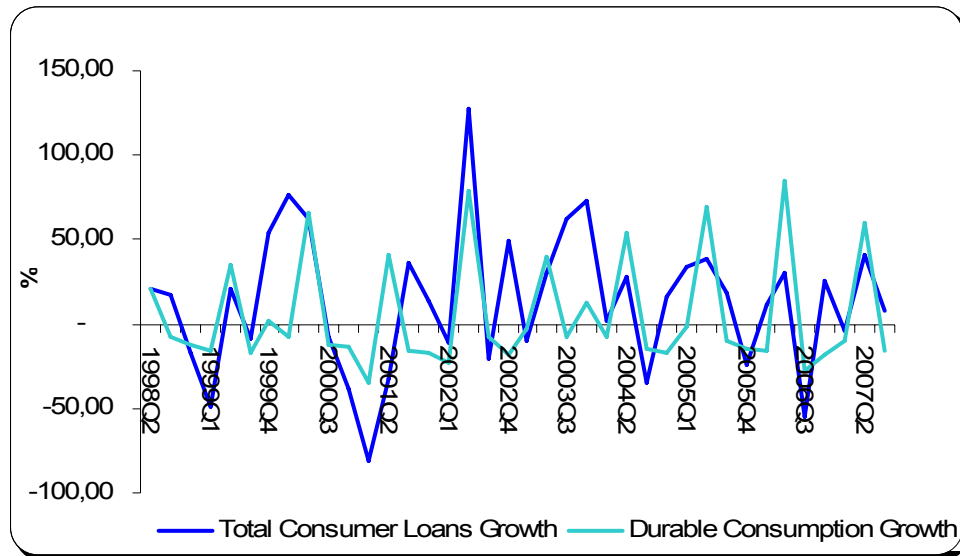
Growth rate of time series  $Y_t$  is denoted by  $GY_t^*$ .

According to Table 7.,

$$D1GDCE^* = -1,896 + 0,372 GCL^* + 0,847 D2GGDP^* \quad (3.18.1)$$

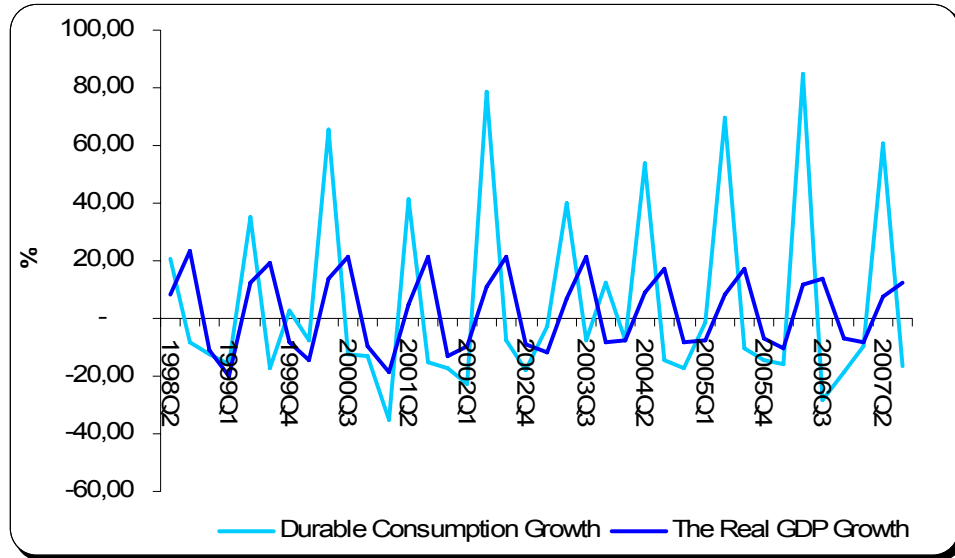
Equation (3.18.1) shows that if growth rates of “the real GDP” and “total consumer loans extended” increases 1%, that of “durable goods consumption expenditures” increase 0,85% and 0,37% respectively. Figure 3.5 compares the growth rates of durable consumption and the real GDP.

**FIGURE 3.4 A COMPARISON OF GROWTH RATES OF DURABLE CONSUMER GOODS EXPENDITURE AND TOTAL CONSUMER LOANS EXTENDED**



Source: The BAT and Turkstat.

**FIGURE 3.5 A COMPARISON OF GROWTH RATES OF DURABLE CONSUMER GOODS EXPENDITURE AND THE REAL GDP**



Source: Turkstat.

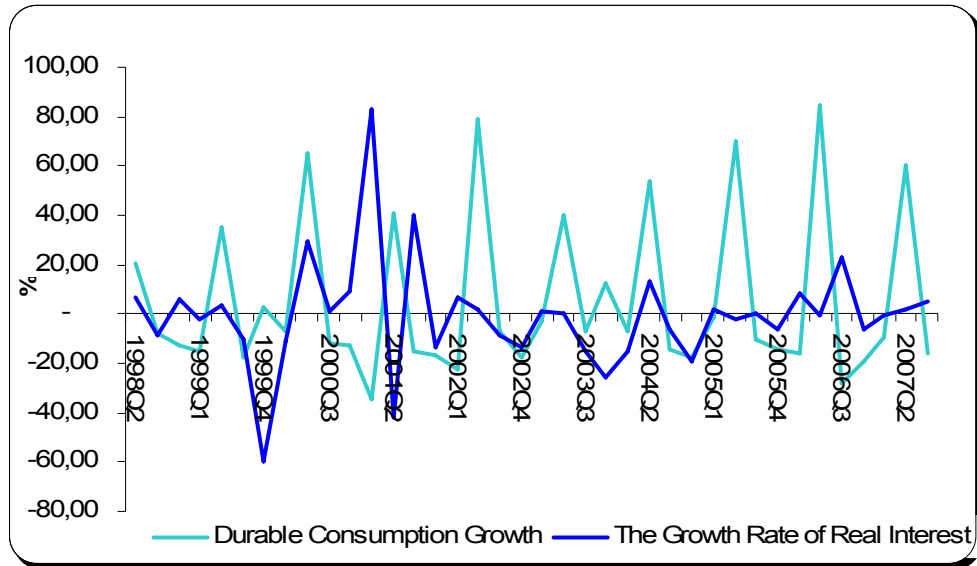
In equation (3.19) growth rate of real interest rate was included in the model. Although the effect of the real interest rate was found lower than others, all of the variables were found to be significant in the model, thus  $H1_0$ ,  $H2_0$  and  $H3_0$  are rejected. Similar to equation (3.18.1), in this model the real GDP is the main determinant for durable consumer goods expenditure while consumer loan is the second factor. Considering coefficients, equation (3.19) is:

$$D1GDCE^* = 3,831 + 0,394GCL^* + 0,951D2GGDP^* + 0,011GINT^* \quad (3.19.1)$$

When growth rates of total consumer loan extended, the real GDP and the real interest rate increases 1%, durable consumption growth increases 0,39%, 0,95% and

0,01% respectively. Accordingly, durable goods consumption is not affected as much by the real interest rate as it is by consumer loans and the real GDP. Figure 3.6 compares the growth rates of durable consumer goods expenditure and real interest rate.

**FIGURE 3.6 A COMPARISON OF GROWTH RATES OF DURABLE CONSUMER GOODS EXPENDITURE AND REAL INTEREST RATE**



Source: CBRT and Turkstat.

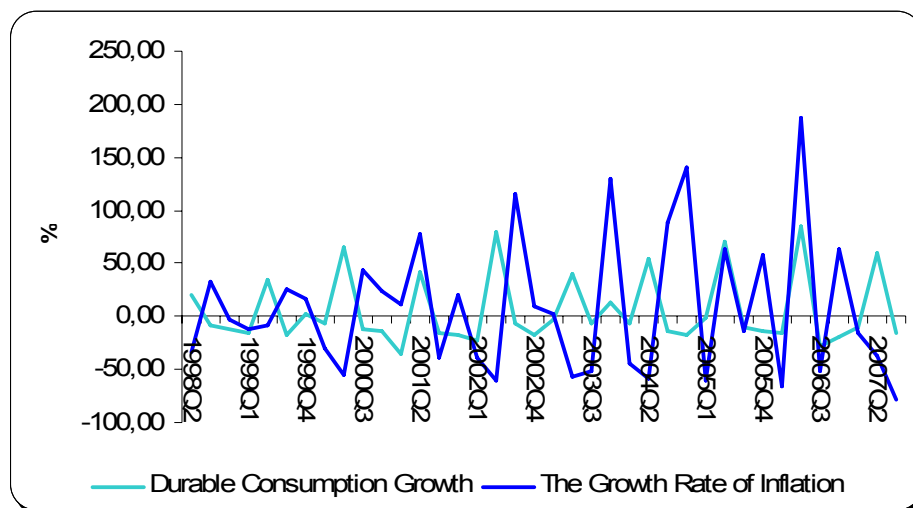
In equation (3.20) inflation rate was included in the model as a control variable. Before regression analysis, we discovered significant correlations between GINF\* and GINT\*, and GINF\* and D2GGDP\*. As a result of the correlations, in this model the rate of inflation and the real interest rate were insignificant according to t-statistic, so  $H3_0$  and  $H4_0$  are not rejected. Similar to previous models, total consumer loans and the real GDP were found to be significant ( $H1_0$  and  $H2_0$  are rejected).

Moreover growth rate of inflation has a negative effect on durable goods consumption. Equation (3.20) can be written as following:

$$D1GDCE^* = 0,0009 + 0,45GCL^* + 1,108D2GGDP^* + 0,008GINT^* - 0,025GINF^* \quad (3.20.1)$$

As we see in the equation (3.20.1), when there is an increase by 1% in growth rate of total consumer loans extended, that of durable consumption increases 0,45%. On the contrary, if the rate of inflation increases 1%, durable consumption growth deteriorates by 0,025%. The effect of the real GDP was much more in this model. When real GDP growth increases 1%, durable consumption growth increases 1,1%.

**FIGURE 3.7 A COMPARISON OF GROWTH RATES OF DURABLE CONSUMER GOODS EXPENDITURE AND RATE OF INFLATION**



Source: Turkstat.

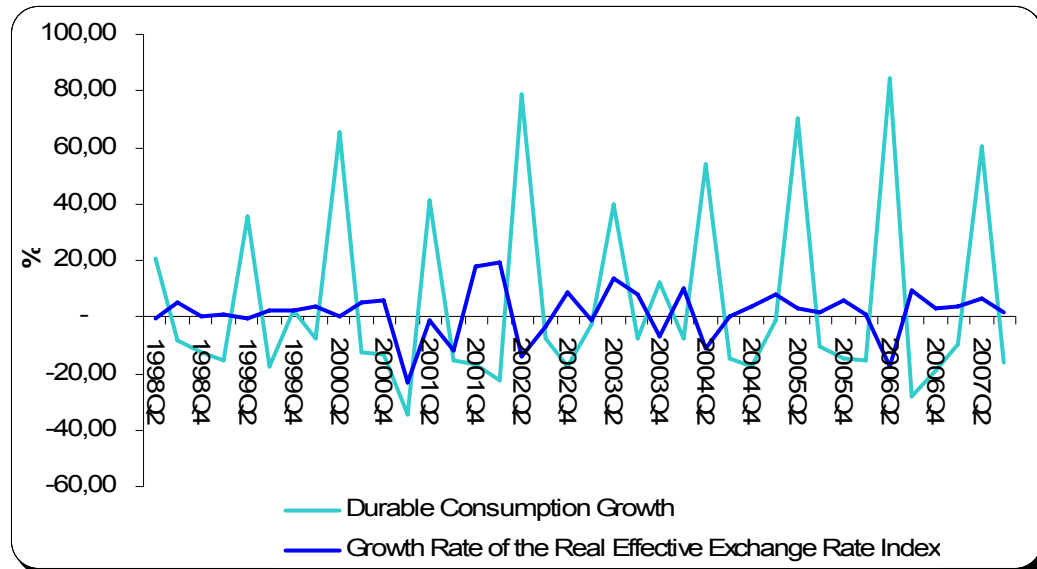
In equation (3.21) all control variables were included in the model. According to the results, growth rates of inflation rate and the real effective exchange rate were found insignificant;  $H_{4_0}$  and  $H_{5_0}$  are not rejected. Similar to the previous models, consumer loans, the real GDP and the real interest rate were found to be significant;  $H_{1_0}$ ,  $H_{2_0}$  and  $H_{3_0}$  are rejected. The real GDP, consumer loans and the real interest rate had positive effect on durable goods consumption, while the rate of inflation and the real effective exchange rate had negative. Considering coefficients, equation (3.21) can be written as follows:

$$D1GDCE^* = 0,001 + 0,464GCL^* + 0,994D2GGDP^* + 0,0107GINT^* - 0,017GINF^* - 0,245GRER^* \quad (3.21.1)$$

When  $GRER^*$  was included in the model, the effect of consumer loans and the real GDP decreased. 1% increase in growth rates of total consumer loans and the real GDP makes that of durable goods consumption 0,46% and 0,99% increase, respectively. The effect of the real interest rate remains almost the same. In contrast, if the growth rates of inflation and the real effective exchange rate increases 1%, durable consumption growth deteriorates 0,01% and 0,24% respectively.

Figure 3.8 shows the relationship between growth rates of durable consumer goods expenditure and real effective exchange rate index.

**FIGURE 3.8 A COMPARISON OF DURABLE CONSUMER GOODS EXPENDITURE AND REAL EFFECTIVE EXCHANGE RATE INDEX**



Source: CBRT and Turkstat.

To sum up, the determinants of durable good consumption consist of total consumer loans extended, the real GDP and the real interest rate. The rate of inflation and the real effective exchange rate were found to be insignificant. The effect of consumer loans on durable goods consumption increased when two control variables were included to the model; the real GDP and the real interest rate. Considering these three variables, the most important determinant for durable goods consumption was real GDP, followed by consumer loans and real interest rates respectively.

Table 8. represents hypotheses of regression analysis.



**TABLE 8. HYPOTHESES OF REGRESSION ANALYSIS**

MODELS	H <sub>0</sub>	H1 <sub>0</sub>	H2 <sub>0</sub>	H3 <sub>0</sub>	H4 <sub>0</sub>	H5 <sub>0</sub>
(3.17)	Rejected	Rejected				
(3.18)	Rejected	Rejected	Rejected			
(3.19)	Rejected	Rejected	Rejected	Rejected		
(3.20)	Rejected	Rejected	Rejected	Not Rejected	Not Rejected	
(3.21)	Rejected	Rejected	Rejected	Rejected	Not Rejected	Not Rejected

## CONCLUSION

The household is the basic unit in a society. Thus, household consumption expenditures give important clues about socio-economic structure of a country. In Turkey, private final consumption expenditures constitute the greatest part of gross domestic product, especially between the years 1998-2007 this rate was about 70%.

In this thesis, the effect of consumer loans on durable consumer goods expenditures which is a subcategory of private final consumption expenditures was examined. In the literature, much research has been conducted into the consumption. Accordingly, income, rate of inflation, interest rate, GDP, consumer attitudes and expectations and consumer loans are some of these determinants.<sup>22</sup>

In developed economies, consumer loans have become increasingly important with the rising of durable goods market, they also invigorate the market (Yüksel: 1970). In Turkey, considering the history of durable goods market we see that with domestic production, the retail price of durable goods fell compared to imported durables. Nevertheless consumers who are salary/wage earners were still unable to afford them. At this point the importance and necessity of consumer loans emerged. Indeed

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<sup>22</sup> See Lusardi (1996), Ludvigson (1999), Hamburger (1967), Mishkin (1976), Mankiw (1985), Katona (1960), Adams (1964), Kwan and Cotsomitis (2004), Burch and Werneke (1975), Lee (1964), Soman and Cheema (2002), Fisher (1963) etc.

research shows that consumers who were unable to meet their needs in cash began to use consumer loans (Selimoğlu: 2006).

In research conducted until present, credit conditions such as length of maturity and the interest rates applied to loans have been evaluated as a measure of consumer loans while analyzing the relation between consumer loans and durable consumer goods (See Ball and Drake (1963), Bacchetta and Gerlach (1997), Suits (1958), Evan and Kisselgoff (1968).

This thesis aimed to analyze the effect of consumer loans on durable consumer goods expenditures. Consumer loans were considered as an important tool for customers to finance durable goods. In the analysis the real GDP, the rate of inflation, the real rate of interest and real effective exchange rate index were used as control variables. To examine the relationship between consumer loans and durable consumer goods expenditure, a simple multi regression model was built by using the variables above.

Econometric analysis started with Augmented Dickey Fuller test to check stationarity of time series. In this part E-views 6.0 software was used. In the next step variables were transformed to log-linear form. ADF test was applied to transformed variables. When stationary variables were obtained, SPSS 11.0 software was used for regression analysis. In the regression analysis, growth rate of “durable consumer goods expenditure” was the dependent variable; growth rate of “total consumer loans extended” was independent variable while growth rates of “the real GDP”, “the real

interest rate”, “the rate of inflation” and “the real effective exchange rate index” were control variables.

According to estimation results

The relationship between consumer loans and durable goods consumption expenditures were found to be significant whether or not control variables were included to the model.

When growth rate of “durable consumption expenditures” was regressed against growth rate of “total consumer loans extended” estimation results showed that if growth rate of consumer loans increase 1%, that of durable consumption increases 0,37%.

Consumer loans had more influence on durable goods consumption when all of the control variables were also considered in the model. Indeed, if all of the control variables were included in the model, a 1% increase in growth rate of consumer loans caused a 0,65% rise in durable goods consumption.

The effect of the real GDP and the real interest rate on durable consumption expenditures was significant whereas that of inflation rate and the real effective exchange rate index was insignificant.

Increasing growth rate of consumer loans, the real GDP and the real interest rate caused upswing in growth rate of durable goods consumption whereas the rate of inflation and the real effective exchange rate caused down trend.

The most important determinants of durable consumer goods expenditures were the real GDP, total consumer loans extended and the real interest rate, respectively.

“Durable consumer goods expenditures” is an important subcategory of GDP, which may be the reason that real GDP was its most significant determinant. As mentioned before durable goods consumption is related to private final consumption expenditures which constitute the greatest part of GDP. Thus, any increase in GDP may result from increase in durable goods consumption.

While calculating the real interest rate, weighted averages of 12 month deposit interest rate was used. Thus, the positive effect of the real interest rate on durable consumption might be about household’s wealth. Especially if consumers have income from interest, any increase in the real interest rate causes appreciation in value of their money. Thus, people tend to buy durables.

Regarding real effective exchange rate index, an increase in the index denotes an appreciation. This is a disadvantage for people who have foreign exchange, since increase in the index causes depreciation in value of their money. Hence, consumers avoid purchasing durables.

The negative effect of inflation on durable good consumption can be explained by consumer expectations. Ascending rate of inflation makes people feel pessimistic about the future. So, they save their money instead of spending on durables.

Finally, the relationship between total consumer loans extended and durable goods consumption is obvious. When people use more consumer loans, they spend more on durables. Also, estimation results proved that. Consumer loans are an important tool for purchasing durable goods.

For further research instead of total consumer loans, consumer loans and credit card usage only for durable goods should be used as independent variable. Besides, percentage of durable consumer goods expenditure in gross domestic product can be used as a control variable. Attitudes to current economic conditions and future expectations about economy should also be considered. I believe these variables can affect results. Thereby, research would be more reliable and effective.

## APPENDIX

**TABLE 1. ORIGINAL DATA SET**

PERIODS	TOTAL CONSUMER LOANS EXTENDED (TRY,in constant prices)	THE REAL GDP (TRY,in constant prices)	THE REAL INTEREST RATE
1998Q1	242.723.685	15.265.677.842	0,699
1998Q2	294.609.456	16.484.807.695	0,744
1998Q3	345.010.488	20.346.607.680	0,679
1998Q4	287.738.609	18.106.053.942	0,719
1999Q1	147.281.469	14.436.128.612	0,701
1999Q2	178.194.415	16.217.898.643	0,726
1999Q3	161.728.220	19.361.768.228	0,650
1999Q4	249.979.352	17.824.774.312	0,261
2000Q1	441.353.916	15.217.907.997	0,232
2000Q2	717.961.960	17.269.135.110	0,301
2000Q3	663.881.054	21.019.480.873	0,304
2000Q4	412.393.970	18.929.874.891	0,332
2001Q1	79.733.006	15.419.915.376	0,610
2001Q2	53.540.787	16.173.158.213	0,356
2001Q3	73.010.254	19.650.703.761	0,498
2001Q4	82.904.458	17.065.574.737	0,432
2002Q1	73.185.545	15.469.976.605	0,462
2002Q2	166.817.042	17.214.452.319	0,472
2002Q3	132.575.907	20.876.687.021	0,432
2002Q4	197.861.983	18.958.715.062	0,375
2003Q1	177.775.791	16.716.746.338	0,379
2003Q2	230.936.434	17.898.517.375	0,379
2003Q3	376.220.432	21.774.717.771	0,321
2003Q4	653.032.172	19.948.211.063	0,238
2004Q1	662.935.668	18.380.246.782	0,202
2004Q2	844.438.279	20.035.371.722	0,228
2004Q3	551.064.852	23.528.095.469	0,213
2004Q4	639.034.512	21.541.876.638	0,173
2005Q1	851.915.705	19.947.282.933	0,176
2005Q2	1.180.055.848	21.577.563.274	0,172
2005Q3	1.403.983.627	25.323.570.149	0,173
2005Q4	1.071.026.670	23.651.314.542	0,162

**TABLE 1. (CONT.)**

<b>PERIODS</b>	<b>TOTAL CONSUMER LOANS EXTENDED (TRY,in constant prices)</b>	<b>THE REAL GDP (TRY,in constant prices)</b>	<b>THE REAL INTEREST RATE</b>
<b>2006Q1</b>	1.186.782.782	21.133.291.063	0,176
<b>2006Q2</b>	1.552.107.502	23.678.188.112	0,176
<b>2006Q3</b>	717.010.647	26.916.390.199	0,217
<b>2006Q4</b>	878.905.328	25.010.450.839	0,204
<b>2007Q1</b>	842.093.623	22.875.828.862	0,202
<b>2007Q2</b>	1.182.595.378	24.663.858.526	0,206
<b>2007Q3</b>	1.273.496.362	27.801.781.767	0,216

**TABLE 1. (CONT.)**

<b>PERIODS</b>	<b>THE RATE OF INFLATION</b>	<b>REAL EFFECTIVE EXCHANGE RATE INDEX</b>	<b>DURABLE CONSUMER GOODS EXPENDITURES (TRY,in constant prices)</b>
<b>1998Q1</b>	0,159	98,12	1.053.098.468
<b>1998Q2</b>	0,106	97,53	1.273.363.362
<b>1998Q3</b>	0,141	102,26	1.171.847.160
<b>1998Q4</b>	0,137	102,09	1.025.754.202
<b>1999Q1</b>	0,121	102,85	866.389.870
<b>1999Q2</b>	0,111	102,60	1.172.698.164
<b>1999Q3</b>	0,140	104,79	969.864.484
<b>1999Q4</b>	0,164	107,49	993.436.264
<b>2000Q1</b>	0,115	111,80	920.719.248
<b>2000Q2</b>	0,052	111,72	1.523.066.912
<b>2000Q3</b>	0,075	117,37	1.336.738.415
<b>2000Q4</b>	0,093	124,64	1.161.632.329
<b>2001Q1</b>	0,104	95,84	756.879.553
<b>2001Q2</b>	0,185	94,41	1.067.770.345
<b>2001Q3</b>	0,112	83,18	903.993.769
<b>2001Q4</b>	0,135	98,21	750.047.249
<b>2002Q1</b>	0,083	116,87	579.165.029
<b>2002Q2</b>	0,033	100,40	1.035.523.403
<b>2002Q3</b>	0,071	97,28	959.701.083
<b>2002Q4</b>	0,078	105,89	788.526.904
<b>2003Q1</b>	0,080	104,29	766.924.495
<b>2003Q2</b>	0,035	118,72	1.071.584.126
<b>2003Q3</b>	0,017	127,93	993.686.074
<b>2003Q4</b>	0,039	118,72	1.118.535.115



**TABLE 1. (CONT.)**

<b>PERIODS</b>	<b>THE RATE OF INFLATION</b>	<b>REAL EFFECTIVE EXCHANGE RATE INDEX</b>	<b>DURABLE CONSUMER GOODS EXPENDITURES (TRY,in constant prices)</b>
<b>2004Q1</b>	0,022	130,29	1.035.811.378
<b>2004Q2</b>	0,009	116,11	1.595.869.720
<b>2004Q3</b>	0,017	116,61	1.362.208.735
<b>2004Q4</b>	0,041	120,92	1.127.360.745
<b>2005Q1</b>	0,016	130,63	1.109.512.402
<b>2005Q2</b>	0,026	134,68	1.885.546.434
<b>2005Q3</b>	0,023	136,96	1.695.266.559
<b>2005Q4</b>	0,036	144,73	1.446.081.858
<b>2006Q1</b>	0,012	146,08	1.218.937.115
<b>2006Q2</b>	0,036	119,99	2.248.917.544
<b>2006Q3</b>	0,017	131,31	1.615.594.788
<b>2006Q4</b>	0,028	135,19	1.311.836.213
<b>2007Q1</b>	0,024	139,84	1.185.608.007
<b>2007Q2</b>	0,015	148,62	1.902.381.615
<b>2007Q3</b>	0,003	150,56	1.591.398.440

**TABLE 2. DESCRIPTIVE STATISTICS**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std.Deviation</b>	<b>Variance</b>
<b>CL</b>	39	53540787	1552107502	545587107,4	426142095,8	1,8159
<b>GDP</b>	39	14436128612	27801781767	19838784675	3454472989	1,1933
<b>INF</b>	39	0,003	0,185	0,069512821	0,0521	0,0027
<b>INT</b>	39	0,162	0,744	0,364051282	0,193	0,0372
<b>RER</b>	39	83,18	150,56	116,6030769	17,2869	298,8387
<b>DCE</b>	39	579165029,4	2248917544	1194699425	355252240	1,262

**TABLE 3. TRANSFORMED DATA SET**

Time series  $Y_t$  was transformed into  $GY_t^* = [(\ln Y_t - \ln Y_{t-1}) / (\ln Y_{t-1})]$  form.

<b>PERIODS</b>	<b>GCL*</b>	<b>GGDP*</b>	<b>GINT*</b>	<b>GINF*</b>	<b>GRER*</b>	<b>GDCE*</b>
<b>1998Q2</b>	0,010034	0,003277	-0,173390	0,220499	-0,001317	0,009142
<b>1998Q3</b>	0,008098	0,008947	0,309107	-0,127130	0,010337	-0,003963
<b>1998Q4</b>	-0,009234	-0,004915	-0,150670	0,014691	-0,000357	-0,006377
<b>1999Q1</b>	-0,034384	-0,009590	0,077377	0,062477	0,001603	-0,008138
<b>1999Q2</b>	0,010130	0,004975	-0,096067	0,040844	-0,000532	0,014710
<b>1999Q3</b>	-0,005103	0,007537	0,345009	-0,105591	0,004572	-0,009094
<b>1999Q4</b>	0,023039	-0,003492	2,118071	-0,080476	0,005473	0,001160
<b>2000Q1</b>	0,029398	-0,006699	0,085424	0,196325	0,008398	-0,003669
<b>2000Q2</b>	0,024444	0,005393	-0,178054	0,366969	-0,000160	0,024385
<b>2000Q3</b>	-0,003840	0,008337	-0,008887	-0,123877	0,010475	-0,006172
<b>2000Q4</b>	-0,023439	-0,004405	-0,074017	-0,083046	0,012598	-0,006682
<b>2001Q1</b>	-0,082838	-0,008666	-0,550392	-0,047067	-0,054442	-0,020523
<b>2001Q2</b>	-0,021888	0,002033	1,085908	-0,254473	-0,003308	0,016832
<b>2001Q3</b>	0,017428	0,008285	-0,325331	0,297414	-0,027851	-0,008009
<b>2001Q4</b>	0,007019	-0,005951	0,205571	-0,085315	0,037575	-0,009053
<b>2002Q1</b>	-0,006839	-0,004166	-0,080359	0,242916	0,037927	-0,012652
<b>2002Q2</b>	0,045498	0,004554	-0,027632	0,370576	-0,031898	0,028799
<b>2002Q3</b>	-0,012135	0,008184	0,118195	-0,224602	-0,006859	-0,003663
<b>2002Q4</b>	0,021409	-0,004056	0,168799	-0,035549	0,018534	-0,009499
<b>2003Q1</b>	-0,005604	-0,005318	-0,010645	-0,009924	-0,003275	-0,001356
<b>2003Q2</b>	0,013772	0,002902	-0,001149	0,327303	0,027905	0,016351
<b>2003Q3</b>	0,025342	0,008304	0,172745	0,215408	0,015631	-0,003630
<b>2003Q4</b>	0,027928	-0,003680	0,263085	-0,203789	-0,015391	0,005713
<b>2004Q1</b>	0,000742	-0,003452	0,114211	0,176475	0,019465	-0,003688
<b>2004Q2</b>	0,011914	0,003648	-0,075704	0,234185	-0,023671	0,020822
<b>2004Q3</b>	-0,020766	0,006774	0,043768	-0,135014	0,000916	-0,007471
<b>2004Q4</b>	0,007358	-0,003693	0,137559	-0,216063	0,007620	-0,008997
<b>2005Q1</b>	0,014181	-0,003232	-0,009962	0,292642	0,016109	-0,000766
<b>2005Q2</b>	0,015845	0,003313	0,010539	-0,117934	0,006271	0,025462
<b>2005Q3</b>	0,008318	0,006728	-0,000656	0,039373	0,003424	-0,004981
<b>2005Q4</b>	-0,012852	-0,002852	0,034944	-0,119614	0,011214	-0,007481
<b>2006Q1</b>	0,004936	-0,004713	-0,044912	0,317306	0,001868	-0,008102
<b>2006Q2</b>	0,012844	0,004783	0,001853	-0,240236	-0,039477	0,029275
<b>2006Q3</b>	-0,036492	0,005366	-0,120559	0,221602	0,018823	-0,015359
<b>2006Q4</b>	0,009984	-0,003058	0,040147	-0,121587	0,005977	-0,009823
<b>2007Q1</b>	-0,002078	-0,003726	0,005159	0,047952	0,006884	-0,004819
<b>2007Q2</b>	0,016523	0,003155	-0,013212	0,125082	0,012329	0,022631
<b>2007Q3</b>	0,003545	0,005005	-0,030399	0,361310	0,002596	-0,008354

**TABLE 4. TRANSFORMED STATIONARY DATA SET**

<b>PERIODS</b>	<b>CL*</b>	<b>GDP*</b>	<b>INT*</b>	<b>INF*</b>	<b>REDK*</b>	<b>DCE*</b>
<b>1999Q1</b>	-0.009234	-0.019532	-0.459777	0.014691	-0.000357	-0.002414
<b>1999Q2</b>	-0.034384	0.009187	0.228046	0.062477	0.001603	-0.001761
<b>1999Q3</b>	0.010130	0.019240	-0.173444	0.040844	-0.000532	0.022848
<b>1999Q4</b>	-0.005103	-0.012003	0.441076	-0.105591	0.004572	-0.023804
<b>2000Q1</b>	0.023039	-0.013590	1.773.061	-0.080476	0.005473	0.010254
<b>2000Q2</b>	0.029398	0.007822	-2.032.647	0.196325	0.008398	-0.004830
<b>2000Q3</b>	0.024444	0.015299	-0.263478	0.366969	-0.000160	0.028054
<b>2000Q4</b>	-0.003840	-0.009148	0.169167	-0.123877	0.010475	-0.030557
<b>2001Q1</b>	-0.023439	-0.015687	-0.065130	-0.083046	0.012598	-0.000510
<b>2001Q2</b>	-0.082838	0.008482	-0.476374	-0.047067	-0.054442	-0.013841
<b>2001Q3</b>	-0.021888	0.014961	1.636.299	-0.254473	-0.003308	0.037355
<b>2001Q4</b>	0.017428	-0.004447	-1.411.239	0.297414	-0.027851	-0.024841
<b>2002Q1</b>	0.007019	-0.020489	0.530902	-0.085315	0.037575	-0.001043
<b>2002Q2</b>	-0.006839	0.016021	-0.285930	0.242916	0.037927	-0.003599
<b>2002Q3</b>	0.045498	0.006936	0.052728	0.370576	-0.031898	0.041451
<b>2002Q4</b>	-0.012135	-0.005091	0.145826	-0.224602	-0.006859	-0.032462
<b>2003Q1</b>	0.021409	-0.015869	0.050605	-0.035549	0.018534	-0.005836
<b>2003Q2</b>	-0.005604	0.010977	-0.179444	-0.009924	-0.003275	0.008143
<b>2003Q3</b>	0.013772	0.009482	0.009496	0.327303	0.027905	0.017707
<b>2003Q4</b>	0.025342	-0.002818	0.173894	0.215408	0.015631	-0.019981
<b>2004Q1</b>	0.027928	-0.017386	0.090340	-0.203789	-0.015391	0.009343
<b>2004Q2</b>	0.000742	0.012213	-0.148874	0.176475	0.019465	-0.009401
<b>2004Q3</b>	0.011914	0.006871	-0.189915	0.234185	-0.023671	0.024510
<b>2004Q4</b>	-0.020766	-0.003974	0.119472	-0.135014	0.000916	-0.028293
<b>2005Q1</b>	0.007358	-0.013594	0.093791	-0.216063	0.007620	-0.001526
<b>2005Q2</b>	0.014181	0.010928	-0.147522	0.292642	0.016109	0.008231
<b>2005Q3</b>	0.015845	0.006084	0.020501	-0.117934	0.006271	0.026227
<b>2005Q4</b>	0.008318	-0.003130	-0.011195	0.039373	0.003424	-0.030443
<b>2006Q1</b>	-0.012852	-0.012994	0.035600	-0.119614	0.011214	-0.002500
<b>2006Q2</b>	0.004936	0.007719	-0.079856	0.317306	0.001868	-0.000620
<b>2006Q3</b>	0.012844	0.011356	0.046765	-0.240236	-0.039477	0.037377
<b>2006Q4</b>	-0.036492	-0.008912	-0.122412	0.221602	0.018823	-0.044634
<b>2007Q1</b>	0.009984	-0.009007	0.160707	-0.121587	0.005977	0.005537
<b>2007Q2</b>	-0.002078	0.007756	-0.034988	0.047952	0.006884	0.005004
<b>2007Q3</b>	0.016523	0.007549	-0.018371	0.125082	0.012329	0.027450

Transformed stationary time series obtained in E-views 6.0 software by using the following equations:

$$GCL^* = CL^*(-1)$$

$$D2GGDP^* = D(GGDP^*(-1),2)$$

$$\text{GINT}^* = \text{GINT}^*(-1)$$

$$\text{GINF}^* = \text{GINF}^*(-1)$$

$$\text{GRER}^* = \text{RER}^*(-1)$$

$$\text{DGDCE}^* = \text{D}(\text{GDCE}^*(-1))$$

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### **Online Resources**

<http://www.dpt.gov.tr>

<http://www.economyprofessor.com/economictheories/relative-income-hypothesis.php>

<http://www.economyprofessor.com/economictheories/permanent-income-hypothesis.php>

<http://www.economyprofessor.com/economictheories/life-cycle-hypothesis.php>

<http://evds.tcmb.gov.tr/cbt.html>

<http://evds.tcmb.gov.tr/yeni/cbt-uk.html>

<http://www.jstor.org>

<http://lmisnt.pub.die.gov.tr/indeksSerileri.xls>

<http://www.staff.city.ac.uk/d.a.asteriu/NON-STATIONARITYv1.ppt>

<http://www.tbb.org.tr/net/donemsel/default.aspx?dil=EN>

<http://www.tcmb.gov.tr>

<http://www.tuik.gov.tr/PreHaberBultenleri.do?id=2070>

[http://www.tuik.gov.tr/VeriBilgi.do?tb\\_id=17&ust\\_id=6](http://www.tuik.gov.tr/VeriBilgi.do?tb_id=17&ust_id=6)

[http://www.tuik.gov.tr/VeriBilgi.do?tb\\_id=57&ust\\_id=16](http://www.tuik.gov.tr/VeriBilgi.do?tb_id=57&ust_id=16)

[http://www.tuik.gov.tr/PreHaberBultenleri.do?id=3912&tb\\_id=8](http://www.tuik.gov.tr/PreHaberBultenleri.do?id=3912&tb_id=8)