ESSAYS ON THE COMPETITION AND REGULATIONS IN THE TURKISH CREDIT CARD MARKET

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ESSAYS ON THE COMPETITION AND REGULATIONS IN THE TURKISH CREDIT CARD MARKET

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Thesis Abstract

Gazi İshak Kara

"Essays on the Competition and Regulations in the Turkish Credit Card Market"

The aim of this thesis is to analyze the price and non-price competition in the credit card market in Turkey. The level of credit card interest rates created an unabated debate in Turkey. While interest rates in consumer credit markets declined to competitive levels with the decrease in market interest rates in recent years, response of credit card rates to this decline is very slow. However, banks swiftly reflected the increase in the cost of funds during the 2000 and 2001 crises to credit card rates.

The Central Bank started to put ceiling on credit card rates in 2006. Further regulations of credit card interest rates are on the agenda of the government. In order to design and implement an effective and efficient regulation, a rigorous analysis of the nature of competition in the market is necessary. Importance of credit cards in the economy and for the monetary transmission mechanism specifically is continuously increasing in recent years. Number of credit cards reached 37.3 million while credit card transactions comprised more than 23 percent of all private consumption spending in 2007. Therefore any incorrectly designed regulation may have economy wide adverse effects.

In the first chapter, we analyze the price competition in the credit card market. System GMM regression is run on a dynamic panel data model and it is shown that credit card interest rates are economically insensitive to the changes in the cost of funds. This result is an indication of the lack of price competition in the market.

In the second chapter, we investigate the non-price competition in the market. Banks create switching costs for their customers by providing non-price benefits. We divide non-price benefits into two groups: benefits from general banking services and benefits depending on the credit card usage. We argue that quality of general banking services and bank characteristics are at least as important as the non-price benefits of credit cards directly for credit card choice of customers. Our empirical analyses confirm that as the measures of both groups of non-price benefits increase, banks can charge higher credit card rates to their customers. Therefore, we conclude that competition in the credit card market is taking place on non-price aspects rather than interest rates.

Tez Özeti

Gazi İshak Kara

"Essays on the Competition and Regulations in the Turkish Credit Card Market"

Bu tezin amacı Türkiye'de kredi kartı pazarındaki fiyat ve fiyat dışı rekabeti analiz etmektir. Türkiye'de kredi kartı faizlerinin yüksek seviyesi hafiflemeden sürüp giden bir tartışmaya yol açmıştır. Son yıllarda piyasa faiz oranlarının düşüşüne paralel olarak tüketici kredileri pazarındaki faiz oranlarının rekabetçi seviyelere gerilemiş, ancak kredi kartı faizlerinin piyasa faizlerindeki düşüşe tepkisi çok yavaş olmuştur. Öte yandan, bankalar 2000 ve 2001 krizler sırasında fonloma maliyetlerindeki artışları kısa bir süre içerisinde kredi kartı faiz oranlarına yansıtmıştır.

Türkiye'de Merkez Bankası 2006'dan itibaren kredi kartı faiz oranları için üst limit belirlemeye başlamıştır. Kredi kartı faizlerine ilişkin yeni düzenlemeler de hükümetin gündeminde yer almaktadır. Ancak, etkin ve verimli bir düzenlemenin tasarlanması ve uygulanması öncelikle kredi kartı pazarındaki rekabetin güçlü bir analizinin yapılmasını zorunlu kılmaktadır. Kredi kartlarının ekonomideki önemi, özellikle de parasal aktarım mekanizmaları açısından önemi son yıllarda sürekli artmaktadır. Toplam kredi kartı sayısı 37,3 milyona ulaşmış, kredi kartı ile yapılan işlemlerin tutarı ise toplam nihai tüketim harcamalarına oranla yüzde 23 seviyesine çıkmıştır. Bu nedenle, doğru tasarlanmamış bir düzenleme bütün ekonomi üzerinde olumsuz sonuçlara yol açabilir.

Tezin ilk bölümünde, kredi kartı pazarındaki fiyat rekabeti analiz edilmiştir. Dinamik bir panel veri modeli üzerinde sistem GMM yöntemi ile yapılan regresyon, kredi kartı faizlerinin fonlama maliyetlerindeki değişimlere ekonomik olarak duyarsız olduğu ortaya koymuştur. Bu sonuç, kredi kartı pazarında fiyat rekabetinin işlemediğini göstermektedir.

İkinci bölümde, pazardaki fiyat dışı rekabet incelenmiştir. Bankalar müşterilerine fiyat dışı faydalar sağlayarak müşteriler için kart değiştirme maliyetleri yaratmaktadır. Bu çalışmada kredi kartı sahiplerine sunulan fiyat dışı faydaları iki gruba ayırmaktayız: Genel bankacılık hizmetleri üzerinden sağlanan faydalar ve kredi kartı kullamına bağlı faydalar. Bir başka ifadeyle, genel bankacılık hizmetlerinin kalitesi ve banka özelliklerinin müşterilerin kredi kartı şeçiminde kredi kartlarının döğrudan sağladığı fiyat dışı faydalar kadar önemli olduğunu ileri sürmekteyiz. Ampirik analizlerimiz, her iki gruptaki fiyat dışı fayda unsularına ilişkin göstergeler arttıkça, bankaların müşterilerine daha yüksek kredi kartı faiz oranları uygulayabildiğını göstermektedir. Bu nedenle, Türkiye'de kredi kartı pazarında rekabetin faiz oranları üzerinden değil, fiyat dışı unsurlar üzerinden yürütüldüğü sonucuna varmaktayız.

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PART I

FAILURE OF PRICE COMPETITION IN THE TURKISH CREDIT CARD MARKET

Introduction

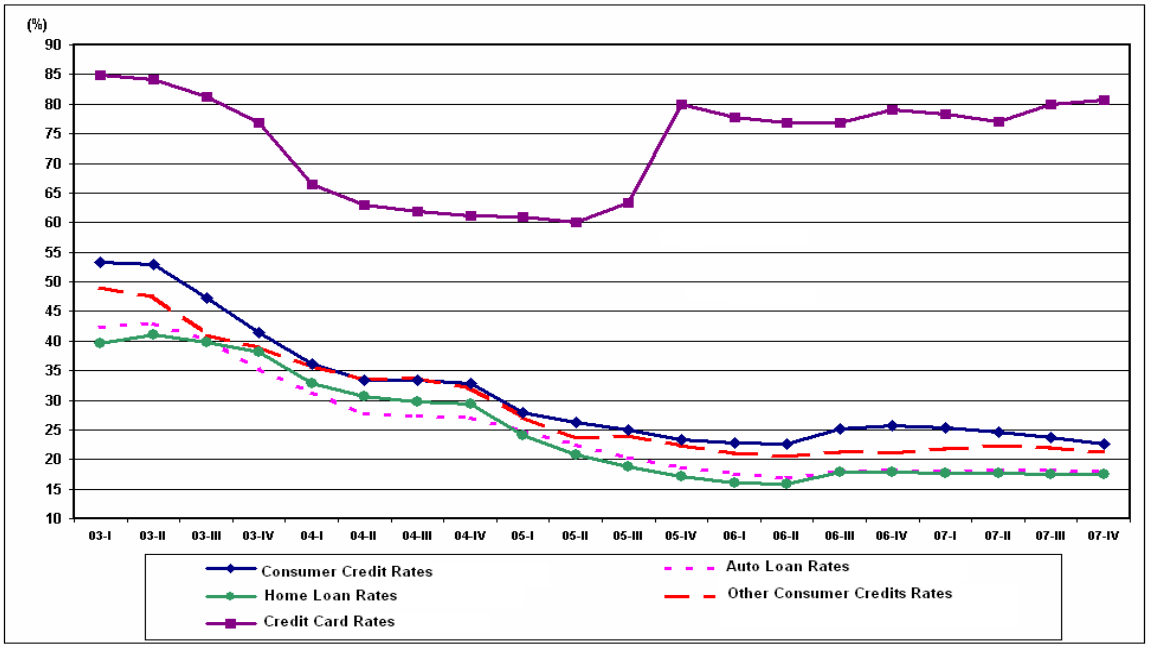
The level of credit card interest rates in Turkey stayed consistently high compared to the declining market interest rates in recent years. Between 2003 and 2007, overnight interest rate, which moves closely with market interest rates, declined from 44 percent to 15.75 percent. However, weighted average interest rate in the credit card market barely declined from 85 percent in 2003 to 60 percent in the in 2005 and rose again 80 percent level in 2007. While banks swiftly reflected the increase in the cost of funds during the November 2000 and February 2001 crisis to credit card rates, their response to the decline in the cost of funds afterwards was very slow.

A similar downward-sticky interest rate trend has not been observed in other credit markets such as home, auto and consumer credits. Interest rates in these markets closely followed the decline in the market interest rates. The major reason of this decline is the increasing competition in consumer banking in 2000s. The main source of profits for the banking industry throughout the 1990s was lending government at high interest rates. This "low-risk, high return" period ended with the November 2000 and February 2001 financial crises. The new economic program (Transition to a Strong Economy) which has been adopted following the crisis in 2001 and the accompanying stand-by agreement with IMF[1] have been beneficial in

[1] Turkey signed the 18th Stand-by agreement with IMF on February 22, 2002.

establishing stability in the economy, which resulted in high growth rates and declining inflation and real interest rates. Government bonds lost their attractiveness and banks shifted their focus to the large consumer credits market. Consequently, interest rates and profit margins in consumer credit markets decreased to competitive levels quickly with the increasing competition.

Graph 1 shows the path of credit card interest rates, overnight interest rate, and interest rate in other credit markets. As clearly observed in the graph, there is a remarkable decrease in the market interest rates and consumer credit interest rates between 2003 and 2007. However, spreads between credit card interest rates and market interest rates even increases in the same period.



Graph 1. Credit card interest rates vs. market interest rates

Source: Central Bank of Turkey

Stickiness of credit card interest rates is not unique to Turkey. Credit card interest rates are higher than other consumer credit interest rates all over the world. Empirical evidences from other countries indicate that credit card interest rates are

also downward-sticky and show asymmetric response to the changes in the cost of funds. In a seminal paper, Ausubel (1991) showed that although there were about 4,000 banks in the US credit card market and in that sense market fitted to the perfect competition model, response of credit card interest rates to the decline in the cost of funds was very slow in the 1982-1987 period. Moreover, he calculated that banks earned 3-4 folds higher returns from their credit card business compared to the ordinary rate of return of banking industry in that period.

Debate over the level of credit cards continues unabated, making it necessary to assess the issue. Before any further regulation in the market, a rigorous analysis of the competition in the credit card market is necessary. In this study, we focus on the price competition in the credit card market in Turkey. The experience of Turkish credit card market in recent years is examined and existence of price competition in the market empirically analyzed the by employing a quarterly data set of average credit card interest rates of all issuers in Turkey for the period between the second quarter of 2001 to the last quarter of 2006. Ausubel (1991) and Aysan and Muslim (2006) empirically analysed the response of credit card rates to the changes in the cost of funds for US and Turkish markets respectively, by using conventional fixed and random effects panel data models and instrumental variable techniques. We employ dynamic panel data models to better measure the response of credit card interest rates to the changes in the cost of funds. In that sense, we improve the methodology used in previous studies for similar estimations. Moreover, we cover an extended time period compared to Aysan and Muslim (2006) study with the availability of new data. System GMM regression is run on a dynamic panel data model and it is shown that credit card interest rates are economically insensitive to

the changes in the cost of funds. This result is an indication of the failure of price competition in the market.

The organization of this paper is as follows: In the next section, a brief outlook of the recent developments and regulations in the Turkish credit card market are provided. In the third section, we make survey of the literature that examines the price competition in the credit card markets. In the fourth section, we empirically analyze the existence of price competition in the Turkish credit card market. Lastly, section five concludes.

Recent Developments in the Credit Card Market in Turkey

The adventure of the Turkish credit card market in the new millennium is highly interesting, but this story has not yet been much studied. Credit card usage in Turkey has continuously increased in the last decade in spite of high interest rates. Even though first credit cards entered the Turkish market in 1968 with Diners Club, only some high-income people had credit cards and a small number of stores accepted these cards for more than two decades.

There were only 554,000 credit cards in Turkey in the early 1990s. High inflation and interest rates, frequent economic crises and consequent increases in consumer default risks delayed the development of credit card market in 1990s (Aysan and Muslim, 2006). The rapid development of the Turkish credit card market started in the late 1990's and accelerated in 2000s. Number of credit cards increased almost three folds from 13.6 million to 37.3 million between January 2002 and December 2007. A tremendous increase in the number of point of sales (POS) from

382 thousand to 1,454 thousand during the same period reflects the widespread acceptance of credit cards by merchants and vast investments made by banks in the credit card business. Total number of bank branches, ATM's and bank cards accompanied the growth in the credit cards. Table 1 summarizes these statistics.[2]

Table 1. General Outlook of the Turkish Credit Card Market

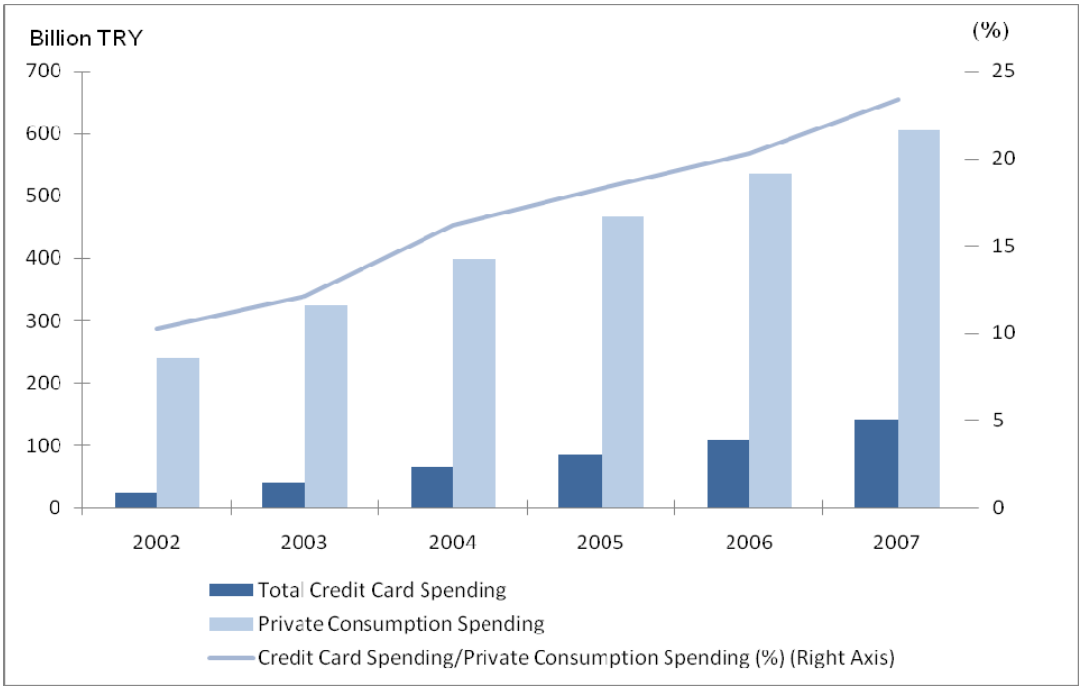
Year	Total Number of Credit Cards (million)	Total Value of Credit Card Transactions (billion TRY)	Number of POSs (thousand)	Number of ATMs	Number of Branches	Total Number of Bank Cards (million)
2002	15.7	24.5	495.7	12,069	6,340	35.1
2003	19.9	39.4	662.4	12,857	6,107	39.6
2004	26.7	64.6	912.1	13,544	6,242	43.1
2005	30.0	85.3	1,141.0	14,823	6,679	48.2
2006	32.4	108.4	1,282.7	16,511	7,256	53.5
2007	37.3	141.5	1,453.9	18,800	8,073	55.5

Source: Interbank Card Center

A number of benefits that credit cards provide such as paying the shopping amount in installments, gaining rebates, money-points, actual gift rewards and frequent flyer miles for using credit cards instead of cash, debit cards or checks increased the attractiveness of credit cards for consumers. Especially, in a society where people are accustomed to high interest rates, credit cards' feature of making the shopping amount payable in installments without adding any term difference to cash price of goods, and large number of installments (4-8 months on the average, but can be up to 24-36 months for some sectors) that merchants offer to credit cards skyrocketed the demand for credit cards and the amount of purchases made by credit cards. Decline of interest rates to single-digit numbers after 30 years of high inflation

[2] The data presented in the Table 1 is taken from the database of Interbank Card Center (www.bkm.com.tr).

enabled banks and retailers to support and encourage installment system in credit cards. Moreover, merchants preferred credit cards over traditional methods for sales with installments, since credit cards transferred the default risk and the cost of collecting receivables to banks. Adoption of CHIP system which makes credit cards a more secure payment instrument, increasing security in internet shopping, conveniences that internet shopping provides and accompanying increase in the internet usage in the society also contributed to the increasing adoption of credit cards by consumers.



Graph 2. Ratio of credit card spending to total private consumption spending

Source: Central Bank of Turkey and Interbank Card Center

Note: 1. Private Consumption Spending is the final consumption expenditure of resident households.

2. Total Credit Card Spending includes cash draws with credit cards.

Total transaction volume of credit cards increased from TRY 24,507 million to TRY 141,467 million between 2002 and 2007. Ratio of total credit card transaction volume to private consumption spending increased from 10.3 percent to

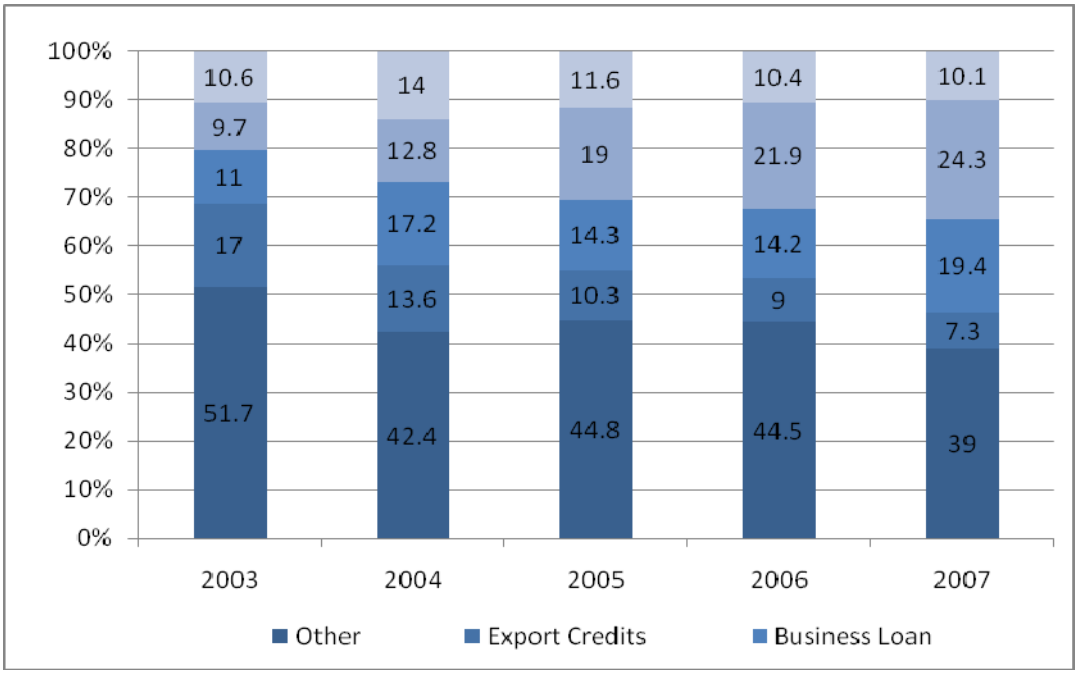
23.4 percent (Graph 2), and ratio of credit card purchases to GDP rose from 6.3 percent to 14.9 percent during the same period. Although drawing cash with credit cards is the most expensive borrowing method[3], total amount of cash draws with credit cards rose to TRY 13,449 million in 2007 from TRY 2,542 in 2002. While both total number of credit cards and amount of credit card transactions are increasing, transaction per credit card is also on the rise. Transaction per credit card increased from TRY 107 in January 2002 to TRY 373 in December 2007.

Increase in the amount of outstanding balances of credit cards in 2000s is also tremendous. Outstanding balances reached 23,987 million TRY as of July 2007 while this amount was just 2,317 million TRY in January 2002. Besides customers' increasing substitution of other payment instrument such as cash, charge cards with credit cards, credit cards also gained a wide spread usage as a credit instrument. TRY 7,316 million of the amount of the outstanding balances in July 2007 is revolving debt. Ratio of revolving credit card debt to total outstanding balances is 30.50 percent, which reflects that an important number of consumers are borrowing on their credit cards in spite of abnormally high interest rates. However, share of credits provided by credit cards in total credits exhibits a stable trend in recent years at around 10 percent (Graph 3). This indicates that other consumer credit markets also grew significantly in recent years due to shifting focus of banks from government bonds market to consumer credits markets.

In addition to the growth in the credit card transactions and outstanding balances, credit card limits have continuously increased in recent years. As of July 2007 total limits that Turkish credit card sector provides to consumers is 48,913 million TRY. This amount was 28,747 million TRY in July 2004. Limit per credit

[3] Banks charge 3 percent of the borrowing amount as a commission for cash draws with credit cards in addition to the conventional interest rate.

card on the other hand has decreased somewhat after reaching a peak of TRY 1,600 in the second quarter of 2004, stayed about TRY 1,400 level during 2006 and 2007.



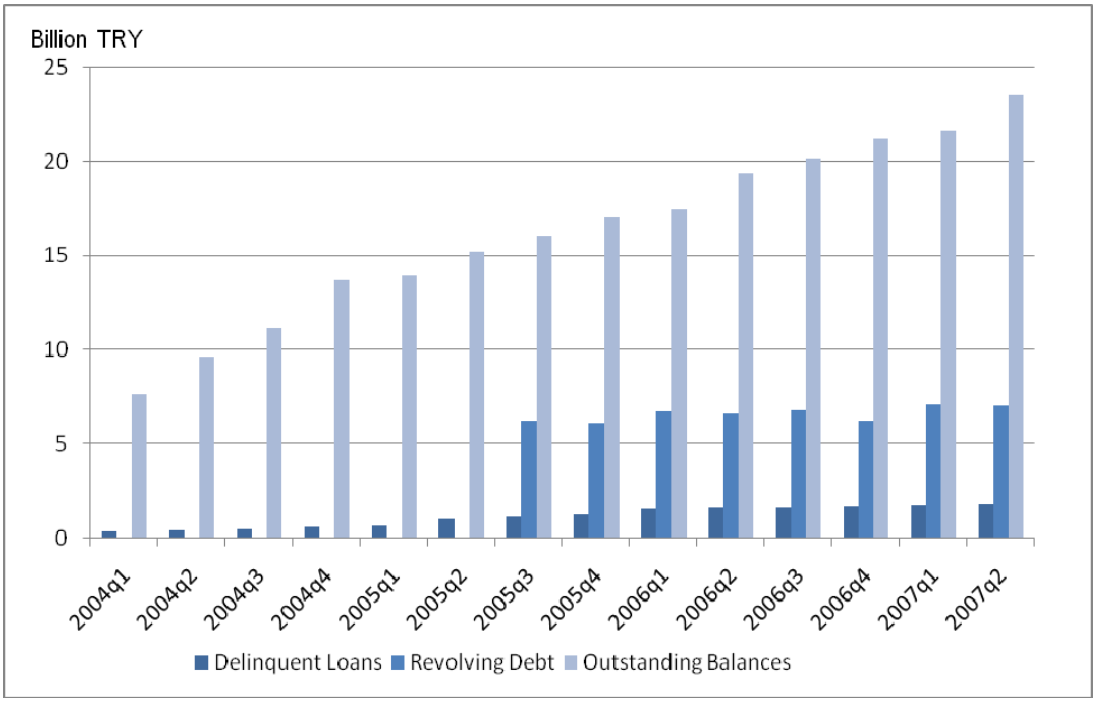
Graph 3. Distribution of credits in the Turkish banking sector by types

Source: Banking Regulation and Supervision Agency of Turkey and Central Bank of Turkey

On the other hand, number of consumers who are in credit card debt delinquency increased sharply in spite of buoyant economic growth, low inflation, and political and economic stability in recent years. Number of delinquent consumers more than doubled and rose to 949,534 in July 2007 from 414,559 in January 2005. The total amount of delinquent loans grew, as more and more consumers fell into delinquency. Delinquent loans in the sector increased from TRY 311 million to TRY 1,787 million between January 2004 and June 2006 (Graph 4)[4].

[4] Data for outstanding credit card balances, delinquent credit card loans, revolving credit card debt, credit card limits and number of credit card consumers are provided from the Central Bank of Turkey.

Ratio of delinquent loans to total outstanding balances is 7.5 percent as of July 2007. A decrease in the delinquency ratio has been observed between 2002 and late 2004. Delinquency ratio decreased until 2.3 percent in 2003. However, this ratio increased again 2005 and 2006.



Graph 4. Delinquent loans and revolving debt in the Turkish credit card market

Source: Central Bank of Turkey

Note: Revolving credit card debt data does not exists before August 2008.

Supply Side of the Credit Card Market

Main players in credit card markets are network providers, issuers, merchants, acquirers and cardholders. The systems that include all of these parties are called "open systems". Visa and Master Card are the two biggest network providers that operate open systems. When issuer, acquirer and network provider is the same company, these systems are called "closed systems". American Express and Discover

Card are examples of closed system credit card providers. The world's two largest network associates, Visa and MasterCard also dominate the Turkish credit card market with almost 50 percent market shares each. Network associates provide and improve the infrastructure of credit card systems, they set rules and standards of credit card systems and they regulate the relations between issuers and acquirers such as determining the level of interchange fees. In Turkey rules and standards of the game between domestic issuers and acquirers are set within the Interbank Card Center (ICC), a private organization with 28 member banks, including all credit card issuers. ICC behaves as a representative organization of Turkish issuers and acquirers in the relations with foreign banks and card networks.

Table 2. The Six Largest Issuers in the Turkish Credit Card Market, June 2007

Bank	Outstanding Balances (billion TRY)	Market Share (%) (Outstanding Balances)	Number of Customers (million)	Market Share (%) (Number of Customers)
Yapi Kredi	5.8	24.8	6.4	24.7
Garanti	4.9	20.8	3.4	13.3
Akbank	3.4	14.5	3.3	12.6
Isbank	2.9	12.4	3.1	11.9
Finansbank	1.8	7.6	2.5	9.6
HSBC	1.7	7.1	2.1	8.1
Six Largest Issuers	20.5	87.1	20.8	80.2
Sector	23.6	100.0	25.9	100.0

Source: Central Bank of Turkey

There are 21 issuers in the credit card market in Turkey.[5,6] Three of them are public banks and eight of them are foreign banks. All of these issuers provide general

[5] In this study we do not consider four small financial institutions which do not charge interest for credit cards.

[6] Kocbank and Yapi Kredi merged under Yapi Kredi in the second half of 2006. This merger decreased the number of issuers in the market to 21. However in the empirical part of the paper we include data 22 issuers since we cover the period until the second half of 2006. There is no new entrance to the market during the sample period.

corporate and individual banking services at the same time. The credit card market is quite concentrated. Six large banks (Yapi Kredi, Garanti, Isbank, Akbank, Finansbank and HSBC) control 87 percent of the market in outstanding balances and their total market share in term of number of customers is 80 percent.[7] C3 and C4 ratios for the market are 60 and 72.4 percents respectively and Herfindahl-Hirschman index is 1537.[8] Yapi Kredi and Garanti are the market leaders with a total market share of 45 percent. They are followed by Akbank and Isbank (Table 2).

21 issuers are enough to establish price competition in the market. However, banks' reluctance to decrease credit card rates in response to the decline in the cost of funds indicates that competition in the market is not concentrated on the prices. Especially the three largest issuers obviously do not compete on prices. Instead, large issuers focus on strategies to increase customer loyalty by providing non-price benefits to credit card customers. Until the price ceiling in June 2006 they charged higher than average interest rates in general and they set their credit card rates at the ceiling level since the price cap practice has started. On the other hand, some smaller issuers and public banks charged lower than average interest rates during the sample period, however they could not improve their market shares. This fact also indicates that on the average customers are more concerned about non-price benefits rather than interest rates.

Market leaders of the credit card issuers are also the leaders of the acquirer market in Turkey. An important dimension of the competition among the issuers in Turkey is extending the number of the point of sales. Because of interchange fees

[7] Some customers have credit cards from different issuers.

[8] Herfindahl-Hirschmann Index is calculated by summing up the squares of the market shares of each issuer. Market is highly concentrated if this index is closer to 10000 (monopoly case) and it is competitive if this index is closer to 0. Generally it is accepted that a market in which the HHI is below 1000 is unconcentrated, between 1000 and 1800 is moderately concentrated, and above 1800 is highly concentrated.

that acquirers need to pay to issuers, banks try to increase their point of sales. Many big and medium size merchants maintain the POS machines of different issuers in Turkey. However, larger issuers have a considerable advantage at the point of sales. Merchants prefer to maintain largest issuers' POS machines at first place since higher number of consumers use their credit cards. Customers of smaller issuers become disadvantaged at these points of sales, since they are not offered non-price benefits such as large number of installments, attractive rebates and gifts for the purchases with their credit cards.

Regulations in the Credit Card Market in Turkey

Sluggish response of credit card rates to the decrease in the cost of funds starting in 2002 gave rise to serious problems and tragedies which created a pressure over government to regulate the market. Consumers who have difficulty in paying their credit card debts witnessed that their interest debt is increasing exponentially because of extremely high interest rates. With about 100 percent compounded interest rates, credit card debt of consumers could be doubled only in a year once they fall into delinquency.[9] The number of consumers who defaulted on their credit card debt increased in spite of a buoyant economic environment in recent years.[10]

Increasing complaints from cardholders and consumer organizations prepared the way for the first regulation in the credit card market. However, preparation of a specific law for credit cards took time due to disagreements between parties.

[9] Banks were applying compounded interest rate to credit card debts. This was banned with the regulation in 2006.

[10] See Aysan and Yildiz (2007) for a detailed discussion of the problems caused by high credit card rates

Therefore, as an initial step credit cards were taken into scope of the Consumer Protection Law in 2003. This first regulation limited the default interest rate to 30 percent above of the conventional interest rate for credit cards.[11] However, this regulation amplified the problem, rather than solving it, since banks first determined the default interest rates at the maximum possible amount to get the maximum profit from consumers who are in delinquency, and set the conventional interest rates accordingly.

The link between default and conventional rates became the focal point of complaints shortly after this regulation. A more comprehensive regulation for credit cards came into debate in 2004. However, long discussions before the regulation created an uncertainty, which alone had negative effects on credit card rates. With the uncertainty created by the expectation of a new regulation banks refrained from decreasing credit card interest rates in this period (See Graph 1). After long debates, Bank and Credit Cards Law was enacted on March 1, 2006. This Law lifted the link between default and conventional interest rates and gave the right to the Central Bank to put ceiling on the credit card rates to avoid some banks from charging higher than average interest rates. Central Bank started to determine ceilings at the beginning of each quarter by adding 0.5 percentage points to the weighted average of credit card rates in the market.

However, even ceiling practice could not be a remedy for the high credit card rates. Most of the banks, especially larger banks, set their credit card rates at the maximum level allowed by the ceiling. Consequently, another more restrictive ceiling was proposed in the Parliament in May 2008. This legislative proposal

[11] Conventional interest rate is applied for the part of the credit card debt over the minimum payment requirement, while default interest rate is applied if consumers fail to pay the minimum payment requirement. The regulation in 2006 requires that the minimum payment requirement must be at least 20 percent of the transactions in the grace period.

suggests limiting credit card interest rates with the two folds of weighted average of market deposit interest rates. With the interest rates in the first half of 2008, this means 35-40 percent reduction of the credit card ceiling. For example, as of April 2008 credit card ceiling set by the Central Bank is 52.68 percent while the weighted average of one month deposit rate in the market in the same month is 16.16 percent. According to the legislative proposal, credit card ceiling must be 32.32 percent rather than 52.68 percent with these rates.

Government supports the legislation by arguing that price competition is not functioning well in the market, hence it is necessary to tighten the credit card rate ceiling. Banks are strictly against any further regulation for credit card rates based on their claim that further decreases in credit card rates will seriously harm profitability of credit card business, which will result in decreasing other benefits to credit card consumers (such as rewards, rebates and installments). They claim that decreasing non-price benefits to credit card consumers will discourage credit usage and lead to economy wide consequences. For example, credit cards have been very beneficial to decrease the size of unregistered transactions; hence they increased tax income for the government. Retailers also support the banks in this argument. They also fear that their sales will be harmed with a decrease in credit card usage.

These debates at least show that, in order to design and implement an effective and efficient regulation, a rigorous analysis of the nature of competition in the market is necessary. Any incorrectly designed regulation may have economy wide adverse effects especially when we consider the increasing importance of credit cards in the economy and for the monetary transmission mechanism specifically. In the next part, we survey the theoretical explanations of high interest rates in the

credit card markets and we evaluate the competition in the Turkish credit card market in the light of these theories.

Theoretical Background

Some features of credit cards make them more expensive compared to other credit types. Credit cards provide uncollateralized credit to consumers. Moreover, banks commit to lend up to a certain amount which is defined by credit card limits. Utilization of this credit is solely at the discretion of consumers. Banks ex ante do not have information when and how much they are going to lend to credit card consumers. Therefore, they have to keep provision equal to the difference between total credit card limits and total outstanding balances. Banks secure themselves against this liquidity risk by keeping short-term low yield securities or by being prepared to borrow short-term expensive funds (Shaffer and Thomas, 2007). In that sense, funding of credit cards is more expensive than funding of other credits. Furthermore, credit card consumers do not make any payment for a certain period which is called, "grace period" and in some countries, including Turkey, they do not pay interest for this period even if they credit their purchases.

Additionally, operating of a credit card system entails expensive investments in technology and other infrastructure. Banks also provide many non-price benefits to credit card consumers such as rebates, frequent flyer miles which again entails high costs. These factors are related to the nature of credit card business, and answer the question of "Why credit card borrowing is so expensive?" only in part. However, even after considering costs arising from the nature of credit cards, credit cards are still expensive. Moreover, in spite of high operating costs, credit card issuers make

above normal profits (Ausubel, 1991). This observation suggests that reasons of high credit card rates lie in somewhere else.

There are various explanations of high credit card rates in the literature. A leading explanation is based on the customer structure in credit card markets. Chakrovarti (2003) classifies the customers into two groups according to their credit card usage behavior: convenience users who regularly pay the bill at the end of the grace period, and revolvers who use credit option of their cards. Chakrovarti argues that the level of credit card rates is related to the relative ratios of these two different customer groups in the market. Convenience users are not as profitable as revolvers for issuers. Consumers in this group use their credit cards only as a mean of payment. Additionally they benefit from rewards and rebates that depend on credit card usage frequency. Hence, their costs in the non-interest grace period are financed through the interest income from revolvers. Since 30 – 40 percent of the customers in the US credit card market are convenience users[12], there are two revolvers for each convenience user. However, 78 percent of the customers pay their balances full at the end of grace period in Turkey.[13] This means that, a revolver is financing three convenience users. As of December 2006 revolving credit card debt is around TRY 6.2 billion and with average credit card interest rates between 75-80 percent issuers earned a total interest income of about TRY 4.4 billion from revolving credit card debt in 2006[14]. It has been argued that this consumer structure in the market is the reason of extremely high credit card interest rates in Turkey. However, unusual profit rates of credit card issuers indicates that credit card rates cannot be explained only by costs.

[12] Predictions for 2003. Chakravorti (2003)
[13] ICC, Bank and Credit Card Usage Survey, May 2008
[14] Data for revolving credit card debt and total interest income from credit card lending are provided from the Central Bank of Turkey.

Another classification of consumers was provided by Chakravorti and Emmons (2003). These economists classify consumers into two groups according to their risk level: liquid and illiquid consumers. If merchants make a reduction in cash price of goods compared to credit cards because of commissions they pay and other costs of accepting credit cards, then liquid consumers will prefer paying in cash, while illiquid consumers will use their credit cards. In this setting, only illiquid, high-risk consumers will hold credit cards and the equilibrium interest rates will be high. Credit card market will reach lower rate equilibrium where both types of consumers use credit cards only if liquid consumers can be attracted by rebates, actual rewards and similar non-price benefits. Customer loyalty strategies are important in that sense for the structure of the market and they play an important role for encouraging the credit card usage (Chandran, Matthews and Tripe, 2005).

Ausubel (1991) points to the low price elasticity of consumers for credit card demand and information asymmetries between banks and consumers as factors that prevent the market from reaching competitive levels. He explains the low sensitivity of consumers to credit card rates by high search and switching costs and by the irrational behavior of a group of consumers who generally spend more than their plans.

Ausubel classifies consumers into three different groups: The first group comprises consumers who use their credit cards as a convenient payment instrument and never borrow on their credit cards. Although customers in this group are not risky, banks cannot make profit from them, instead they finance these customers. Customers in the first group are insensitive to changes in credit card rates since they never use credit option of their cards. The second group includes consumers who exhibit some sort of irrationality: they do not intend to borrow ex-ante, but find

themselves in need of borrowing ex-post. These consumers generally low-risk and pay their debt, hence they are a preferred consumer group for banks. Since they do not plan to use credit option of their cards ex-ante, expected benefit of switching to a lower rate card is lower than switching costs for these consumers. Therefore, they are not much sensitive to credit card rates. Consumers in the third group plan to use credit option of their cards, they are illiquid, hence risky and not preferred by banks. These customers are sensitive to interest rates because they actually intend to pay their debt. According to the new adverse selection theory suggested by Ausubel (1991), if banks cannot differentiate between these three consumer types, any bank that unilaterally lowers interest rate will attract only the consumers in the third group[15]. This theory is one of the fundamental explanations of banks' reluctance for competing on prices.

Calem and Mester (1995) and Calem, Gordy and Mester (2006) prefer to explain high credit card rates by search/switching costs, and interbank and bank-consumer information asymmetries rather than consumer irrationality. These economists classify credit card consumers into three groups again, but in a different way: In the first group there are consumers who carry low credit card balances, hence do not bear enough profit opportunities for banks, who are patient and therefore have low search costs and who are sensitive to credit card rates. The second group consists of consumers who want to spend more in the current period compared to future, who carry high balances, who are impatient and hence have high search costs, but pay their debt. They are low-risk and preferred by banks. Consumers in the third group are again impatient and have high search costs, carry high balances but have high

[15] Well-know Stiglitz and Weiss (1981) adverse selection theory predicts an opposite outcome. only high-risk consumers respond if a bank unilaterally increases interest rates. Hence this banks risk position worsens and expected future profits decrease. Ausubel (1991) argues that, Stiglitz-Weiss theory fits to securitized credit markets, while his own theory is better for unsecuritized credit markets.

default risk, and they are not preferred by banks because they are high-risk. These authors explain how a cut in interest rates will cause adverse selection because of search and switching costs when consumer types are not observable by banks as follows:

If a bank cuts interest rates in a setting where there are only search costs, it will only attract the first group of consumers who have low search costs but are not profitable. On the other hand, switching costs can lead to an adverse selection in two different ways. If only debt level is observed and high balances are accepted as an indication of high risk, the second and third type consumers will have high switching costs since they have to reduce their balances in order to be approved for a new card. Therefore, if a bank lowers card rates, only the first type of consumers will respond. Alternatively, if consumer types are observed only by their issuer bank and the issuer bank increases the switching costs for second type of customers by offering attractive features such as high credit card limits, other banks that cut credit card rates will attract only third or first types of customers.

Search cost and information asymmetries explanations above of high credit card rates are less relevant for Turkish market. There are a number of factors that decrease search costs for consumers in Turkey. First of all there are only 21 issuers. This number is very small compared to average number of issuers from which a consumer in the US or Europe have to choose. Secondly, Banking Regulation and Supervision Agency (BRSA) and Central Bank of Turkey (CBRT) publish all relevant information about credit card pricing and benefits provided by each credit card of each issuer and they update this information monthly. Therefore, consumers do not need much time and effort to obtain information about different credit cards.

Information asymmetries problem is also not a serious issue in Turkey. Firstly, there is a developed information sharing system between banks. Each bank can reach the relevant information about other banks' customers which eliminated the interbank information asymmetries. Moreover, advancements in the risk management and technology have provided banks with better means for screening default risks of the credit card consumers. Credit Bureau of Turkey, a private organization, provides risk monitoring and evaluating services to credit institutions. Therefore, banks are now able to differentiate between high risk and low risk customers at lower costs. This makes information asymmetries between bank and consumers argument irrelevant for the Turkish credit card market.

Therefore we focus our shift to the switching costs explanations of sticky credit card rates. The main reason of high credit card rates in Turkey seems to be the low demand elasticity of consumers to credit card prices. Banks create and increase the switching costs for their credit card consumers by focusing on strategies to increase customer loyalty. Banks provide a number of non-price benefits to their credit card customers such as rebates, actual gifts, frequent flyer miles, and higher number of installments. Since most of the time credit card consumers use other products of banks as well, customer loyalty strategies of banks include improving the quality of general banking services and providing more convenience to customers. For example, if a customer has a deposit account at the bank which she has provided the credit card, it is easier and cheaper for her to pay credit card debt using the online branch of this bank. Even she can give automatic payment order at no cost to pay her credit card balance each month. These conveniences and non-price benefits create captive customers for banks. Especially larger banks can provide more non-price

benefits through their large branch, ATM, POS networks and because of the high costs of providing any kind of non-price benefit.

Empirical analysis of the credit card rates in Turkey

Previous studies stress that the main determinant of the marginal costs for credit card issuers is the cost of funds. Additionally, cost of funds is the only part of the marginal costs that changes relatively frequently (Ausubel, 1991; Budde 2001). Therefore changes in the credit card interest rates are expected to move together with the changes in the cost of funds in the continuous spot market equilibrium (Ausubel, 1991). Credit card operations of the banks must be funded with short-term funds because of the unexpected liquidity flows arising from the nature of credit cards. Hence, overnight interest rates or interest rates on the short-term government bonds are considered as the cost of funds for the credit card sector. Ausubel (1991) employs the T-bill interest rates in the US to account for the cost of funds. Similarly, in this paper overnight interest rates, which show parallel movements to T-bill rates, are employed as the cost of funds.

Ausubel (1991) and Park (2004) argue that default risk of the card holder is an endogenous variable under the control of the issuers through adjustment of the credit lines and therefore they reject the increasing default rates explanation of banks for the high credit card interest rates. Following this approach, default rates are not primarily taken into account in this empirical research.

The model

In order to analyze the response of credit card interest rates to the changes in the cost of funds, these rates are regressed on their own lag, the lag of the cost of the funds:.

$$rate_{it} = \alpha\, rate_{i,t-1} + \beta\, cost_{i,t-1} + \eta_i + v_{it} \qquad (1)$$

In this model "rate" is the credit card interest rates for the issuers in the Turkish credit card market and the cost is the interest rate on the Treasury Bills which is accepted as the cost of funds, η_i's are fixed effects and v_{it}'s are idiosyncratic error terms.[16] Quarterly data used in the regressions and time period spans from the second quarter of 2001 to the last quarter of 2006.

If we apply OLS to equation (1), the result is dynamic panel bias which stems from the fact that the lagged dependent variable, $rate_{i,t-1}$ is correlated with the fixed effects and therefore it is endogenous. Thus, the estimated coefficients are inconsistent and the coefficient of the lagged dependent variable is upward biased due to this positive correlation.

When we apply mean transformations to the equation (1) we obtain:

$$rate^*_{it} = \alpha\, rate^*_{i,t-1} + \beta\, cost^*_{i,t-1} + v^*_{it} \qquad (2)$$

where $rate^*_{i,t-1} = rate_{i,t-1} - 1/(T-1)*(rate_{i2} + \ldots.. + rate_{iT})$ and $v^*_{it} = v_{it} - 1/(T-1)*(v_{i2} + \ldots.. + v_{iT})$.

[16] Monthly credit card interest rates are provided both from BRSA and CBRT for the period December 2005 - August 2006. There are small differences between these two different data sources for some banks. Therefore, for this period average of the two data for each bank is used. For the period before December 2005 only the data provided from BRSA is used. After August 2006 only the data from CBRT is used.

In the mean transformed regression, correlation between the transformed lagged dependent variable and the transformed error term is negative. (Nickell, 1981). Therefore we expect the coefficient on the lag of the dependent variable in this regression to be downward biased. The order of the correlation in the above regression is 1/(T-1) and therefore if T becomes large this bias will disappear.

Since, (for short panels) applying OLS to equation (1) inflates the coefficient of the lagged dependent variable and applying Within Groups transformation creates a downward bias, both of these estimates are inconsistent. Bond (2002) suggests that the candidate for a consistent estimate should create a coefficient for the lagged dependent variable between these two estimates.

When we apply "first-difference transformation" to the model in equation (1) we obtain:

$$\Delta rate_{it} = \alpha \, \Delta rate_{i,t-1} + \beta \, \Delta cost_{i,t-1} + \Delta v_{it} \qquad (3)$$

First difference transformation removes the fixed effects but the lagged dependent variable in this transformation is still correlated with the error term. To see this note that the term $rate_{i,t-1}$ in $\Delta rate_{i,t-1} = rate_{i,t-1} - rate_{i,t-2}$ is correlated with the term $v_{i,t-1}$ in $\Delta v_{it} = v_{it} - v_{i,t-1}$. However, fortunately, deeper lags of the lagged dependent variable are now uncorrelated with the transformed error term and they remain as instruments for the transformed lagged dependent variable in equation (3).

Results

Results of the estimation of equation (1) are presented in Table 3. OLS gives a higher coefficient than the Within Groups estimation in the regressions as can be

seen in the 1st and the 2nd columns of Table 3. Therefore we can expect the consistent estimations to give coefficients between 0.87 and 0.75 for the lagged dependent variable.

Table 3. Empirical Results

	1	2	3
Dep Var: Rate	OLS	Within Groups (Fixed Ef.)	System GMM (t-2 t-3)
Lag of rate	0.87	0.75	0.75
p value	*0.00*	*0.00*	*0.00*
Lag of cost of fund	0.13	0.22	0.37
p value	*0.00*	*0.00*	*0.00*
R-squared	0.93	0.92	
m1			0.00
m2			0.099
Sargan Test			1
Instrument count			26
Number of steps in GMM			2
Time period:	2001q2-2006q4 (23 periods)		
Number of observations:	496		
Number of cross-sections (banks):	22		

However, since T is relatively large (23) in our regressions a strong bias is not expected in the Within Groups estimation. Hence, it would be reasonable to expect the coefficient of the lagged dependent variable to be close to the Within Groups coefficient in a proper estimation of this dynamic panel data model.

Lastly 2 step system GMM is run to estimate the model. Now reasonable and statistically significant coefficients are obtained. Coefficient of the lagged dependent

variable (0.75) is almost equal to the Within Groups estimation. m1 test shows that there is a first order serial correlation in the transformed error terms as expected, and the second order serial correlation is rejected by the m2 test[17], hence using second lag of the dependent variable as an instrument for the transformed lagged dependent variable is possible.[18]

Note that the Hansen test of joint validity does not work properly and it gives extremely good results such as a p value equal to 1 because the number of instruments (26) exceeds the number of the cross-sections (22) in this system GMM estimation[19].

A note on the persistency

Simulations show that if panel series at hand are highly persistent, i.e. if they exhibit a pattern close to random walk, then applying "difference GMM" performs poorly and results could be improved by using what is called system GMM. To check the persistency, the credit card interest rates are regressed on their own lags

[17] In Table 3 and 4, m1 and m2 are the are Arellona and Bond tests for first order and second order serial correlation, asymptotically N(0,1) (Arellona and Bond, 1991). The reported values for m1 and m2 are the p values for the null hypothesis of no-serial correlation. In the OLS estimation they test the serial correlation in levels residuals, and in GMM-estimations they test the first differenced residuals.

[18] First order serial correlation in the first differenced residuals are expected by construction since $\Delta v_{it} = v_{it} - v_{i,t-1}$ and $\Delta v_{i,t-1} = v_{i,t-1} - v_{i,t-2}$ share the same term, $v_{i,t-1}$. What we need to check is the second order correlation in the first differenced residuals. Because if there is a correlation between $\Delta v_{it} = v_{it} - v_{i,t-1}$ and $\Delta v_{i,t-2} = v_{i,t-2} - v_{i,t-3}$, this indicates a first order correlation in levels due to the correlation between the $v_{i,t-1}$ in first and $v_{i,t-2}$ in the latter. If we find second order correlation in differenced residuals we can no longer use twice lag of the dependent variable, $rate_{i,t-2}$, as an instrument for the first differenced lag of the dependent variable, $\Delta rate_{i,t-1}$ and therefore we need to use deeper lags of the dependent variable (Bond 2002, Roodman 2006).

[19] Since the instrument matrix creates one column for each period and lag available to that period, the number of instruments is quadratic in T. In the literature, as a rule of thumb, limiting the instrument count with the number of cross-sections in the regression is recommended (Bond, 2002). However there is no universal rule, therefore instrument counts are also reported in Table 3 and 4 following the advice of Windmeijer (2005). When number of instruments exceeds number of cross-sections Sargan-Hansen test of joint validity does not work properly and it gives extreme good results such as a p value equal to 1 (Hansen, 1982).

and on time dummies. Bond (2002) shows in simulations that System GMM gives the best result in checking for the persistency of panel data series. OLS and Within Group estimations are also reported in Table 4 for comparison. The coefficient on the lag of rate is 0.73 in the two-step system GMM regression and it is statistically significant (Table 4).

Table 4. Persistency of credit card rates

	OLS	Within Groups	GMM Sys (t-2 t-3)	GMM Dif (t-2 t-3)	GMM Dif (t-3 t-4)
Lag of rate	0.86	0.75	0.73	0.64	0.84
p value	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
R-squared	0.93	0.92			
m1	0.050		0.002	0.003	0.002
m2	0.017		0.022	0.008	0.017
Sargan-Hansen Test			1		1
Instrument count			25/22	23/22	23/22
Steps in GMM			2	1	1

Conclusion

This study analyses the price competition in the Turkish credit card market and effects of regulations on the price competition in the light of theoretical studies in the literature. In a competitive spot market model, a close connection is expected between the credit card interest rates and the cost of funds for the credit card issuers (Ausubel, 1991). However, credit card interest rates did not respond much to the decline in the cost of funds in different countries and in different periods. We empirically analyze the response of credit card interest rates to the changes in the

cost of funds in Turkey during the period 2001-2006. A quarterly data set of the credit card interest rates for the all 22 issuers is employed in the empirical model where these rates are regressed on their own lag, the lag of the cost of the funds, and time dummies. In this dynamic panel data setting the two-step system GMM estimation gives a coefficient of 0.37 for the lag of the cost of the funds. This coefficient indicates that a 10% decline in the cost of fund results in 3.7% reduction in the credit card interest rates. Although this coefficient is statistically significant, in economic terms it is not very significant. In other words, credit card interest rates adjust to the changes in the cost of fund at a sluggish rate. Therefore this paper provides an empirical evidence for the lack of price competition in the Turkish credit card market.

PART II

NON-PRICE COMPETITION IN THE TURKISH CREDIT CARD MARKET

Introduction

Previous studies presented evidence for the failure of price competition in credit card markets. Ausubel (1991) shows that credit card interest rates in the US remains sticky compared to the declining cost of funds in 1980s and credit card issuers earn 3-4 times of the ordinary profit rates of the banking industry. Aysan and Muslim (2006) and the first chapter of this thesis similarly present evidence for the failure of price competition in the credit card market in Turkey. These studies show that response of credit card interest rates to decline in the cost funds in the post crises period in Turkey is economically insignificant.

High and sticky interest rates in credit card markets led to a shift of interests from price to non-price competition in these markets. While price competition fails, there is ample empirical and anecdotal evidence that supports the existence of a fierce non-price competition in credit card markets. In this study we analyze the nature of non-price competition in the Turkish credit card market. Analyzing non-price competition is important and necessary in order to design and implement effective regulations in the credit card market. Central Bank of Turkey is applying a price ceiling on credit cards since June 1, 2006. However, credit card rates are still at extremely high levels in 2008. Tightening of price ceiling is on the agenda of the government in order to decrease credit card rates. Any incorrectly designed regulation may have economy wide adverse effects since increasing credit cards

numbers and transaction volumes made credit cards crucial for the functioning of the economy in recent years.

In the first chapter of this thesis we argued that the main reason of extremely high credit card interest rates in Turkey is the low price elasticity of demand for credit cards. Low price elasticity of demand stems from high switching costs of cardholders. Banks create and increase switching costs by providing a number of non-price benefits to their credit card customers and they try to create captive customers by doing so. We divide non-price benefits offered to credit card customers into two groups: Direct benefits that depend on credit card usage and indirect benefits arising from convenience and quality of general services and characteristics of the issuer bank. Direct benefits of using a credit card include gaining money-points, frequent flyer miles, rewards, paying shopping bill in installments and conveniences of online shopping. Quality of banking general services and bank characteristics are important for the card choice since many cardholders use other services of the issuer bank such as having a deposit account in that bank. Moreover, anecdotal evidence shows that customers obtain credit cards from the banks they are already working with. Using many services of a bank at the same time increases the cost of switching for cardholders especially if they are pleased with the quality of other services.

We use an empirical model to examine the explicit relationship between credit card rates and direct and indirect measures of non-price benefits to credit card customers. We benefit from switching costs and bank pricing models in the literature. Especially, the duopoly model of competition with consumer switching costs in Stango (1999) and bank pricing model proposed by Hannan (1991) provide guidance about likely candidates to include in this empirical setting. We use the number of

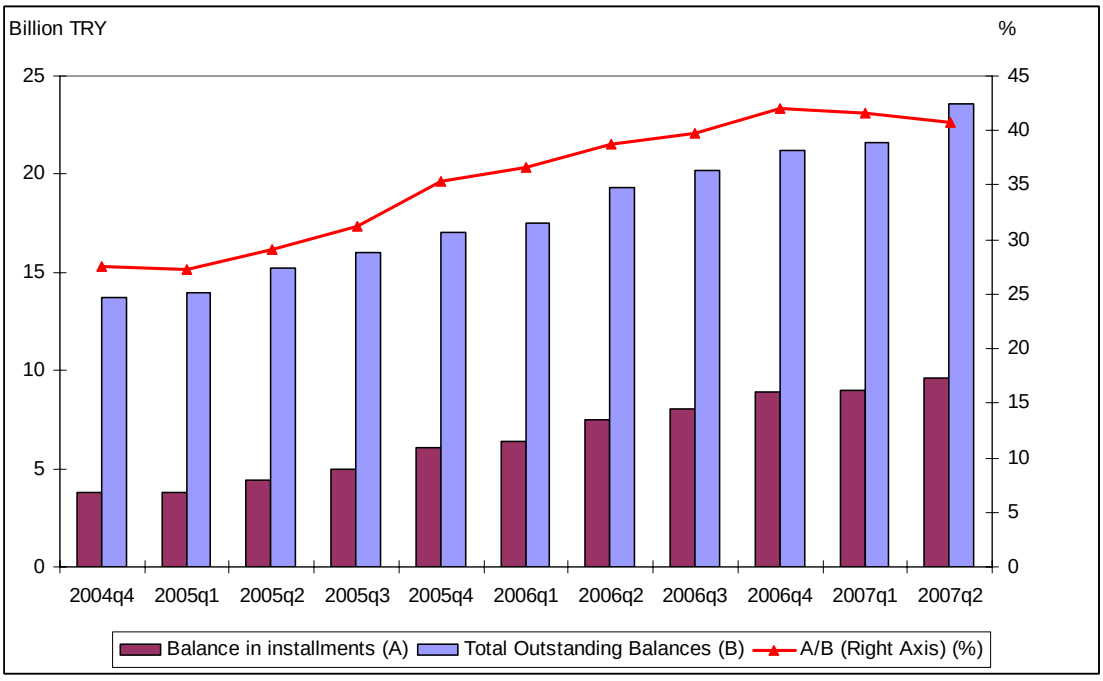
bank branches, capital ratio, and average salaries as proxies for the quality of general banking services and to measure the bank characteristics. We capture non-price benefits of credit cards with market shares of the issuers and we also control for the costs of default and liquidity risks of credit card operations. We use a quarterly panel data set for 22 issuers in the credit card market in Turkey which spans from the last quarter of 2001 to the second quarter of 2006. Fixed and random effect regressions show that as the measures of both groups of non-price benefits increase, banks can charge higher credit card rates. In other words, there is a statistically significant positive relationship between switching costs and prices in the credit card market in Turkey as predicted by most switching cost models. Our results also confirm the hypothesis that credit card interest rates adjust to the changes in the cost of funds sluggishly even after controlling for non-price features. These results are robust to the econometric specification and econometric methodology.

The organization of the paper is as follows: In the next section, we examine the non-price competition in the Turkish credit card market. In the third section, we develop our empirical model in the light of theoretical and empirical studies that examine the switching costs and bank pricing behavior, and we explain the variables included in the empirical model. Section four presents the empirical model, information about the data used in the estimations and explains the econometric methodology. Empirical results and robustness test are presented in the fifth section. Lastly, section six concludes.

There are currently 21 issuers in the Turkish credit card market. All of them market their product nationally and they compete in a large market where total number of credit cards is 37.3 million as of December 2007. Total transaction volume in the market reached TRY 141,468 million and its ratio to total private consumption spending increased from 10.3 percent to 23.4 percent between 2002 and 2007. Growth performance of the Turkish credit card market in 2000s is outstanding. Number of credit cards increased almost three folds between 2000 and 2008. Average growth rate of total outstanding balances between 2003 and 2007 is 59 percent, whereas average growth rate of total transaction volume in the same period is 43 percent.

A number of factors lead to the increasing substitution of traditional payment instruments with credit cards. Turkish consumers who lived with high inflation for 30 years especially enjoy the non-interest bearing "grace period" between shopping time and payment date and paying in installments without any surcharge over cash prices of goods. Additionally, customers enjoy to collect money points each time they use the credit cards and to spend these money points like cash when shopping at member merchants (Savasci and Tatlidil, 2006). A customer survey conducted by Interbank Card Center (ICC) in 2008 shows that 61 percent of all shopping is paid by credit cards and this ratio increases to 80 percent in the sectors in which the installment option is offered (ICC, 2008). Again, according to this survey, the most enjoyed features of credit cards in Turkey are installments and collecting money points. Three of each four cardholder collect and spend money points, while installments is most preferred when shopping amount is between TRY 51 and 100.

Credit cards can be used by consumers in almost all sectors to pay the shopping bill in 4-6 months of installments on the average. Number of installments rises even to 24-36 in some sectors such as durable goods. Although Turkish consumers met with the first installment practice in 1999, this practice became prevalent especially after the 2001 crisis. Decline of inflation rate to single digit numbers and decreasing expectations for another crisis in the economy enabled merchants and banks to offer high number of installments to cardholders. Banks compete on installments to build customer loyalty and increase their market share. Installments have been beneficial for merchants also by increasing their sales and by transferring the burden of collecting receivables and default risk to banks.



Graph 5. Ratio of credit card balances in installments to total outstanding credit card balances

Source: Central Bank of Turkey

Total credit card debt balance in installments reached TRY 9.5 billion in June 2007. Ratio of credit card debt balance in installments to total outstanding balances

increased considerably from 27.5 percent in December 2004 to 41 percent in June 2007 (Graph 5). These numbers are alarming according to the Banking Regulation and Supervision Agency (BRSA). BRSA claims that with unusual installment numbers consumers are spending beyond their means, and this increases the risk position in the credit card sector. Therefore they are working on a regulation to limit the number of installments with 12 months for durable goods, and with 3-6 months for nondurable goods.[20] On the other hand, competition for rebates and rewards are reflected in the total amount of such promotions given to the cardholders. Data from Central Bank of Turkey and ICC shows that issuers distributed TRY 729 million to cardholders as rebates and rewards in the first nine months of 2006. This number represents 0.95 percent of the total credit card transaction volume in this period.

ICC survey also reveals that 78 percent of cardholders in Turkey pay their credit card debt on time. Only 22 percent of cardholders use credit option of their cards. Consumers who use their card only as a payment instrument are called convenience users. Their ratio to all customers increased since 2001. In 2001 this ratio was just 60 percent.[21] Bad experience of defaults especially during the economic crises in 2000 and 2001 and high level of credit card rates afterwards led the adoption of credit cards as a payment instrument in the first place rather than a credit instrument by consumers in Turkey. Whereas, ratio of convenience users in the US credit card markets is about 30-40 percent (Chakravorti, 2003). Therefore, there is an important difference between the consumer structures of Turkish and US markets.

Competition between issuers in Turkey is intensified on non-price measures in accordance with the consumer structure in the market. Banks emphasize number

[20] http://www.tkbb.org.tr/index.php?option=com_content&task=view&id=286&Itemid=846
[21] http://www.bkm.com.tr/images/basinodasi/06082005_dunya.jpg

of installments that their credit cards provide, additional money points they give, actual gifts and rewards when consumers shop in specific retailers, frequent flyer miles, but they never mention the interest rates when they advertise their credit cards in the media. Co-branding and affinity cards are among the other recent popular trends in Turkey in parallel with world credit card markets. As stated by Stango (2002) affinity cards offer discounts and other benefits to their customers. Co-branded cards with airline companies or sea transportation companies that provide frequent traveler miles and co-branded cards with soccer clubs are the most common ones in Turkey. Hence we can argue that banks try to differentiate their product in the market, hence increase switching costs for consumers by increasing the number of affinity and co-branded card networks. Convenience and security provided in the online shopping and online banking can be added to the non-price features of credit cards that issuers compete on. Some smaller issuers also compete on other non-price features of credit cards such as annual fees, or they offer teaser rates, and switching checks to other issuers' customers; however competition on these features is not fierce in general. Especially, annual fees are almost out of competition among the largest issuers. They charge more or less the same annual fees on their most common credit cards, and the level of annual fees increase for special credit cards such as gold and platinum cards.

Turkish credit card market is highly concentrated. There are six largest issuers[22] and their market share is 87 percent in total outstanding balances and 80 percent in number of customers. All of the issuers in the market perform general banking services. Credit cards are only one of their various products. The six largest issuers are also among the main players in deposit and consumer credits markets

[22] The six largest issuers are Yapi Kredi, Garanti, Akbank, Isbank, Finansbank and HSBC.

together with three large public banks. They have high number of branches, and large ATM and POS networks and they compete on these measures to increase their market share in individual banking. In this study we also consider general service and convenience aspects and characteristics of banks within the scope of non-price competition. By obtaining a credit card, consumers begin a long lasting relationship with a bank. Therefore, general service aspects and characteristics of the issuer bank affect the credit card choice. As the quality of service improves and conveniences provided increase, it becomes more costly for customers to switch to another credit card.

Theoretical Background and the Empirical Model

Banks try to increase switching costs for customers by enhancing non-price features of their credit cards. Switching costs lock customers to their current credit card and they cannot move to a lower rate card. This allows issuers to set prices that differ from marginal costs (Stango, 2002). Therefore, switching cost models predict a positive correlation between prices and switching costs. On the other hand, issuers try to decrease the switching costs for their competitors' customers. For example, banks in Turkey do not demand annual fees in the first year when they give a new credit card since annual fees are generally considered one of the major sources of switching costs. Ausubel (1991) states that since credit card fee is usually billed on an annual basis if one switches banks at the wrong time one foregoes some money. Similarly, banks offer switching checks or low introductory interest rates to their competitor' customers.

Switching costs models, in general, propose that once a customer purchases a product, she becomes locked-in (Stango, 2002). Stango (2002) adopts this assumption to the credit card markets. He proposes that before obtaining a credit card consumers may view credit cards as functionally identical, but once they obtain one, they may not easily switch to another issuer's card with lower interest rate. Stango (1999) examines the effects of switching costs on prices and profitability in a duopoly model of competition with consumer switching costs. The model predicts that switching costs lead higher prices and there is a positive correlation between market share and prices. These results are parallel with the predictions of switching cost models in general. A positive correlation between market share and prices in these models arises from the incentive of larger firms to exploit their captive customers. Smaller firms on the other hand price more aggressively to gain market share. Stango (2000) states that this fact can be better explained in a dynamic model. In a dynamic model firms take into account of their prices on future market shares and hence on future profits. Therefore, firms can set lower prices in the first period compared to second period to build market share.

Stango (2000) empirically tests the model in Stango (1999). He estimates the effects of market share, cost volatility and rate type choice (i.e. fixed or variable rate) on the credit card interest rate margins where prime rate is used as a proxy for the cost of funds. In these regressions, he controls for defaults per account as a cost measure for issuers. He finds evidence for the significant positive effect of market share, cost volatility and rate type choice on the interest rate margins for the US market.

Stango (2002) empirically examines the explicit relation between switching costs and prices. Following the switching costs model of Chen (1997), Stango

suggests that credit card prices can be written as a function of switching costs of an issuer's customers and switching costs of its competitors' customers. Stango uses issuer level data from US credit card market for the period between 1989 and 1994 and his estimations show that there is a positive and significant relationship between switching costs and credit card interest rates. Therefore he concludes that economically significant within firm variations in pricing can be explained by switching cost variables.

In this study we investigate the explicit relationship between credit card interest rates and switching costs for the Turkish credit card market. Stango's models presented above are good starting points for our study. Additionally we benefit from the theoretical and empirical studies that examine the bank price setting behavior. Hannan (1991) proposes an explicit model of the banking firm to examine the relationship between market structure and various aspects of bank conduct such as loan pricing, deposit pricing, and bank profit rates. In this study Hannan provides the likely variables to be included in an empirical investigation of the relationship between bank prices and market structure. Hannan's model implies that loan rate is increasing in security rates, concentration of the relevant loan market, market share of the relevant loan market, and the differential between the marginal costs associated with loans and the marginal cost associated with securities.

We intend to assess the importance and the effect of switching costs on credit card prices while controlling for the measures of market conditions. The service and convenience aspects of credit card usage reflect the switching costs for consumers in our model. In order to measure the switching cost that credit card consumers face we make a distinction between direct service and convenience aspects of credit card usage and the quality of the general services and characteristics of the bank that

provide the credit card. Anecdotal evidence suggests that consumers obtain their credit cards from the banks that they are already working with. Additionally, if they were not working with any bank when they obtained their first credit card, they start to use other services of the bank such as opening a deposit account. Moreover, having a deposit account and credit card from the same bank provides many advantages such as paying the credit card debt through online banking. Therefore, quality of the general services and characteristics of a bank also creates switching cost for credit card users.

We include cost and balance sheet data of general bank operations to capture the general service and convenience aspects of having a bank account. Factors that affect the bank choice of deposit customers have also influence on the choices of credit card customers. Therefore we control for the implicit returns to customers from having an account in a bank with the similar variables used in Berger and Hannan (1989) and Neubergen and Zimmerman (1990) studies.

We propose that the average credit card interest rate set by an issuer is a function of three types of variables: Variables reflecting the market conditions, variables related to the general characteristics and service aspects of the issuer bank, and the variables related to the credit card operations of the issuers. Therefore we can write:

$$r = f(MC, GBSC, CCS)$$

where MC, BS AND CCS stand for the general market conditions, general bank services and characteristics, and credit card services, respectively.

We proxy the general market conditions with the overnight interest rates. Overnight interest rates reflect the cost of short term borrowing for credit card

lenders. In order to maintain the profitability in the short-term banks must set credit card interest rates above the overnight rates. Credit cards are the only instrument that banks provide very short term lending and this lending must be funded with expensive short term funds. In that sense, overnight interest rate is a good measure of the cost of funds for credit card issuers. Cost of funds is one of the main costs in the credit card market (Ausubel, 1991, Budde 2001). Ausubel (1991) states that cost of funds is the most frequently changing part of the marginal costs for issuers, therefore credit card interest rates are expected to move together with the changes in the cost of funds. Therefore we expect a strong positive correlation between credit card interest rates and overnight rates.

The second group of explanatory variables includes cost and balance sheet data for individual banks. These variables include both measures of direct benefits to credit card customers for having an account in a bank and indirect measures of the benefits provided through costs of providing these services as in the Neubergen and Zimmerman (1990) study. A common variable included in bank pricing equations is the number of bank branches. Banks strategically invest in branches to expand their network and to reach more customers. Service and convenience provided by an extended branch network may compensate higher credit card interest rates for consumers. Therefore we predict a positive coefficient on this variable.

As argued by Neubergen and Zimmerman (1990), number of bank branches may not fully capture the services provided to bank and credit card customers. Banks create or increase switching costs to their customers by providing free or underpriced services and by providing better quality service than their rivals. For example, some of the banks provide more secure online and POS payment systems to their customers, and/or more points and convenience for paying credit card debt. It is

difficult to measure all these different aspects of service and convenience provided by banks. However, these services entail higher operating costs.

We use two measures as proxies of the cost of services provided to bank customers: average salaries and overhead expenses per dollar of assets. Average salary variable is included both by Berger and Hannan (1989) and Neubergen and Zimmerman (1990) studies while overhead expenses variable used by Neubergen and Zimmerman (1990). Average salary is not only a proxy for the level and quality of general bank services but it is also a direct measure of the quality of the customer relations of a bank: everything else being equal if a competitive bank pays higher than average salaries, its employees are expected to provide better service on the average. As long as customers care about the how they are treated when they go to a bank branch or when they call the customer service line, they may be willing to accept higher interest rates in exchange of a higher service quality. In short, differences in overhead expenses and average salaries across banks are expected to reflect the differences in the level or quality of the service provided (Neubergen and Zimmerman, 1990). In that sense, they are a proxy for implicit benefits to credit card customers. Therefore, we expect positive coefficients for these variables.

General health of the bank also matters for the bank choice. Especially in Turkey we expect the strength of a bank to be more important in bank choice because of the bad experience of bank failures in recent history where tens of thousands of depositors lost their savings in whole or in part. As a proxy for the general health of the bank we use the ratio of owner's equity to total assets (capital ratio) and we expect a positive correlation between this variable and the credit card interest rates.

In the third group, we include a proxy for non-price benefits of credit cards and also cost and risk variables related to the credit card operations of the banks. We

use market shares of credit card issuers to capture the implicit price dimensions of the credit card interest rates such as cash rebates, frequent flyer miles and installments. We have very limited data on the credit card transactions in installments, promotion expenses of credit card issuers in terms of cash rebates, frequent flyer miles. Although these are good proxies for the non-price benefits of credit cards, we cannot use them in our estimations due to very small sample size. However, we find a strong significant positive correlation between market shares of issuers and these variables. In other words, larger firms offer more non-price advantages to cardholders. As in the previous theoretical and empirical studies on switching costs we predict a positive coefficient for the market share variable. However, an endogeneity problem emerges when we include market share variable on the right hand side. This endogeneity issue was also raised by previous empirical studies where credit card price is the dependent variable. Stango (2002) corrects this endogeneity by using the lag of the market share variable. We apply this correction in our estimations.

We include two types of cost measures for credit card issuers in our estimations: costs arising from default risk and liquidity risk. We proxy the cost of default risk with the delinquency rates which is measured by the ratio of dollar value of delinquent credit card balances to total outstanding credit card balances. However, delinquent loans are stock values and include delinquent loans from previous periods. What is more important for current credit card rates is the recent change in the delinquent loans. Therefore we use the lag of the first difference of delinquency rates in our estimations.

Delinquency rates affect prices by two different channels: by increasing issuer specific costs and by increasing switching costs. Firstly, since banks have to keep

provision for delinquent loans, higher delinquency rates are associated with higher costs and hence higher prices. In that sense, Stango (2000) includes dollar value of defaults (chargeoffs) per outstanding balances as a control variable in credit card interest margin equations. On the other hand, higher delinquency rates increase the captivity of customers and hence increase the switching costs since delinquencies worsen the credit history of consumers and decrease the chance of their application for lower rate card to be approved. Both of these channels affect the prices in the same direction; therefore we predict a positive coefficient on this variable.

On the other hand, banks in Turkey extended their credit card customer bases without caring about the associated default risks. Until the regulation in 2006, banks enclosed high risk customers by distributing credit cards on the streets or at universities without asking any guarantors or examining consumers' income status, although they are much more careful when they are giving other consumer credits. Moreover, they were sending credit cards to their deposit customers without any request from them. This behavior of banks is expected to weaken the relationship between default rates and credit card interest rates. Therefore, relationship between these variables may not be significant.

Again an endogeneity issue arises if we include delinquency rates on the right hand side. An increase in credit card rates increases the expected future interest burden for credit card borrowers and hence increases the probability of default (Stango, 2000). Since we use lag of the first difference of delinquency rates in our estimations, this eliminates the potential endogeneity problem.

The liquidity risk issue in the credit card markets is first raised by Shaffer and Thomas (2007). Shaffer and Thomas criticize previous studies for neglecting the pre-commitment risk and hence the resulting liquidity risk of the credit card lending.

Unlike other loans, in the credit card lending banks commit to lend up to a certain amount and the fully utilization of this amount is solely at the discretion of credit card users. Therefore, banks must be prepared to lend the amount equal to difference between credit card limits and average outstanding balances either by keeping cash reserves and highly liquid short term investment securities or being ready to borrow short term funds from central bank and other banks. The opportunity costs arising from keeping low yield short term investments or direct cost of relying on expensive short term borrowing comprise an important component of total costs of credit card issuing. Shaffer and Thomas, therefore argue that any study that neglects or underestimates this important cost of liquidity management will obtain results biased towards finding non-competitive behavior in credit card markets.

Thomas and Shaffer note that there is a high correlation between pre-commitments and the resulting liquidity risk. In our empirical model, we control the cost of liquidity management with the ratio of credit card limits to the total assets and we predict a positive coefficient on this variable.

Model and Data

The basic model estimated in our regressions is:

$$rate_{it} = B_1 l.\cos t_t + \beta_2 branch + \beta_3 avgsal + \beta_4 capitalr + \beta_5 l.marketshare + \beta_6 l.d.delqrate + \beta_7 cc\lim itsA + \eta_i + \varepsilon_{it}$$

We employ quarterly data of all 22 credit card issuer banks in Turkey to estimate this equation. We cover the period from the last quarter of 2001 to the second quarter of 2006. Therefore, we focus on the post crisis period in Turkey and we cut our data set in the second quarter of 2006 because Central Bank started to put

ceiling on the credit card rates from June 1st of 2006. We have 413 observations in total. However, we do not have default rate and credit card limits data for some banks for the first few quarters. We drop these observations to keep the number of observations constant in different specifications. Additionally, using lag of the market share and lag difference of default rate in the main specification above, limits the number of observations used in estimations to 328. While reporting correlation matrix between variables and the descriptive statistics for the data we use only these 328 observations to maintain consistency.

Table 6 in the appendix presents the descriptive statistics for the variables used in estimations. We provide between and within firm standard deviations and minimum and maximum values for each variable. One noteworthy observation in Table 6 is the difference between mean values of credit card interest rates and cost of funds which are 627 and 227 respectively. This remarkable difference indicates that price competition may not be functioning well (lack or failure of price competition) in credit card market as claimed by previous studies. Secondly, the within firm variation in credit card rates are significantly higher than between firm variations, in other words, change in interest rates in time is higher than the change in interest rates across banks. This observation also indicates the weakness of price competition in the market. Standard deviations, minimum and maximum values of other variables show that there are considerable within and across firm variations in these variables.

The dependent variable in the empirical model is the nominal credit card interest rates of issuers. Banks charge different interest rates on their different cards and for a specific card of an issuer interest rates also differ depending on how much of the balance paid by credit card user. Credit card rates in our study are weighted

averages of all these different interest rates charged by an issuer and these rates are collected by the Interbank Card Center (ICC).

The explanatory variables in the model are opportunity cost of funds (*cost*), market share of issuers' in the credit card industry (*marketshare*), credit card delinquency rates (*delrate*), number of bank branches (*branch*), owner's equity as a ratio of total assets (*capital*), average cost per employee (including social benefits) (*avgsal*), overhead expenses as ratio to total assets (*overheadA*), and credit card limits as a ratio to total assets (*cclimitsA*). We also include a trend dummy (*quarter*) and cross section dummies in the regressions.

We use quarterly average of the overnight borrowing rate from the Central Bank of Turkey as a proxy for the cost of funds. Outstanding credit card balances are used as proxies for the market shares of the issuers'. Average salary is calculated by dividing the total yearly personal expenses to the average number of employees in that year. Credit card delinquency rate is the ratio of average quarterly delinquent loans to average quarterly outstanding credit card balances. Credit card balances and delinquent credit card loans are provided from the Central Bank of Turkey. Other balance sheet items of the issuer banks and numbers of bank branches and employees are collected from the database of the Banks Association of Turkey.

Econometric Methodology

We estimate our model using fixed effects panel data regression. Our data set is exhaustive, in other words, we include all of the credit card issuers in Turkey in our estimations. When data set is exhaustive fixed effects regression is preferred over random effects regression. Additionally, random effects regression is only consistent

and efficient if explanatory variables are not correlated with individual effects. In our model, we use the same period switching cost variables to explain the variation in credit card rates. Therefore correlation of explanatory variables with individual effects is likely in our estimations. We perform Hausman test and the results also suggest using fixed effects regression. We do not include the lag of the dependent variable within the explanatory variables. Therefore, fixed effects regression is consistent and efficient in these estimations.

We calculate the heteroscedasity adjusted standard errors. We do not include time dummies in the regressions, since interest rates exhibit to have a trend component; we include a trend dummy in the estimations.

Estimation Results

Table 7 in the appendix presents the pair wise correlations between the variables used in the empirical model. All of the explanatory variables in the basic specification are significantly correlated with the credit card interest rates. The correlation of credit card rates is highest with the lag of the cost of funds and the trend dummy. Among explanatory variables high correlation is observed only between trend dummy and lag of the cost of funds. Therefore, we do not expect a multicolinearity problem in our estimations.

Table 5 presents the results of the Least Squares Dummy Variables (LSDV) estimation of model (1) which is equivalent to the fixed effects estimation of the results. We prefer LSDV estimation in order to observe the distribution of the slope coefficients.

All of the explanatory variables except the delinquency rate are significant at 5% and they have the correct signs. The coefficient on the cost of funds is 0.48 and indicates that a 10 percent decrease in the cost of funds, leads to a 4.8 percent decrease in the average credit card interest rates even after controlling for the other related costs of credit card issuers. The estimated coefficient indicates that effect of the changes in the cost of funds is economically not very strong on the credit card interest rates. The highly significant and negative coefficient of the trend dummy indicates a significant downward trend in credit card rates in recent years.

The coefficient of number of bank branches variable is significant at the 5% level and it indicates that if a bank has 100 more branches, consumers accept 38 basis points higher interest rates. Although, this coefficient seems small at first sight, if we consider the differences in the number of branches between some big and small banks in Turkey, its effect is important. In our data set, one of the banks has over 1000 branches, three banks have between 500 and 1000 branches, 11 banks have between 100 and 499 branches, and seven banks have less than 100 branches.

The ratio of owner's equity to total assets (capital ratio) always enters the equations with a highly significant and positive coefficient, indicating the importance of the soundness of a bank. The coefficient of this variable can be interpreted that consumers are willing to pay on the average 3.16 basis point higher interest rate when, everything else is equal, a bank has 1 percentage point higher owner's equity ratio than another bank.

Significant and positive coefficient on the average salary variable reflects the importance of service aspects in credit card choice. This variable takes the highest coefficient among the other explanatory variables. Results indicate that if average

quarterly salary and benefits is TRY 1,000 higher in a bank compared to one another, it can charge 16 basis points higher credit card interest rates.

Table 5. Estimation Results (Fixed effects)

ratebp	Basic Specification Model I	Model II	Model III	Model IV
costbp.L1.	0.48***	0.49***	0.49***	0.49***
	(4.16)	(4.31)	(4.26)	(4.36)
branch	0.38**	0.36**	0.37**	0.36**
	(2.22)	(2.13)	(2.19)	(2.11)
capitalr	3.16***	3.10***	3.29***	3.21***
	(3.35)	(3.36)	(3.54)	(3.47)
avgsal	15.55***	16.17***	15.68***	16.22***
	(3.13)	(3.46)	(3.16)	(3.46)
quarter	-16.20***	-16.43***	-16.05***	-16.28***
	(-5)	(-5.03)	(-4.97)	(-4.98)
marketshare.L1.	6.24**	6.45**	6.22**	6.41**
	(2.04)	(2.11)	(2.03)	(2.09)
cclimitsA	1.53***	1.55***	1.55***	1.56***
	(2.75)	(2.74)	(2.75)	(2.75)
delqrate.LD.	0.04	0.03	-0.01	-0.01
	(0.08)	(0.06)	(-0.01)	(-0.01)
nonbsA		0.02		0.02
		(0.46)		(0.41)
netprofitA			0.86	0.72
			(0.43)	(0.36)
constant	358.19***	352.13***	352.05***	347.63***
	(5.07)	(5.19)	(5.04)	(5.12)
Number of Obs.	328	328	328	328
R-square within	0.7713	0.7715	0.7714	0.7715
R-square between	0.0275	0.034	0.0288	0.0344
R-square overall	0.2037	0.2166	0.2066	0.2177

Notes:

1. (***) Indicates significance at 1% level, (**) Indicates significance at 5% level, (*) Indicates significance at 10% level

2. t statistics are provided in parentheses.

Lagged value of the market share variable is significant at 5% level and the coefficient on this variable is positive as expected. One percentage point increase in the market share enables firms to charge 6 basis points higher credit card rates. Given the differences of market shares of large and small issuers the effect of market share on credit card interest rate can be quite high. The largest firm in the market is 11,150 times larger than the smallest firm in terms of the outstanding balances. The higher the market share, the higher the credit card interest rates issuer banks can charge. This finding confirms the expectations of the switching cost models. In other words, banks with larger market shares exploit their captive customers by applying higher credit card interest rates.

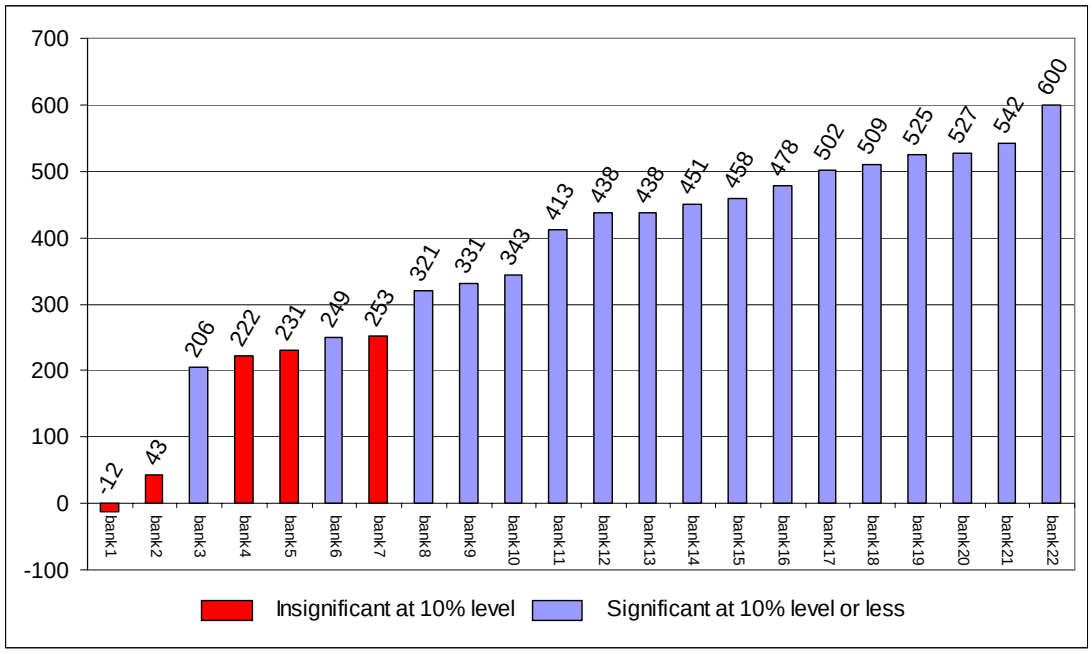
As a risk and a cost measure, delinquency rate variable enters the equations with a positive coefficient as expected. The coefficient of this variable is not significant even at 90% confidence level, which is not surprising. Estimations also indicate that liquidity management costs have positive and significant effects on the credit card interest rates as suggested by Shaffer and Thomas (2007). Important however, coefficient and effect of this variable on the credit card interest rates is not as large as supposed by Shaffer and Thomas, at least in the credit card market in Turkey. One percentage point increase in our liquidity risk measure variable increases the average credit card interest rates of an issuer by 1.5 basis points. Compared to variables capturing the service aspects of issuer banks, such as average salaries, effect of the liquidity cost on card rates is smaller. Additionally, even after controlling for the costs arising from liquidity management, estimation results indicate that credit card interest rates adjust to the changes in the cost of funds at a sluggish rate.

On the other hand, pricing strategies of public banks may differ from the pricing strategies of private banks due to the differences in the priorities of these two types of banks. Public banks may price more in favor of consumers by considering the social wealth at the first place. In other to test this hypothesis we might include a public dummy in the estimations. However, we cannot include a public dummy in the fixed effect estimations since within transformation eliminates any time-invariant variables. Another way to check the differences in the pricing strategies of public and private banks is considering the distribution of the coefficients of bank dummies in the Least Squares Dummy Variable (LSDV) estimation which is equivalent to the fixed effects estimation. Graph 6 gives this distribution of slope coefficients for 22 issuers for the basic model. The bank with the lowest slope coefficient is a public bank and the bank with second lowest slope coefficient is a private bank but it behaves like a public bank due to its ownership structure. 41 percent of the shares of this bank are owned by its employees and retired employees, 28 percent are owned by a politic party and the rest are traded in the stock exchange. Two other public banks have the 6^{th} and 8^{th} lowest slope coefficients. This observation indicates that after controlling for switching costs and market conditions, public banks price more in favor of consumers compared to private banks.

Robustness of the results

In order to check the robustness of our results in the previous part, we add other related explanatory variables to the basic specification. First of this variables is the ratio of non balance sheet items to total assets. Non balance sheet items basically contain credit commitments and derivative instruments. It reflects the level of various

operations and services a bank involved. In that sense, it may affect credit card interest rates positively. Results in the second column of Table 5, confirms that expectation, however it is effect on credit card interest rates is not significant. Signs and significances of other explanatory variables do not change when we add nonbsA variable to the estimations.



Graph 6. Distribution of slope coefficients for Model I

Secondly, we add the ratio of net profits to total assets to our basic model and the Model II. This ratio can be considered as an additional measure of the soundness of a bank just as the capital ratio. Therefore we expect a positive coefficient for this variable. Results of these estimations are presented in the column 3 and 4 of the same table. Again, signs and significances of other explanatory variables do not change (except that lag difference of default rate becomes slightly negative). However coefficient of *netprofitA* variable is not significantly different from zero in that model.

Moreover, we use two other control variables to check the robustness of our estimations. One of these control variables is the ratio of fixed assets to total assets. Credit card issuing is a costly business. Establishing secure and convenient credit card systems do entail high fixed investments. Banks that provide more secure and convenient credit card services invest heavily in technological infrastructure. These investments include infrastructure for providing online services, computers, establishing POS systems and extending number of retailers subscribed in this system. These investments than are reflected to consumers as better services. The other control variable is the ratio of overhead expenses to total assets. This variable is used by Neubergen and Zimmerman (1991) in addition to the average salary variable to proxy the operating costs of banks. When we run our regressions with these variables on the right hand side, we obtain a significant positive coefficient on these variables as expected while and signs and significance of other variables in the basic specification do not change except that market share variables becomes insignificant when we run the model with the ratio of fixed assets to total assets (See Table 8 in the appendix for the results of these estimations).[23] These experiments confirm that our results are robust to different specifications of the econometric model.

Lastly, we check the robustness of results to the econometric model used in the estimations. We estimate the same equation with random effects model. Except two differences results stay the same: Number of bank branch variable changes sign and becomes statistically insignificant and market share variable is less precisely estimated under random effects regression. Results of the random effects estimation of the basic model are presented in the Table 8 in the appendix.

[23] When run these regressions separately due to high correlation between these two variables. Additionally we drop the capital ratio variable in these regressions due to high correlation of this variable with these control variables.

We perform Hausman test, in order to see if the results under fixed effect regression is statistically different than results under random effects regression. We reject the null hypothesis that the difference in coefficients is not systematic (See appendix, Table 8). Hausman test indicates a correlation between explanatory variables and individual effects. Therefore, fixed effects estimation is consistent and efficient while random effects estimation is not. We can conclude that our results are also robust to the econometric method.

Conclusion

In this study we analyze the nature of non-price competition in the Turkish credit card market. Issuer banks create and increase switching costs by providing a number of non-price benefits to their credit card customers. These benefits are either direct benefits that depend on credit card usage or indirect benefits that arise from convenience and quality of general services of the issuer bank. Direct benefits of using a credit card include gaining money-points, frequent flyer miles, rewards, paying shopping bill in installments and conveniences of online shopping. General quality of banking services and bank characteristics are important for the card choice since many cardholders use other services of the issuer bank such as having a deposit account in that bank. Moreover, anecdotal evidence shows that customers obtain credit cards from the banks they are already working with. Using many services of a bank at the same time increases the cost of switching for cardholders especially if they are pleased with the quality of other services.

We construct an empirical model to examine the explicit relationship between credit card rates and direct and indirect measures of non-price benefits to credit card

customers. We benefit from switching costs and bank pricing models in the literature to construct our empirical model. We use the number of bank branches, capital ratio, and average salaries as proxies for the quality of general banking services and bank characteristics. We capture non-price benefits of credit cards with market shares of the issuers and we also control for the costs of default and liquidity risks of credit card operations. We use a quarterly panel data set for 22 issuers in the credit card market in Turkey which spans from the last quarter of 2001 to the second quarter of 2006. Fixed and random effect regressions show that as the measures of both groups of non-price benefits increase, banks can charge higher credit card rates. In other words, there is a statistically significant positive relationship between switching costs and prices in the credit card market in Turkey. Our results are in parallel with the predictions of most switching cost models.

APPENDIX

TABLES THAT ARE REFERRED TO IN THE TEXT

Table 6. Descriptive Statistics

Observations for Each Variable					
N (overall)		328			
N (between)		22			
T –bar (within)		14.91			
Variable		Mean	Std. Dev.	Min	Max
ratebp	overall	626.61	141.86	275	995
	between		82.71	504.69	841.94
	within		116.57	320.67	955.43
L.costbp	overall	226.85	109.92	112.5	479.9
	between		35.17	155.7	264.15
	within		105.24	81.86	460.29
branch	overall	290.55	303.53	8	1176
	between		298.74	9	1151.94
	within		22.44	225.14	432.49
capitalr	overall	13.01	5.33	2.38	59.35
	between		3.95	7.69	20.43
	within		3.83	-2.19	51.92
avgsal	overall	9.54	2.34	4.73	16.43
	between		1.98	7.11	14.88
	within		1.35	6.63	14.76
quarter	overall	11.74	4.65	3	19
	between		1.37	10	14.5
	within		4.48	3.74	19.74
L.marketshare	overall	5.1	6.93	0	28.29
	between		6.72	0.01	24.17
	within		0.94	1.84	9.22
cclimitsA	overall	12.66	15.66	0.43	83.99
	between		15.23	1.13	59.56
	within		6.21	-16.73	38.77
LD.delqrate	overall	0.15	10.13	-163.65	44.48
	between		3.38	-12.05	8.88
	within		9.71	-151.44	49.51
nonbsA	overall	196.54	144.78	7.29	809.77
	between		111.21	44.95	527.51
	within		90.03	-226.85	525.65
netprofitA	overall	0.81	2.14	-17.61	5.85
	between		1.43	-4.91	2.1
	within		1.69	-11.89	7.77

Table 7. Pair wise Correlations

	ratebp	L.costbp	branch	capitalr	avgsal	quarter	L.markshare	cclimitsA	LD.delqrate	nonbsA	netprofitA
ratebp	1										
L.costbp	0.75*	1									
branch	-0.14*	0.08	1								
ownerseqL	0.09*	-0.04	-0.11*	1							
avgsal	-0.26*	-0.50*	-0.20*	0.31*	1						
quarter	-0.75*	-0.96*	-0.06	-0.01	0.52*	1					
L.marketshare	0.13*	0.10*	0.38*	0	0.03	-0.09	1				
cclimitsA	0.23*	-0.07	-0.15*	0.33*	0.41*	0.04	0.22*	1			
LD.delqrate	-0.04	-0.08	0	-0.09*	-0.01	0.09*	-0.01	0.03	1		
nonbsA	-0.07	-0.38	-0.26*	0.15*	0.46*	0.38*	0.07	0.43*	0.04	1	
netprofitA	0.03	0	0.13*	-0.29*	-0.20*	0	-0.03	0.12*	0.36*	0.10*	1

(*) Indicates significance at 10% level

Table 8. Random Effects Estimation and Additional Robustness Tests

ratebp	Random Effects Model I	Fixed Effects Model V	Fixed Effects Model VI
costbp.L1.	0.50	0.42	0.53
	(4.42)	(3.55)	(4.53)
branch	-0.05	0.41	0.36
	(-0.92)	(2.32)	(2.4)
capitalr	2.59		
	(2.55)		
avgsal	9.67	14.47	15.30
	(2.55)	(2.83)	(3.33)
quarter	-13.27	-17.04	-15.83
	(-4.54)	(-5.08)	(-4.94)
marketshare.L1.	3.11	4.22	8.76
	(1.74)	(1.32)	(2.94)
cclimitsA	1.59	1.92	1.41
	(3.00)	(3.54)	(2.56)
delqrate.LD.	0.09	0.08	0.00
	(0.21)	(0.16)	(0.01)
fixedassetsA		3.64	
		(2.91)	
overheadA			8.61
			(3.27)
constant	518.89	414.74	372.38
	(8.34)	(5.81)	(5.67)
Number of Obs.	328	328	302
R-square within	0.7629	0.7647	0.7572
R-square between	0.3436	0.0224	0.0056
R-square overall	0.6387	0.1863	0.1529
Hausman Chi2(8)	99.44		
P Value of Chi2(8)	(0.00)		

Notes:

1. z and t statistics provided in parentheses for random and fixed effects estimations respectively.

2. Model for estimated for the period between 2002q4 and 2006q2 due to data limitation for overhead expenses. Therefore number of observations drops to 302 in this model.

3. Hausman tests the null hypothesis that difference in coefficients of fixed effects and random effects estimations of basic specification is not systematic. Clearly, we reject this hypothesis.

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