

Regulations and Competition in Credit Card Market in Turkey

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Abstract

Turkish credit card market experienced a strong growth with the establishment of stability in the economy and the decline in the inflation rate after 2001 crisis. Turkey became the 3rd biggest market in Europe with 32 million credit cards in 2006. However, the quick response of the credit card interest rates to the increase in the cost of funds during the 2001 crisis was not observed in the case of decreasing cost of funds afterwards. Credit card interest rates stayed persistently high compared to the declining market interest rates and the interest rates in other credit markets such as home, auto or consumer credits. This study is an attempt to analyze the failure of competition in the Turkish credit card market. Moreover, a quarterly data set of the credit card interest rates of the all 22 issuers in the Turkish market is employed to provide empirical evidence for the failure of price competition in the market. The data set spans from the second quarter of 2001 to the last quarter of 2006. One-step and two-step difference and system GMM regressions are run on the panel data set. The study concludes that the credit card interest rates in Turkey are economically insensitive to the changes in the cost of funds during this period.

Keywords: Credit Cards, Regulation, Financial Markets, Banking, Competition Market Structure.

JEL classification: F21, G21, O19

I. Introduction

Credit cards have become the changing face of modern societies. Rising affluence and technological developments contributed much to the increasing substitution of “plastic money” with other forms of payment instruments such as cash, cheque, and charge cards. In parallel to these developments, share of credit card purchases in total consumption spending increased sharply in many countries. Although it is an expensive form of borrowing, many consumers enjoyed using credit option of their cards. Credit card debt stock began to comprise an important part of the total household debt stock in recent years in the countries where this option is available such as the US, UK, France, Ireland, and Turkey.

Turkish credit card market is also experiencing a striking growth in recent years. Number of credit cards reached to 32.4 million at the end of 2006, which ranks Turkey as the 3rd biggest market in Europe after the UK and Spain. Merchants are increasingly accepting credit cards for payments in Turkey. Number of Point of Sales (POS) climbed to 1.28 million in 2006 from 0.51 million in 2003. Volume of transactions processed through credit cards amounted to 18.8% of the GDP in 2006. Establishment of political and economic stability after a long period of economic crises and short-lived coalition governments, and decreasing inflation and high growth rates have strong positive impacts on this process.

Although market interest rate and inflation rate fall significantly in recent years, credit card rates show strong persistency. In the second quarter of 2001 overnight (o/n) interest rates was 71% when compounded annually, inflation rate was 52% and average APR in the credit card market was 180%. Inflation and market interest rates declined remarkably following the 2001 crisis in Turkey, especially after 2002. As of the last quarter of 2006 o/n and inflation rates are 17.5% and 9.8% respectively. However average APR in the credit market is still 86%.

Sticky interest rates were not observed in other credit markets such as home, auto or consumer credits. Interest rates in these markets followed paths similar to the downward trend in the market rates in recent years.

In this study, the experience of Turkish credit card sector in recent years is examined and the possible reasons for the sticky behaviour of credit card rates are explained. Effects of recent regulations on the competitive behaviour of the market are analyzed from the perspective of theoretical and empirical studies in the literature. Moreover, using a quarterly data set of average credit card interest rates of all issuers in Turkey since 2001, this study provides empirical evidence for the stickiness of the credit card rates in Turkey. One step and two step GMM regressions are 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 for the period between the second quarter of 2001 to the last quarter of 2006. This result is a clear evidence for the lack of competition in the Turkish credit card market.

II. Recent Developments in Turkish Credit Card Market

The adventure of the Turkish credit card market in the new millennium is highly interesting, but this story has not been much studied yet. The rapid development of the Turkish credit card market started in the late 1990's. Usage of credit card stayed very limited until late 1990's. Even though first credit cards entered the Turkish market in 1968 with Diners Club only some high-income people used credit cards and small number of stores accepted these cards for decades.

There were only 554,000 credit cards in Turkey in the early 1990's. This number climbed to 13.4 million in 2000. In the last six years number of credit cards in Turkey more than doubled and rose to 35 million. Turkey became the 3rd biggest market in Europe in card numbers. Not just the numbers but also the transaction volume with credit cards increased remarkably in recent years. The transaction volume of the credit cards amounted to 18.8% of GDP in 2006, whereas it was 11.1% of GDP in 2003 (Figure 1). Advancements in the technology contributed to the increasing popularity of credit cards by making them a more secure and more convenient mean of payment. Turkey gradually shifted to the PIN based cards which minimize the risk of credit card fraud.

In relation to the widespread usage of credit cards, credit card debt stock increased dramatically in recent years. Credit cards became a major source of borrowing for Turkish households; especially for whom the conventional ways to reach credit are very costly or even most of the time such options are not available. Total stock of credit card debt which was just 2.58 billion YTL in December 2001 climbed to 22 billion YTL as of December 2006¹. However if we include only the debts from instalment purchases and delinquent loans, the debt stock amounts to 10.7 billion in December 2006 which was just 1.1 billion in December 2002 (Banking Regulation and Supervision Agency (BRSA), 2006). Credit card debt stock comprises 10% of all credits given by financial sector to households in Turkey in December 2006 (BRSA, 2006:50). Additionally, total credit card lines (43.4 billion YTL) are the major share of the non-balance sheet liabilities of the financial system which is 167.5 billion YTL in December 2006.

On the other hand, the real increase in the credit card debt stock has always been lower than the real increase in the consumer credit debt stock. In a report of the Central Bank of the Republic of Turkey (CBRT) it is emphasized that some portion of the increase in the

¹ Note that these numbers include the balances which have to be paid at the end of the grace period and cash in advances.

consumer credit stock is related to the credits taken to close down the credit card debt stocks which grow rapidly due to the very high interest rates (CBRT, 2006:55).

Number of people defaulted on their credit card debt increased sharply in spite of buoyant economic growth, low inflation, political and economic stability in recent years (Table 1). The number of people whose credit card balances are transferred into the delinquent loans by banks increased even more than this. This number jumped from 11,184 in December 2002 to 964,000 in December 2006. At the same time delinquent credit card loans increased from \$304 million to \$1.19 billion. These numbers indicate that average per capita delinquent loans for these people is \$1,223 in December 2006.

II-1 Developments on the issuers' side

There are 22 issuers in the Turkish credit card market. Total market share of the four biggest issuers is 74%.² Two biggest issuers, Yapi Kredi and Garanti together control almost half of the market. 9 of the 22 issuers have market shares of less than 1% each. Herfindahl-Hirschmann Index for the market is 0.16 which indicates that the market is moderately concentrated.³

The competition is fierce in the Turkish credit card market. However, competition is concentrated on the features of the credit cards such as frequent usage awards, number of instalments, annual fees rather than the interest rates. Fierce competition puts pressure on issuers and therefore they expand their customer bases to include less creditworthy customers and increase credit card lines of the customers without detailed examination of the customers' risk position. The regulation in 2006 inhibits banks from sending new cards or increasing card limits without the request or approval of the customers. The regulation limits the total credit card line of a person with 2 folds of his/her income for the first year of owning a credit card, and 4 folds of his/her income in the second and later years.⁴ However, the number of people defaulted as well as the total volume of defaulted debt continued to increase even after this regulation. Advancements in the 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 for credit institutions. Better screening of credit risk may have been associated with decreasing costs in the Turkish credit card market. However, it is not clear how much the banks consider these risk reports when they give new credit cards or extend credit card lines.

Interest rates in the Turkish credit card market exhibit high degree of stickiness. The cost of funds declined remarkably in recent years, but the credit card rates did not respond much to this decline. Overnight interest rates declined from 71% in the second quarter of 2001 to 19% in the last quarter of 2006 while credit card rates fell from 180% to just 86% in the same period. Some may argue that credit card market became more competitive, encouraged by the almost 100 percentage points decline in the card rates. However, the ratio of credit card rates to overnight rates increased from 2.51 to 4.5 in the same period. Additionally, credit card spreads fell just 42 percentage points in spite of the stabilization of the economy after the 2001 crisis.

² Market shares are calculated using average monthly credit card balances of the issuers.

³ Herfindahl-Hirschmann Index is calculated by squaring market shares of the each issuer and then summing up this values. Market is highly concentrated if this index is closer to 1 and it is a competitive market if this index is closer to 0.

⁴ This limit is for people who will get a new credit card. It is not clear that how the limit will be set if a consumer has other issuers' credit card(s) when applying for a new one. Additionally, there are uncertainties due to the personal income calculations since unregistered incomes constitute an important part of the disposable income in Turkey.

Sticky interest rates are not observed in other credit markets such as consumer or home/auto credits. Spreads in these markets declined down to 4-5 percentage points with the normalization in the economy in recent years. Sluggish adjustment of credit card rates to the changes in the cost of funds created long-lasting spreads between these rates and market rates in many other developed and developing countries. However, this difference is remarkably higher in Turkey compared to other countries (Table 2).

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. Many big and medium size merchants maintain the POS machines of different issuers in Turkey. However, big issuers have a big advantage at the point of sales. They offer large number of instalments, attractive rebates and gifts for the purchases with their credit cards whereas it is very difficult for the small issuers to offer similar terms. Therefore, they increase the switching costs for their existing customers and attract new ones even though some small issuers offer remarkably lower credit card interest rates.

A distinctive feature of the Turkish credit card market is the large number of instalments. Issuers compete by offering up to 18 months of instalments to the credit card users. Consumers do not pay interest rate on these instalments if they pay their debt timely. Approximately one fifth of all purchases made by credit cards are paid in instalments (Table 3). It seems that consumers care more about the number of instalments than the interest rate of their credit cards. Political and economic stability and low inflation rates enabled banks to offer large number of instalments in recent years. Many consumers make use of the opportunities created by instalments to buy the goods that they would not be able to buy otherwise. However, these generous instalments became an important source of defaults since people began to spend beyond the reach of their income prospects. Chakravorti and Emmons (2003) argue that if consumers pay in instalments, they pay an interest rate of which a part may be used to cover the costs associated with credit-card processing.

III. Theoretical Background

Sticky behaviour of credit card rates attracted attention of many economists and regulatory agencies in all over the world in the last two decades. Ausubel (1991) empirically showed that credit card interest rates did not respond to the decline in the market interest rates between 1982 and 1987 in the U.S. and at the same time banks earned 3-5 times higher than the ordinary rate of return of the banking industry from their credit card branches. Ausubel provided 3 explanations for the failure of competition in the credit card market: (i) search costs, (ii) switch costs, and (iii) adverse selection. High search cost expected in the market due to the barriers that prevent customers from locating the low price issuers, and switching costs are present since customers who want to switch to a low rate card may face a high sum of monetary, physical and psychological costs.

New adverse selection theory proposed by Ausubel states that the banks that unilaterally lower interest rates will disproportionately attract high risk customers. The difference of this adverse selection theory from the famous theory of Stiglitz and Weiss (1977) lies at the assumptions about the consumer types in the credit card market. Ausubel classifies consumers of credit cards into 3 main groups and there is almost a consensus on this classification in the literature. In the first group there are “convenience users” who pay their bill in full each month and hence do not borrow on their credit cards. In the second group, there are “revolvers” who intend to use the credit option of their cards and borrow on their credit cards heavily. This group is also classified as high-risk or illiquid consumers. The return on

shopping around for lower interest rates or switching to a lower rate card is the highest among this group. In the last group there are consumers who do not intend to borrow on their credit cards but cannot prevent themselves from borrowing anyway. Therefore these consumers exhibit some sort of irrationality according to Ausubel. This group is the most profitable consumer class for banks since they borrow at high interest rates and generally pay their debts.

Ausubel's explanations for sticky credit card rates are later empirically proven by other studies. Using individual level data from 1989 Consumer Finance Survey, Calem and Mester (1995) found that search and switch costs are relevant in the credit card market and they can lead to adverse selection for credit card issuers that unilaterally lower interest rates. Hence search and switch costs prevent credit card rates from falling when cost of funds fall.

Search costs are considered as an important informational barrier that prevents interest rates from falling in the credit card markets. It is argued that if consumers can locate lower interest rate cards through searching this will create a competitive pressure on the issuers and hence card rates will decline. Additionally, if expected benefit from searching is lower for low-risk and/or profitable customers, then banks that unilaterally lower their card rates will disproportionately attract less profitable customers. Ausubel (1991) argues that majority of the low-risk customers believe that their indebtedness will be short lived and thus they are less inclined to engage in search activity. Similarly, Calem and Mester (1995) show that consumers with high search costs generally have higher balances (these consumers also have more payment difficulties), therefore banks that lower interest rates face adverse selection because they attract less profitable customers.

Evidence and arguments in favour of search costs motivated governments to take regulatory actions to reduce search costs. The US Fair Credit and Charge Card Disclosure Act which entered into force in 1988 imposed standardized disclosure requirements on banks. The aim of this act was creating competitive pressures on banks by increasing information available to consumers (Berlin and Mester, 2004). Similarly, BRSA and Central Bank started to announce interest rates charged by different credit card issuers after the regulation in 2006 in Turkey. However, a striking decline in the credit card rates did not occur following these regulations in both countries. Consistent with these developments, later empirical studies provided less evidence to support the search cost explanation of the sticky interest rates in credit card markets. Crook (2002), Kerr and Dunn (2002) re-examined the search costs problem using updated data from 1998 Consumer Finance Survey and they found less evidence in favour of search cost explanation of sticky credit card rates. Berlin and Mester (2004) employed another set of individual level data for the US credit card market and they again found no supporting evidence for the search based monopolistic competition models. Cargill and Wendell (1996) and Canner and Luckett (1992) argued that reducing search costs will create a limited pressure on credit card rates because the majority of cardholders are convenience users and the benefit of searching for lower rates is small for them.

Unlike for the search costs, there are ample empirical evidences supporting the switch costs explanation of the sticky card rates in recent years. Stango (2002) argues that many customers in the credit card market consider credit cards as functionally identical before they get a card, but once they get a card they may not switch to a lower rate card easily. Thus, switch cost models imply that many customers are stuck in their current cards and they are exploited by their profit maximizing banks (Ausubel 1991; Stango, 2000). Calem and Mester (1995) employed data from 1989 Consumer Finance Survey and found that it is more likely for customers with large outstanding card balances that their application for credit denied because high balances are considered as an indication of high default probability by issuers. These

customers, even they are low risk and just plan to switch their current balances to a lower rate card, do not apply for a new card because they know that their probability of rejection is high. Hence, an adverse selection problem emerges. Banks hesitate to lower their card rates unilaterally because they may not be able to attract these profitable customers.

Calem, Gordy and Mester (2005) provided similar empirical evidence almost after a decade, using updated data from 1998 and 2001 Consumer Finance Surveys. They examined the effects of the credit card balances on the credit card rates that cardholders pay on their larger outstanding balances while controlling for the credit score and other characteristics. They run two separate regressions for convenience users and revolvers. A relationship between shopping behaviour and credit card rates is not expected for convenience users. Issuers know that main concern of the convenience users is not the interest rates since they hold credit cards primarily as a mean of payment. Hence, issuers increase the cost of switching for convenience users by providing benefits depended on the card usage frequency and by offering lower annual fees. On the other hand, a positive or a weak relationship between the credit card balances and the card rates is expected for the revolvers if there are informational barriers in credit card markets. Empirical evidence from the 1998 and 2001 Consumer Finance Surveys shows that interest rate paid on the largest revolving balances of the cardholders increases or stays almost stable with the credit card balances. Shopping around for lower terms does not guarantee that a revolver would obtain a lower rate card if he/she holds large balances. High credit balances make it more difficult to switch to a lower rate card because these balances are perceived as a signal of high default risk. This study also shows that informational barriers arising from switching costs are more severe for the lower credit risk and non-shopper groups.

A central assumption of the switch cost models is “a positive correlation between market share and profit margin.” This fact arises from the desire of the issuers with big market shares to exploit their captive customers. Non-price amenities play a central role in tying cardholders to their current cards. Stango (2000) examines the relation between the market shares and the profit margins in the US credit card market. He concludes that issuers with small market shares price more aggressively to capture more market share while big issuers price less aggressively to exploit their market share. When we plot the market shares and interest rates of the 22 issuers in the Turkish credit card market on a scatter-graph we observe a similar positive relation between these two which indicates that switch costs are present in the Turkish credit card market (Figure 2).

Banks in the US began to offer low introductory teaser rates and attractive opportunities for the customers of other issuers if they want to transfer their existing credit card balances. Stango (2002) argues that this observation confirms the existence of switching costs in the credit card market. He also provides empirical evidence in favour of the other predictions of the switch cost models: any issuer's credit card rates increase as indebtedness of its customers and its competitors' customers increase. And also Card rates increase as the annual fees charged by an issuer's competitors and as the market share of the issuer increase in its home state. Therefore he concludes that the profit maximizing issuers are exploiting high switching costs.

1990's witnessed the rapid expansion of solicitation activity and new card issuance in the US credit card market (Calem, Gordy and Mester, 1995). However, in spite of a buoyant economic environment, this rapid expansion of the market brought together a vast increase in the delinquency rates. Ausubel (1999) examines preapproved credit card solicitations and he posits direct evidence for adverse selection in the US credit card market. Data reveals that respondent to solicitations have remarkably worse credit histories than nonrespondents. Another striking result is that customers who responded to solicitations with superior terms

have better observable credit-risk characteristics than those responded to solicitations with inferior terms. Ausubel (1999) posits empirical evidence also for his previous explanation of the irrational behaviour of some credit card consumers. He finds that introductory interest rate is more important than the duration of the introductory offer and than the post-introductory rate among the customers who respond to credit card solicitations. This finding is consistent with the assumption that some customers systematically underestimate the extent of their current and future credit card borrowing. Lastly he shows that probability of default is higher for the customers who accept inferior offers. This fact is valid even all information known by the card issuers at the time account is opened controlled for. This evidence supports the adverse selection in the case of hidden information.

Contrary to Ausubel (1991), Brito and Hartley (1995) claim that rational consumers may heavily borrow on their credit cards at extremely high rates because transaction costs of arranging loans from banks in conventional ways are high and there are costs associated with holding precautionary money balances. They also argue that interest rates need not to fall when cost of funds fall because when cost of funds decline banks extend their consumer bases to include high-risk consumers. Calem, Gordy and Mester (2005) underlines this fact by showing that delinquency and charge-off rates rose between 1995 and 1997 despite a strong economy and remained at high levels thereafter until 2001 recession in the US. In order to explain the increasing delinquency rates Black and Morgan (1999) point out that credit card usage spread among the high risk customers such as blue-collar workers and younger persons between 1989 and 1995 while overall debt burden is also on the rise between these years. Similarly, banks in Turkey tried to expand their customer bases following the decline in the cost of funds in recent years by giving credit cards without detailed examination of the credit risks of the customers. They even distributed credit cards in streets or sent cards to their deposit customers without any request from them until the regulation in March 2006. The rise in the delinquency and charge off rates in Turkey in recent years despite a strong economy can be attributed to this behavior of profit maximizing banks. Hence the spreads between needs to be higher in credit cards market compared to markets for other type of credits.

IV. Empirical evidence for the sticky 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 accepted 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 taken into account in this empirical research.

IV-1 The model

In order to show the sticky behaviour of the credit card interest rates, these rates are regressed on their own lag, the lag of the cost of the funds:

$$\text{rate}_{it} = \alpha \text{rate}_{i,t-1} + \beta \text{cost}_{i,t-1} + \eta_i + v_{it} \quad (1)$$

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.⁵ 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 (1) the result is dynamic panel bias which stems from the fact that the lagged dependent variable, $\text{rate}_{i,t-1}$ 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 model in (1) we obtain:

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

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

In the mean transformed regression, correlation between the transformed lagged dependent variable and the transformed error term is negative. (Bond, 2002; 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 (1) inflates the coefficient of the lagged dependent variable and applying Within Groups transformation creates a downward bias and both of these estimates are inconsistent, Bond (2002) suggest that a candidate consistent better estimate should create a coefficient for the lagged dependent variable between these two estimates.

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

$$\Delta \text{rate}_{it} = \alpha \Delta \text{rate}_{i,t-1} + \beta \Delta \text{cost}_{i,t-1} + \Delta v_{it} \quad (3)$$

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 $\text{rate}_{i,t-1}$ in $\Delta \text{rate}_{i,t-1} = \text{rate}_{i,t-1} - \text{rate}_{i,t-2}$ 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 (3).

IV-2 Results

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 4. Therefore we can expect the good estimations to give coefficients between 0.86885 and 0.7533724 for the lagged dependent variable.

⁵ 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.

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 good estimation of this dynamic panel data model.

In the 3rd column, one-step difference GMM results are presented. In order to restrict the number of instruments⁶, the transformed lagged dependent variable is instrumented by the second and third lags of the dependent variable. Since second order serial correlation is found⁷ in the transformed variables we can no longer use second lag of the dependent variable to instrument the $\Delta rate_{i,t-1}$ term in the transformed regression.⁸

Therefore the model is estimated again by using 3rd and 4th lags of the dependent variable as instruments. Results are presented in the 4th column of the table. Both coefficients are reasonable in this estimation. (Coefficient on the lagged dependent variable is between the coefficients of the OLS and Within Groups estimations.) However, coefficient of the lag of the cost of funds is not statistically significant at 10% confidence level (p value is 0.178).

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 (0.753108) is very close to the Within Groups estimation.⁹ 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, hence using second lag of the dependent variable as an instrument for the transformed lagged dependent variable is possible.

Note that the Sargan-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.

IV-3 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 and on time dummies. Bond (2002) shows in simulations that System GMM gives the best result in checking for the persistency of panel

⁶ 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. However there is no universal rule, therefore instrument counts are also reported in Table 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).

⁷ In Table 4, m1 and m2 are the Arellona and Bond tests for first order and second order serial correlation, asymptotically $N(0,1)$. 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.

⁸ First order serial correlation in the first differenced residuals are expected by construction since $\Delta vit = vit - vi,t-1$ and $\Delta vi,t-1 = vi,t-1 - vi,t-2$ share the same term, $vi,t-1$. What we need to check is the second order correlation in the first differenced residuals. Because if there is a correlation between $\Delta vit = vit - vi,t-1$ and $\Delta vi,t-2 = vi,t-2 - vi,t-3$, this indicates a first order correlation in levels due to the correlation between the $vi,t-1$ in first and $vi,t-2$ 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.

⁹ Here coefficient of the lagged dependent variable slightly falls below the coefficient of the Within Groups estimations. However, as stated before, we do not expect a strong bias in the Within Groups estimation because of the relatively large T which is 23. Therefore we can expect to obtain a coefficient close to the Within Groups estimation in a GMM estimation of the dynamic model.

data series. OLS and Within Group estimations are also reported in Table 5 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 5).

V. Conclusion

This study focuses on the price competition in the Turkish credit card market. 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. This study provides empirical evidence to support the proposition that credit card interest rates are sticky 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. In order to show the sticky behaviour of the credit card interest rates, 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 close to 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, economically 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 failure of competition in the Turkish credit card market.

VI. Tables and Figures

Table 1: Number of people defaulted on credit card and consumer credit debts

	2002	2003	2004	2005	Sept. 2006
Number of people defaulted on consumer credit debt	32,911	30,845	49,611	159,808	182,076
Number of people defaulted on credit card debt	5,627	4,157	9,863	16,767	21,660

Source: Central Bank of the Republic of Turkey

Table 2: Real Credit Card and Consumer Credit Interest Rates

Country	Real Credit Card Interest Rate (%) (1)	Real Consumer Credit Interest Rate (%) (2)	1/2
Turkey	72.15	13.36	5.40
USA	8.76	3.83	2.29
UK	14.30	12.05	1.19
Australia	13.57	8.95	1.52

New Zealand	15.12	10.13	1.49
Poland	18.06	13.59	1.33
Germany	13.54	4.24	3.19
Croatia	10.04	7.39	1.36
Romania	12.34	8.66	1.43
The Netherlands	17.29	5.29	3.27
Hungary	21.01	11.63	1.81
Ireland	14.05	5.55	2.53
Belgium	10.18	3.49	2.92

Source: CBRT

Table 3: Installments in the Turkish credit card market

2006	Total Spending with Credit Cards (Million YTL)	Total Spending with Installments (Million YTL)	Spending with Installments /Total (%)
January	7,362.51	1,509.27	20.50
February	7,048.52	1,403.53	19.90
March	8,199.99	1,637.54	20.00
April	8,280.40	1,753.79	21.20
May	9,144.14	1,979.95	21.70
June	9,237.89	2,061.45	22.30
July	9,214.67	1,902.57	20.60
August	9,282.18	1,851.98	20.00
September	9,228.61	1,962.30	21.30
TOTAL	76,998.92	16,062.37	20.90

Source: CBRT

Table 4: Empirical Results

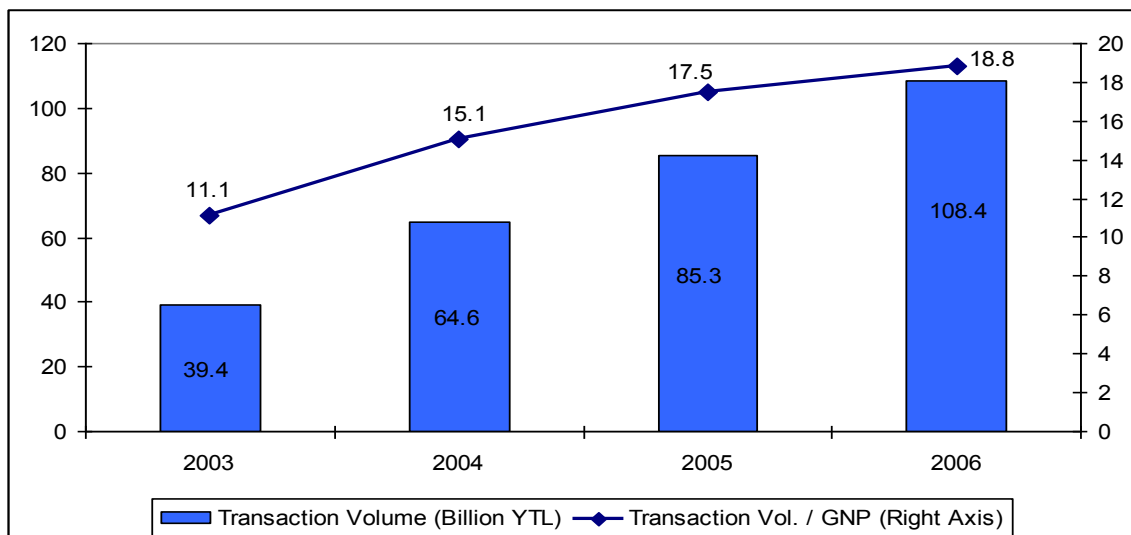
	1	2	3	4	5
Dep Var: Rate	OLS	Within Groups (Fixed Ef.)	GMM Dif t-2 t-3	GMM Dif t-3 t-4	GMM Sys t-2 t-3
Lag of rate	0.86885	0.7533724	0.6380436	0.8400995	0.753108
<i>p value</i>	0.00	0.00	0.00	0.00	0.00
Lag of cost of fund	0.131946	0.2246151	0.3269837	0.1906221	0.373084
<i>p value</i>	0.00	0.00	0.002	0.178	0.001

m1	0.0506		0.003	0.002	0
m2	0.0166		0.008	0.017	0.099
Sargan/Hanset Test			1	0.999	1
Instrument count			23	23	26
Number of steps in GMM			1	1	2
Time period:	2001q2-2006q4 (23 periods)				
Number of observations:	496				
Number of cross-sections (banks):	22				

Table 5: Persistency of credit card rates

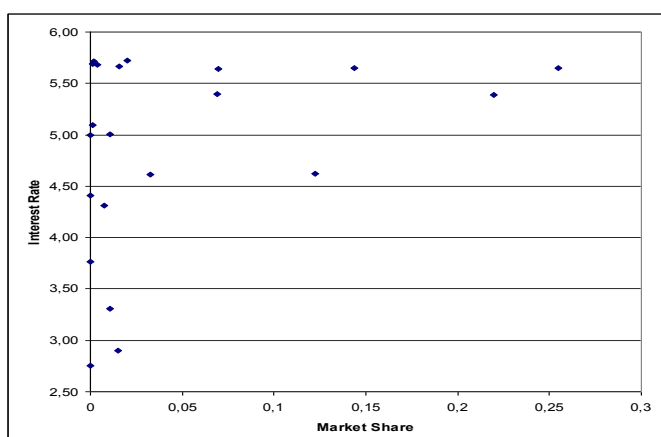
	OLS	Within Groups	GMM Sys t-2 t-3	GMM Dif t-2 t-3	GMM Dif t-3 t-4
Lag of rate	0,86885	0,753372	0,730152	0,638044	0,8401
<i>p value</i>	0.00	0.00	0.00	0.00	0.00
m1	0,0506		0,002	0,003	0,002
m2	0,0166		0,022	0,008	0,017
Sargan-Hansen Test			1		1
Instrument count			25/22	23/22	23/22
Steps in GMM			2	1	1

Figure 1: Transaction volume and its ratio to GDP in the Turkish credit card market



Source: BRSA, Financial Markets Report, December 2006

Figure 2: Market Shares and the Credit Card Interest Rates in Turkey



Source: BRSA and CBRT

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