

## The Effects of Card Level and Bank Level Benefits on Credit Card Interest

### Rates

### Abstract

Credit card rates have been shown to be very high and non-responsive to the changes in the costs of funds. The failure of price competition led to a shift of interests from price to non-price competition in these markets. Credit card issuers create switching costs for their customers by providing non-price benefits. These are either card level benefits that depend on credit card usage or bank level benefits that arise from the convenience and quality of the general services of the issuer bank. This paper empirically investigates the nature of non-price competition in the Turkish credit card market using panel data, introducing the first study of this kind for an emerging market. As the main result, a significant and robust positive relationship between switching costs and credit card interest rates is obtained, confirming that as non-price benefits increase, banks charge higher credit card interest rates to their customers.

**Keywords:** Credit Cards, Non-Price Competition, Switching Costs, Banking

**JEL classification:** G21, G28, O16

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## **The Effects of Card Level and Bank Level Benefits on Credit Card Interest Rates**

### **1. Introduction**

Credit card interest rates are higher than other consumer credit interest rates all over the world. Empirical evidence indicates 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, the response of credit card interest rates to the decline in the cost of funds was very slow in the 1983-1987 period. Moreover, he calculated that banks earned three to four times the ordinary banking industry returns from their credit card business. 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.

Credit card markets in developed countries have been extensively explored. However, very little research has been conducted for developing countries in spite of the recent surge in credit card markets in these economies. Among the very few, Aysan and Muslim (2006) and Aysan and Yildiz (2007) show the failure of price competition in the rapidly growing Turkish credit card market. These studies reveal that the response of credit card interest rates to the decline in the cost funds is economically insignificant. In the current paper, we analyze the nature of non-price competition in the Turkish credit card market, introducing the first evidence of this kind for an emerging market. Analyzing the non-price competition is important and necessary in order to design and implement effective regulations for credit card

markets. Central Bank of Turkey has been applying a price ceiling on credit card interest rates since June 2006 in accordance with the recently enacted credit card law. However, the rates still remain exceedingly high compared to other loan rates. Tightening of the price ceiling is on the agenda of the government. Any incorrectly designed regulation may have economy-wide adverse effects since increasing credit card numbers and transaction volumes made credit cards crucial for the functioning of the economy in recent years.

This paper argues that the main reason for 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 the high switching costs of cardholders. Banks set up and increase switching costs by providing a number of non-price benefits and thus creating captive customers. All the non-price benefits provided to a card holder by her card-issuing bank as part of its product differentiation strategies can be broadly considered as switching cost for the card holder, since she has to forego these benefits if she decides to switch to another card. We divide these non-price benefits offered to credit card customers into two groups: (i) card level benefits that depend on credit card usage, and (ii) bank level benefits arising from the quality of general services and characteristics of the issuer bank. Card level benefits of using a credit card include gaining money-points, frequent flyer miles and rewards, being able to pay shopping bill in installments, and taking advantage of the conveniences of online shopping. The quality of general banking services and bank characteristics are important for credit card choice since many cardholders use other services of the issuer banks as well. Anecdotal evidence also suggests that customers obtain credit cards from the banks at which they already have accounts. Using multiple services of

a bank increases the cost of switching for cardholders, especially if they are pleased with the quality of these services.

The paper aims to establish the role of switching costs in explaining the high and sticky rates in Turkish credit card market and to identify the instruments through which banks create these costs. An empirical model is developed to examine the relationship between credit card interest rates and card level and bank level measures of non-price benefits to credit card customers. We benefit from the switching cost and bank pricing models of the existing literature. The duopoly model of competition with consumer switching costs in Stango (1999) and the bank pricing models proposed by Neuberger and Zimmerman (1990) and Hannan (1991) provide guidance for choosing the relevant variables in the empirical model. Three groups of explanatory variables are used. The first group encompasses cost variables: the cost of funds, default risk and liquidity risk. In the second group, we use the number of bank branches, capital ratio, and average salaries to account for the bank level non-price benefits of credit cards, which are the quality and characteristics of general banking services. The third category includes card level benefits like money points, travel miles and installments which are proxied by the market shares of issuers. This paper is the first to utilize a recently constructed quarterly panel data set for all 22 issuers in the credit card market in Turkey which spans the period from the last quarter of 2001 to the second quarter of 2006. In line with most switching cost models, fixed and random effect regressions yield a significant and robust positive relationship between switching costs and prices in the credit card market in Turkey, confirming that as the measures of both groups of non-price benefits increase, banks charge higher credit card rates. Our results also support the hypothesis that credit card interest rates adjust to the changes in the cost of funds sluggishly even after

controlling for the non-price features. These results are robust to econometric specification and 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. Empirical and theoretical background is presented in Section 3. Section 4 builds the empirical model and explains the data and variables. Results and robustness test are presented in Section 4. Finally, Section 5 concludes.

## **2. Non-Price Competition in the Turkish Credit Card Market**

All credit card issuer banks in Turkey provide their products nationally and compete in a large market where the total number of credit cards is 37.3 million as of December 2007. The growth performance of the Turkish credit card market in 2000s is outstanding. The number of credit cards increased almost threefold between 2000 and 2008. The average growth rate of total outstanding balances between 2003 and 2007 is 59 percent, whereas the average growth rate of the total transaction volume in the same period is 43 percent<sup>1</sup>.

A number of factors led credit cards to substitute for traditional payment instruments to a considerable extent. In addition to the usual benefits of credit cards<sup>2</sup>, Turkish consumers, who have been living with high inflation for 30 years, especially enjoy the non-interest bearing “grace period” between shopping time and payment due date. They also benefit from being able to pay in installments without any surcharge over the cash prices of goods. The decline of the inflation rate to single digit numbers enabled merchants and banks to offer high numbers of installments to

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<sup>1</sup> For details, see the periodically published financial stability reports of Central Bank of Republic of Turkey (CBRT) and the Banking Regulation and Supervision Agency (BRSA).

<sup>2</sup> Like not having to carry cash, being able to borrow at any time, enjoying the benefits of online shopping, etc.

cardholders in the aftermath of the 2001 crisis. Banks compete on installments to build customer loyalty and increase their market shares. Installments have also been beneficial for merchants, boosting their sales and transferring the burden of collecting receivables and default risk to banks. Additionally, customers collect money points when they use their credit cards and spend these money points like cash when shopping at member merchants (Savasci and Tatlidil, 2006). Competition through rebates and rewards are reflected in the total amount of promotions given to the cardholders. Data from Central Bank of Turkey (CBRT) and Interbank Card Centre (ICC) show that issuers distributed 0.95 percent of the total credit card transaction volume as rebates and rewards in the first nine months of 2006.

Competition among issuers in Turkey has intensified on non-price measures in accordance with the consumer structure in the market. Banks stress the numbers of installments, money points, frequent flyer miles, gifts and rewards, but do not emphasize interest rates in their advertisements. Co-branding and affinity cards are among the recent popular tools for creating switching costs in Turkey. Co-branded cards with airline companies or sea transportation companies that provide frequent traveler miles and affinity cards with soccer clubs are the most common ones. The convenience and security provided in online shopping and online banking can be added to the non-price features of competition in the credit card market. Some smaller issuers also compete by offering lower annual fees, teaser rates and switching checks to other issuers' customers, though competition on these features is not fierce in general.

The Turkish credit card market is highly concentrated. The market share of the six largest issuers<sup>3</sup> is 87 percent in total outstanding balances and 80 percent in

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<sup>3</sup> The six largest issuers are Yapi Kredi, Garanti, Akbank, Isbank, Finansbank and HSBC.

the number of customers. All issuers in the market provide general banking services. Credit cards are only one of their various products. The six largest issuers are also among the main players in the deposit and consumer credit markets together with three large public banks. They have high numbers of branches, and large ATM and POS (point of sales) networks. They compete on these attributes to increase their market shares in individual banking. In this study we also consider the general service and convenience 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, the general service characteristics of issuer banks affect credit card choice. As general banking services improve, it becomes more costly for customers to switch to another credit card.

### **3. Theoretical and Empirical Background**

The remarkably high credit card interest rates compared with other types of loans have been widely discussed in economic literature. Some explanations for these high rates are inherent in the characteristics of this product. One such justification is that the uncollateralized nature of credit card loans leads to higher default risk, and consequently to higher interest rates. Another is the non-interest bearing period between the day of purchase and the payment due date. Banks incur a cost in order to finance a customer's purchases during this time. The liquidity risk, which is caused by the banks' obligation to be ready to lend up to the full amount of the issued credit cards' limits at any time, also necessitates costly measures. On top of these inherent reasons, banks also increase their costs by giving out benefits such as money points, gifts and flyer miles.

The explanations listed above are able to account for only some of the interest rate differential. Ausubel (1991) shows this for the US market. The high profitability of the credit card business in Turkey suggests a similar picture. Despite the existence of sufficient numbers of competitors, these markets seem to fail in achieving competitive rates. Ausubel (1991) accounts for this failure with low price elasticity on the demand side stemming from search cost, switch cost and consumer irrationality, and asymmetric information on the supply side. Stating that search and switch costs are not sufficient to explain price stickiness, he categorizes credit card holders in three groups. The first group is made up of convenience users who never borrow and hence are insensitive to interest rates. These customers are not risky for a bank; however, they are costly and do not yield any profit opportunities. The second group consists of low-risk and profit-yielding consumers who do not plan to borrow ex-ante, but somehow end up doing so ex-post. These customers are also price inelastic since they do not anticipate borrowing. The last group is made up of illiquid and risky customers who plan to borrow using their credit cards, and consequently are sensitive to interest rates. Banks cannot observe the types of consumers. By decreasing its interest rate, a bank will be able to attract only customers from the undesirable third group and this makes all banks reluctant to lower prices..

Calem and Mester (1995) and Calem, Gordy and Mester (2006) introduce impatience and by mingling it with search and switch costs, define another set of categories to assess credit card holders. Their first category consists of patient customers with low search costs and high price elasticity of demand. They have low credit card balances and hence are not profitable for banks. The second category includes low-risk and impatient credit card holders. These consumers do not want to postpone consumption and have high search costs. They are profitable for banks as



they carry high balances. Impatient credit card holders with high default risk, high search costs and high balances constitute the third category. They are not desirable for banks. Asymmetric information again results in sticky prices. If a bank lowers its interest rate in the presence of search costs only, it merely attracts customers from the non-profitable first category. Switching costs can affect interest rates in two ways. If credit card balances (but not the types of customers) can be observed by all banks and are taken to indicate risk, then the consumers in the second and third categories will have high switching costs because they will need to reduce their balances in order to be able to get new cards. A decrease in credit card interest rate will thus only attract the consumers in the first category. If the types are known only by their own banks, banks increase switching costs for the consumers in the second category, for example by offering higher limits, so that they do not respond to rate reductions of other banks. Any unilateral interest rate cut by a bank in this situation will thus attract only the undesirable first and third types of customers.

Rather than search cost or asymmetric information, our work concentrate on the switching cost argument. The search cost explanation is not very relevant for the Turkish credit card market. First, there are only twenty-two issuers, which is a very tiny number indeed compared to the US and Europe. Second, the Banking Regulatory and Supervisory Agency (BRSA) and the Central Bank make all current information about credit cards easily available to the public. Although adverse selection may still be a relevant factor, asymmetric information is less of a problem compared to previous decades, due to the advances in information technology, continuously improving screening and monitoring techniques, and the information sharing network (the Credit Bureau of Turkey) among banks for their customers' credit histories. The credit card market in Turkey, on the other hand, vividly presents

a picture supporting the validity of the switching cost argument. Banks offer many non-price benefits along with their credit cards, such as money points, gifts and high numbers of installments. They make it difficult for a customer to switch to another card also by providing improved banking services in general and relying on the ease of using the credit card issued by the bank with which one works.<sup>4</sup>

Switching cost models, in general, propose that once a customer purchases a product, she becomes locked-in. 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 a lower interest rate. Ausubel (1991) lists a number of switching costs as follows: (i) application costs in time, effort and emotional energy, (ii) having to pay multiple annual fees by switching to another card, (ii) foregoing the benefits of a long term relationship with the current issuer, and (iv) waiting time till getting the new card. Such factors allow issuers to set prices that differ from marginal costs.

Switching cost models predict a positive correlation between prices and switching costs. On the other hand, issuers attempt to decrease the switching costs for their competitors' customers. For example, banks offer switching checks or low introductory interest rates to their competitors' customers. Likewise, 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 as one of the major sources of switching costs.

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<sup>4</sup> Our switch cost argument for credit cards does not apply to other loan markets. Credit card holders overwhelmingly use the credit cards issued by their own banks due to the difficulties they may have in closely following their balances and regularly paying them up on time. However, taking a vehicle or housing loan from another bank does not pose the same problems. In the first place, as these would require much larger interest payments, demand is much more elastic. Also, these fixed amounts of payments can be more easily followed and made, for example by placing an order for automatic periodic payment from existing bank account.

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 to higher prices and that there is a positive correlation between market share and prices. These results are in parallel with the predictions of switching cost models. In these models, a positive correlation between market share and prices arises from the incentive of the 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 where firms take the effect of their prices on future market shares and hence on future profits into account. Therefore, firms set lower prices in the first period compared to second period to build market share. Stango (2000) empirically tests this model. He finds evidence for significant positive effects of market share and cost volatility on the interest rate margins in the US market.

Stango (2002) empirically examines the relationship between switching costs and prices. Following the switching cost model of Chen (1997), Stango suggests that credit card prices can be written as a function of the switching costs of an issuer's customers and the switching costs of its competitors' customers. Using issuer level data from the US credit card market for the period between 1989 and 1994, he estimates a positive and significant relationship between the switching costs of an issuer's customers and credit card interest rates.

Stango's models presented above are good starting points to investigate the relationship between credit card interest rates and switching costs for the Turkish credit card market. Additionally, we benefit from the theoretical and empirical studies that examine bank price setting behaviour. Hannan (1991) proposes a model to examine the relationship between market structure and various aspects of bank

conduct such as loan pricing, deposit pricing, and bank profit rates. This model implies that loan rate is increasing in the cost of funds and the concentration in the relevant loan market. Berger and Hannan (1989) and Neubergen and Zimmerman (1990) also empirically analyze bank pricing behavior. Neubergen and Zimmerman (1990) investigate the reasons of the lower bank deposit rates in California and conclude that depositors care not only for prices but also for the quality of the general banking services, which are proxied by the number of branches, average salaries and overhead expenses.

We assess the effect of switching costs on credit card prices while controlling for costs of the issuer. The service and convenience aspects of credit card usage reflect the switching costs for consumers in our model. In order to measure the switching costs that credit card consumers face, we make a distinction between the benefits of credit card services and the benefits of general banking services. Anecdotal evidence suggests that consumers obtain their credit cards from the banks with which they are already working. Having a deposit account and a credit card from the same bank provides advantages such as being able to pay the credit card debt automatically from the deposit account or through online banking. Therefore, the quality of the general banking services also creates switching costs for credit card users.

We propose that the average credit card interest rate set by an issuer is a function of three types of variables: (i) variables reflecting costs of the issuer, (ii) variables related to the general characteristics of the issuer bank measuring bank level benefits, and (iii) variables related to credit card services measuring card level benefits.

In the first group, the variables are the cost of funds, the cost of default risk, and the cost of liquidity. We proxy the cost of funds with overnight interest rates. Credit cards provide short term loans which are financed through expensive short term funds. In that sense, the overnight interest rate is a good measure of the cost of funds for credit card issuers. Ausubel (1991) states that the cost of funds is the most frequently changing part of the marginal cost for issuers and that 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 cost of default risk is proxied with the delinquency rates measured by the ratio of delinquent credit card balances to total outstanding credit card balances. However, delinquent loans are given as stock values and include delinquent loans from previous periods. What is more important for current credit card rates is the flow of delinquent loans, which can be measured by the first difference of delinquency rates.

Delinquency rates affect prices through 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 defaults per outstanding balances as a control variable in the credit card interest margin equations. In addition, higher delinquency rates increase the captivity of customers since delinquencies worsen the credit history of consumers and decrease their chances of getting lower rate cards. Both of these channels affect the prices in the same direction; hence, we predict a positive coefficient on this variable. However, 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). We use the lag of the first difference of delinquency rates to eliminate the potential endogeneity problem.

The liquidity risk issue in the credit card markets was first raised by Shaffer and Thomas (2007). Shaffer and Thomas criticize previous studies for having neglected the pre-commitment risk and the resulting liquidity risk of credit card lending. Unlike other loans, in credit card lending, banks commit to lend up to a certain amount. The full utilization of this amount is solely at the discretion of the credit card users. Therefore, banks have to be prepared to lend the amount equal to difference between credit card limits and outstanding balances. This additional amount necessitates holding excess cash reserves and/or liquid securities, or borrowing short term loans from central bank and/or other banks. The opportunity costs arising from keeping low yield short term reserves or the direct cost of relying on expensive short term borrowing comprise an important component of the total cost of credit card issuing. Shaffer and Thomas, therefore, argue that neglecting the cost of liquidity management results in a bias 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. We capture the cost of liquidity management with the ratio of credit card limits to total assets and expect a positive coefficient on this variable.

In the second group, we include explanatory variables to capture general bank characteristics. 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. The convenience of an extended branch network may

compensate for higher credit card interest rates for consumers. Hence we predict a positive coefficient for this variable.

As argued by Neubergen and Zimmerman (1990), the number of branches may not fully capture the services provided to the customers of a bank. Banks create or increase switching costs to their customers by providing free or underpriced services and better quality services. For example, some banks offer more secure online and POS payment systems to their customers and provide conveniences for paying credit card debts. It is difficult to measure all these different aspects of services; however, an extra service is expected to increase operating costs. Thus, the cost of services may be used as a measure of the number and quality of services. We use average salaries paid by banks as a proxy for the cost of services. The average salary variable is included both by Berger and Hannan (1989) and Neubergen and Zimmerman (1990). Average salary is a proxy for the quality of general bank services. If a competitive bank pays higher than average salaries, its employees are expected to provide better services on average. It is also a direct measure of the quality of the customer relations. Customers may be willing to accept higher interest rates in exchange of a higher customer service quality. Hence, we expect positive coefficients for these variables.

Soundness of a bank also matters for bank choice. Especially in Turkey we expect the strength of a bank to be crucial in bank choice because of the experience of bank failures in recent history when 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 owners' equity to total assets (capital ratio) and we expect a positive correlation between this variable and credit card interest rates.

In the third group, we include a proxy for the non-price benefits of credit cards. We use the market shares of credit card issuers to capture the card level non-price aspects of the credit cards such as money points, frequent flyer miles and installments. There exists limited data on the credit card transactions in installments, the promotion expenses of credit card issuers in terms of cash rebates and frequent flyer miles. The limited number of observations prevents us from using these measures for the non-price benefits of credit cards. However, the existing data yield a significant positive correlation between market shares of issuers and these variables. Hence, as in the previous theoretical and empirical studies on switching costs, we predict a positive coefficient for the market share variable in our estimations. However, an endogeneity problem emerges when we include the market share variable on the right hand side. This endogeneity issue was also raised in previous empirical studies where the credit card rate is the dependent variable. Stango (2002) corrects this endogeneity by using the lag of the market share variable. We also apply this correction in our estimations.

#### 4. The Empirical Model and Data

The benchmark model estimated in our regressions is:

$$ratebp_{it} = \beta_1 L.costbp_{it} + \beta_2 l.delqrate_{it} + \beta_3 cc.limitsA_{it} + \beta_4 branch_{it} + \beta_5 avgsal_{it} + \beta_6 capitalr_{it} + \beta_7 l.marketshare_{it} + \eta_i + \varepsilon_{it}$$

We employ quarterly data of all 22 credit card issuers in Turkey to estimate this equation. We cover the post-crisis period from the last quarter of 2001 to the second quarter of 2006 after which the Central Bank started to set a price ceiling on credit card rates. The entire data set is composed of 413 observations. We do not have, however, 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 across various specifications. Additionally, using the lag of market share and the lag difference of default rate in the main specification limits the number of observations used in estimations to 328. Table A1 in the Appendix presents the descriptive statistics for the variables used in the estimations<sup>5</sup>.

The dependent variable in the empirical model is the credit card interest rates of issuers (*ratebp*).<sup>6</sup> The explanatory variables in the model are the lag of opportunity cost of funds (*costbp.L1*), credit card delinquency rates (*delqrate.LD*), credit card limits as a ratio of total assets (*cclimitsA*), the number of a bank's branches (*branch*), average quarterly cost per employee (*avgсал*), owners' equity as a ratio of total assets (*capitalr*) and the market shares of issuers in the credit card market (*marketshare.L1*). We also include a trend variable (*quarter*) and cross section dummies in the regressions.

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

We estimate our model using fixed effects panel data regression. Random effects regressions are only consistent and efficient if the explanatory variables are

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<sup>5</sup> Credit card interest rates and the cost of funds are expressed as basis points, which are the average monthly rates for each quarter.

<sup>6</sup> Banks charge different interest rates on their different cards. Credit card rates in our study are weighted averages of all these different interest rates charged by an issuer. These rates are collected by the BRSA.

not correlated with the individual effects. In our model, we use the same period switching cost variables to explain the variation in credit card rates. Therefore the individual effects are likely to be correlated with the explanatory variables. To detect this correlation, we perform the Hausman test and the results provide support for using fixed effects regressions.<sup>7</sup>

### **5. Estimation Results**

Table A2 in the Appendix presents the pair-wise correlations between the variables used in the estimations. All of the explanatory variables in the benchmark specification are significantly correlated with the credit card interest rates. The correlation of the credit card rates is highest with the lag of the cost of funds and the trend variable. Table 1 presents the results of the fixed effects regressions. Our benchmark specification is given in the first column. All explanatory variables in this specification except for the delinquency rate are significant at 5% level with the expected signs. The highly significant and negative coefficient of the trend variable indicates a significant downward trend in the credit card rates in recent years. 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 variables pertaining to the credit card market. The estimated coefficient indicates that the impact of the changes in the cost of funds on the credit card interest rates is not substantial. Under perfect competition assumption, this coefficient is expected to be close to one. The sluggish adjustment of credit card interest rates to the cost of funds indicates the lack of price competition in the market.

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<sup>7</sup> See Table A.3 in the Appendix.

The coefficient of the number of bank branches variable is significant at 5% level and it indicates that if a bank has 100 more branches, consumers accept 38 basis points higher interest rates. This effect is substantial considering the large differences in the number of branches between big and small banks in Turkey. In our data set, one of the banks has over 1000 branches, three banks have between 500 and 1000 branches, eleven banks have between 100 and 499 branches, and seven banks have less than 100 branches.

**Table 1: Estimation Results (Fixed Effects)**

Dependent Variable: ratebp	Benchmark Specification Model I	Model II	Model III	Model IV
<b>costbp.L1</b>	0.48*** (4.16)	0.49*** (4.31)	0.49*** (4.26)	0.49*** (4.36)
<b>branch</b>	0.38** (2.22)	0.36** (2.13)	0.37** (2.19)	0.36** (2.11)
<b>capitalr</b>	3.16*** (3.35)	3.10*** (3.36)	3.29*** (3.54)	3.21*** (3.47)
<b>avgsal</b>	15.55*** (3.13)	16.17*** (3.46)	15.68*** (3.16)	16.22*** (3.46)
<b>quarter</b>	-16.20*** (-5.00)	-16.43*** (-5.03)	-16.05*** (-4.97)	-16.28*** (-4.98)
<b>marketshare.L1</b>	6.24** (2.04)	6.45** (2.11)	6.22** (2.03)	6.41** (2.09)
<b>cclimitsA</b>	1.53*** (2.75)	1.55*** (2.74)	1.55*** (2.75)	1.56*** (2.75)
<b>delqrate.LD</b>	0.04 (0.08)	0.03 (0.06)	-0.01 (-0.01)	-0.01 (-0.01)
<b>offbsA</b>		0.02 (0.46)		0.02 (0.41)
<b>netprofitA</b>			0.86 (0.43)	0.72 (0.36)
<b>constant</b>	358.19*** (5.07)	352.13*** (5.19)	352.05*** (5.04)	347.63*** (5.12)
<b>Number of obs.</b>	328	328	328	328
<b>R-squared</b>	0.8456	0.8457	0.8457	0.8457

Notes: 1. (\*\*\*), (\*\*) and (\*) indicate significance at 1%, 5% and 10% levels, respectively.

2. t statistics are provided in parentheses.

3. Credit card interest rates and the cost of funds are expressed as basis points.

The significant and positive coefficient on the average salary variable reflects the importance of general banking services in credit card choice. This variable takes

the highest coefficient among the explanatory variables. Results indicate that if the average quarterly salary increases by TL 1,000, the bank charges a 16 basis points higher credit card interest rate.

Capital ratio enters the benchmark equation with a highly significant and positive coefficient, indicating the importance of the soundness of a bank. The coefficient of this variable shows that consumers are willing to pay a 3.16 basis points higher interest rate on average when a bank has a one percentage point higher capital ratio.

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

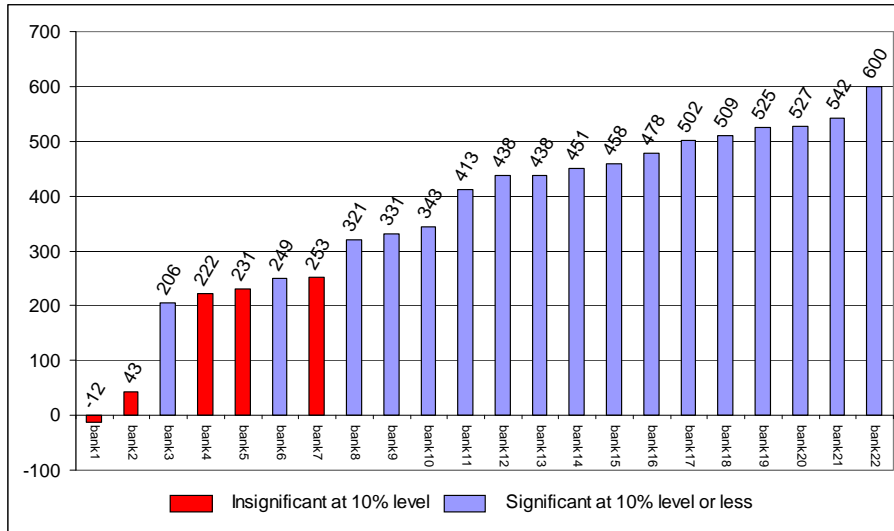
The delinquency rate variable, a risk and cost measure, turns out to be insignificant. This result is not surprising for the Turkish credit card market. Until the regulation in 2006, banks in Turkey extended their credit card customer bases heedless of the default risks. They acquired high risk customers by distributing credit cards on the streets or at universities without asking for guarantors or examining consumers' income status while they were more prudent in giving other consumer credits. Moreover, they were sending credit cards to their deposit customers without

their request. Given the extremely high credit card interest margins, changes in the default risk did not constitute an essential factor in banks' pricing decisions.

Estimations also indicate that liquidity management costs have positive and significant effects on credit card interest rates. However, the effect of this variable on the credit card interest rates is not as large as suggested by Shaffer and Thomas (2007) in Turkey. A one percentage point increase in the liquidity risk measure increases the average credit card interest rate by 1.5 basis points. Compared to the variables capturing the aspects of general banking services of the issuers, the effect of the liquidity cost on card rates is small. 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.

Pricing strategies of public banks, on the other hand, may differ from those of private banks due to the differences in their priorities. Public banks may price more in favor of consumers because of their social welfare concerns. Graph 1 gives the distribution of issuer-specific fixed effects for 22 banks for the benchmark model. The bank with the lowest fixed effect coefficient is a public bank. The second lowest coefficient belongs to a private bank which is run like a public bank due to its ownership structure. Two other public banks have the sixth and eighth lowest fixed effect coefficients. This finding indicates that after controlling for switching costs and market conditions, public banks price more in favor of consumers compared to private banks.

**Graph 1: Distribution of Slope Coefficients for Model I**



In order to check the robustness of our results, we add other related explanatory variables to the benchmark specification (Model I). We first include the ratio of off-balance sheet items to total assets (*offbsA*) in Model II. Off-balance sheet items basically contain credit commitments and derivative instruments. This variable reflects the technology and product diversity of a bank. In that sense, it may affect credit card interest rates positively by increasing switching costs. However, the coefficient of this variable in the second column of Table 1 turns out to be insignificant. Signs and significances of the other explanatory variables are not altered much when we add the *offbsA* variable to the estimations.

Secondly, in Model III, we add the ratio of net profits to total assets (*netprofitA*) to our benchmark specification. This ratio can be considered as an additional measure of the soundness of a bank like capital ratio. Therefore we expect a positive coefficient for this variable. In Model IV, we include both *offbsA* and *netprofitA*. 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. However, the coefficient of *netprofitA* variable is not significantly different from zero.

We use two more control variables to check the robustness of our estimations. Table A3 in the appendix reports the results of these specifications. One of these control variables is the ratio of fixed assets to total assets (*fixedassetsA*). Credit card issuing is a costly business. Establishing secure and convenient credit card systems necessitates substantial fixed investment. Banks that provide more secure and convenient credit card services invest heavily in technological infrastructure. These investments include infrastructure for providing online services, establishing POS systems and extending the number of retailers incorporated in this system. These investments are reflected to consumers as better services and hence increase switching costs. The other control variable is the ratio of overhead expenses to total assets (*overheadA*). This variable is used by Neuberger and Zimmerman (1991) in addition to the average salary variable to proxy the quality of banking services. We obtain significant positive coefficients on these variables as expected. The signs and significances of the variables in the benchmark specification do not change, except that the market share variables become insignificant in Model V.<sup>8</sup> These experiments confirm that our results are robust to different specifications.

Lastly, we check the robustness of the results to the econometric model used in the estimations. We estimate the same equation with the random effects model. Except two differences, results remain the same: the number of bank branches variable becomes statistically insignificant and the market share variable has lower significance in the random effects regression. Results of the random effects estimation of the benchmark model are presented in the Table A3 in the Appendix.

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<sup>8</sup> We run these regressions separately due to high correlation between these two variables. Additionally we drop the capital ratio variable in these regressions due to the high correlation of this variable with these control variables.

We perform the Hausman test in order to see if the fixed effects regression is statistically different from the random effects regression. We reject the null hypothesis that the difference in coefficients is not systematic (See Appendix, Table A3). The Hausman test reveals a correlation between explanatory variables and individual effects. Therefore, the fixed effects estimation is consistent and efficient while the random effects estimation is not. Hence, our choice of the fixed effects regression specification is justified.

## **6. 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 card level benefits that depend on credit card usage or bank level benefits that arise from the convenience and quality of the general services of the issuer bank. Card level benefits of using a credit card include gaining money-points, frequent flyer miles and rewards, being able to pay shopping bills in installments and utilizing the conveniences of online shopping. The general quality of banking services and bank characteristics are important for card choice since many cardholders use other services of the issuer bank such as having a deposit account in that bank as well. Using several services of a bank at the same time increases the cost of switching for cardholders, especially if they are pleased with the quality of the other services.

We construct an empirical model to examine the relationship between credit card rates and the card level and bank level non-price benefits to credit card customers. We use a quarterly panel data set for all 22 issuers in the credit card market in Turkey spanning the period from the last quarter of 2001 to the second



quarter of 2006. We benefit from the switching cost and bank pricing models in the literature to build our empirical model. We use the number of bank branches, average salaries and capital ratio as proxies for the quality of general banking services. We capture the card level non-price benefits of credit cards with the market shares of the issuers. We also control for the costs of funds, default and liquidity risk of credit card operations. Fixed and random effects regressions show that as the measures of both groups of non-price benefits increase, banks can charge higher credit card interest rates. In conclusion, 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 in developed countries. This paper is the first to reveal the role of non-price competition through switching costs in the credit card market of an emerging market economy. The importance of switching costs indicated by this paper implies that any effort by financial market regulators to alleviate switching costs, for example by allowing the credit card users to be able to automatically pay their credit card balances from their accounts at different banks, will significantly help enhance competition in credit card markets.

## 7. Appendix

Table A1: 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
costbp.L1	overall	226.85	109.92	112.50	479.90
	between		35.17	155.70	264.15
	within		105.24	81.86	460.29
delqrate.LD	overall	0.15	10.13	-163.65	44.48
	between		3.38	-12.05	8.88
	within		9.71	-151.44	49.51
cclimitsA	overall	12.66	15.66	0.43	83.99
	between		15.23	1.13	59.56
	within		6.21	-16.73	38.77
branch	overall	290.55	303.53	8	1176
	between		298.74	9	1151.94
	within		22.44	225.14	432.49
avgsal	overall	9.54	2.34	4.73	16.43
	between		1.98	7.11	14.88
	within		1.35	6.63	14.76
capitalr	overall	13.01	5.33	2.38	59.35
	between		3.95	7.69	20.43
	within		3.83	-2.19	51.92
marketshare.L1	overall	5.10	6.93	0	28.29
	between		6.72	0.01	24.17
	within		0.94	1.84	9.22
quarter	overall	11.74	4.65	3	19
	between		1.37	10.00	14.5
	within		4.48	3.74	19.74
offbsA	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	2.10
	within		1.69	-11.89	7.77

Table A2: Pair-wise Correlations

	ratebp	costbp. L1	delqrate .LD	cclimits A	branch	avgsal	capitalr	marksh are.L1	quarter	offbsA	netprofit A
ratebp	1										
costbp. L1	0.75*	1									
delqrate .LD	-0.04	-0.08	1								
cclimits A	0.23*	-0.07	0.03	1							
branch	-0.14*	0.08	0	-0.15*	1						
avgsal	-0.26*	-0.50*	-0.01	0.41*	-0.20*	1					
capitalr	0.09*	-0.04	-0.09*	0.33*	-0.11*	0.31*	1				
markets hare.L1	0.13*	0.10*	-0.01	0.22*	0.38*	0.03	0	1			
quarter	-0.75*	-0.96*	0.09*	0.04	-0.06	0.52*	-0.01	-0.09	1		
offbsA	-0.07	-0.38	0.04	0.43*	-0.26*	0.46*	0.15*	0.07	0.38*	1	
netprofit A	0.03	0	0.36*	0.12*	0.13*	-0.20*	-0.29*	-0.03	0	0.10*	1

(\*) Indicates significance at 10% level

Table A3: Random Effects Estimation and Additional Robustness Tests

Dependent Variable: ratebp	Random Effects Model I	Fixed Effects Model V	Fixed Effects Model VI
<b>costbp.L1</b>	0.50*** (4.42)	0.42*** (3.55)	0.53*** (4.53)
<b>delqrate.LD</b>	0.09 (0.21)	0.08 (0.16)	0.00 (0.01)
<b>cclimitsA</b>	1.59*** (3.00)	1.92*** (3.54)	1.41** (2.56)
<b>branch</b>	-0.05 (-0.92)	0.41** (2.32)	0.36** (2.40)
<b>avgsal</b>	9.67** (2.55)	14.47*** (2.83)	15.30*** (3.33)
<b>capitalr</b>	2.59** (2.55)		
<b>marketshare.L1</b>	3.11* (1.74)	4.22 (1.32)	8.76*** (2.94)
<b>quarter</b>	-13.27*** (-4.54)	-17.04*** (-5.08)	-15.83*** (-4.94)
<b>fixedassetsA</b>		3.64*** (2.91)	
<b>overheadA</b>			8.61*** (3.27)
<b>constant</b>	518.89*** (8.34)	414.74*** (5.81)	372.38*** (5.67)
<b>Number of obs.</b>	328	328	302
<b>R-squared</b>	0.6387	0.8411	0.8420
<b>Hausman Chi<sup>2</sup>(8)</b>	99.44		
<b>P Value of Chi<sup>2</sup>(8)</b>	(0.00)		

Notes: 1. (\*\*\*) , (\*\*) and (\*) indicate significance at 1%, 5% and 10% levels, respectively.

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

3. Credit card interest rates and the cost of funds are expressed as basis points.

4. Model VI is estimated for the period between 2002q4 and 2006q2 due to data limitation for overhead expenses. Therefore the number of observations drops to 302.

5. Hausman test tests the null hypothesis that the difference in coefficients of fixed effects and random effects estimations of the benchmark specification is not systematic.

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