

Non-Price Competition in Credit Card Markets: Evidence from an Emerging Economy

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 benefits are either direct benefits that depend on credit card usage or indirect 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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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 cards 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 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 adopted 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. We divide non-price benefits offered to credit card customers into two groups: (i) direct benefits that depend on credit card usage, and (ii) indirect benefits arising from the quality of general services and characteristics of the issuer bank. Direct 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 the other services.

An empirical model is developed to examine the relationship between credit card interest rates and direct and indirect measures of non-price benefits to credit card customers. We benefit from the switching cost and bank pricing models of the existing literature. Especially, 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. We use the number of bank branches, capital ratio, and average salaries to account for the indirect non-price benefits of credit cards, which are the quality and characteristics of general banking services. Market shares of the issuers are employed to proxy the direct non-price benefits of credit cards. We also control for the costs of default and liquidity risks of credit card operations. We use a 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 percent¹.

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 cards², 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 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 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.

¹ 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).

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

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. Competition on these features, however, is not fierce in general.

The Turkish credit card market is highly concentrated. The market share of the six largest issuers³ is 87 percent in total outstanding balances and 80 percent in 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

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

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

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 one of the major sources of switching costs.

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. In a dynamic model, 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 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 Neuberger and Zimmerman (1990) also empirically analyze bank pricing behavior. Neuberger 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 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 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 market conditions, (ii) variables related to the general characteristics of the issuer bank measuring indirect benefits, and (iii) variables related to credit card services measuring direct benefits.

We proxy the market conditions 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.

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 Neuberger 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 two measures as proxies of the cost of services: average salaries and overhead expenses per dollar of assets. The average salary variable is included both by Berger and Hannan (1989) and Neuberger and Zimmerman (1990), while the overhead expenses variable is used by Neuberger 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 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 direct non-price aspects of the credit cards such as cash rebates, 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.

Finally, as control variables, we include two types of cost measures for credit card issuers: costs arising from default risk and liquidity risk. We proxy the cost of default risk 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 behaviour 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.

4. The Empirical Model and Data

The benchmark model estimated in our regressions is:

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

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 estimations⁴.

⁴ Credit card interest rates and the cost of funds are expressed as basis points, which are the average monthly rates for each quarter.

The dependent variable in the empirical model is the credit card interest rates of issuers (*rate*).⁵ The explanatory variables in the model are the opportunity cost of funds (*cost*), the market shares of issuers in the credit card market (*marketshare*), credit card delinquency rates (*delqrate*), the number of bank branches (*branch*), owners' equity as a ratio of total assets (*capitalr*), average quarterly cost per employee (*avgsal*), overhead expenses as a ratio of total assets (*overheadA*), and credit card limits as a ratio of total assets (*cclimitsA*). We also include a trend dummy (*quarter*) and cross section dummies in the regressions.

We use 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 a proxy for the market shares of the issuers. Average salary is calculated by dividing the total quarterly personnel expenses to the average number of employees in that quarter. Credit card delinquency rate is the ratio of the average quarterly delinquent loans to the average quarterly outstanding credit card balances. 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 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

⁵ 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.

this correlation, we perform the Hausman test and the results provide support for using fixed effects regressions.⁶

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 dummy. 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 the delinquency rate are significant at 5% level with the expected signs. The highly significant and negative coefficient of the trend dummy 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.

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

⁶ See Table A.3 in the Appendix.

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
costbp.L1	0.48*** (4.16)	0.49*** (4.31)	0.49*** (4.26)	0.49*** (4.36)
Branch	0.38** (2.22)	0.36** (2.13)	0.37** (2.19)	0.36** (2.11)
Capitalr	3.16*** (3.35)	3.10*** (3.36)	3.29*** (3.54)	3.21*** (3.47)
Avgсал	15.55*** (3.13)	16.17*** (3.46)	15.68*** (3.16)	16.22*** (3.46)
Quarter	-16.20*** (-5.00)	-16.43*** (-5.03)	-16.05*** (-4.97)	-16.28*** (-4.98)
marketshare.L1	6.24** (2.04)	6.45** (2.11)	6.22** (2.03)	6.41** (2.09)
cclimitsA	1.53*** (2.75)	1.55*** (2.74)	1.55*** (2.75)	1.56*** (2.75)
delqrate.LD	0.04 (0.08)	0.03 (0.06)	-0.01 (-0.01)	-0.01 (-0.01)
nonbsA		0.02 (0.46)		0.02 (0.41)
netprofitA			0.86 (0.43)	0.72 (0.36)
constant	358.19*** (5.07)	352.13*** (5.19)	352.05*** (5.04)	347.63*** (5.12)
Number of Obs.	328	328	328	328
R-squared	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.

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 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 TRY 1,000, the bank charges a 16 basis points higher credit card interest rate.

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

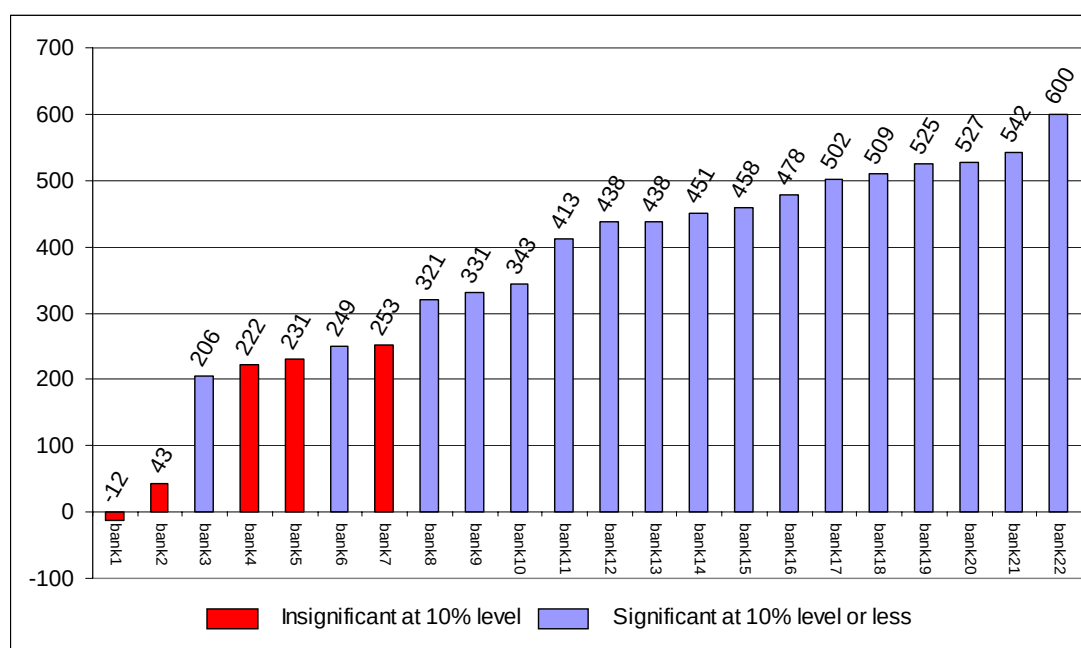
credits. Moreover, they were sending credit cards to their deposit customers without their request. Given the extremely high credit card interest margins, changes in the default risk did not constitute an essential factor in banks' pricing decisions.

Estimations also indicate that liquidity management costs have positive and significant effects on the 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.⁷ 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.

⁷ 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.

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 non-balance sheet items to total assets (*nonbsA*) in Model II. Non-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 *nonbsA* 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 *nonbsA* 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.⁸ 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.

⁸ 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 direct benefits that depend on credit card usage or indirect benefits that arise from the convenience and quality of the general services of the issuer bank. Direct 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 direct and indirect 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, capital ratio, and average salaries as proxies for the quality of general banking services. We capture the direct non-price benefits of credit cards with the market shares of the issuers. We also control for the cost of 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 helps 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
L.costbp	overall	226.85	109.92	112.50	479.90
	between		35.17	155.70	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	10.00	14.5
	within		4.48	3.74	19.74
L.marketshare	overall	5.10	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	2.10
	within		1.69	-11.89	7.77

Table A2: 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.markshare	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 A3: Random Effects Estimation and Additional Robustness Tests

Dependent Variable: ratebp	Random Effects Model I	Fixed Effects Model V	Fixed Effects Model VI
costbp.L1.	0.50*** (4.42)	0.42*** (3.55)	0.53*** (4.53)
branch	-0.05 (-0.92)	0.41** (2.32)	0.36** (2.40)
capitalr	2.59** (2.55)		
avgsal	9.67** (2.55)	14.47*** (2.83)	15.30*** (3.33)
quarter	-13.27*** (-4.54)	-17.04*** (-5.08)	-15.83*** (-4.94)
marketshare.L1.	3.11* (1.74)	4.22 (1.32)	8.76*** (2.94)
cclimitsA	1.59*** (3.00)	1.92*** (3.54)	1.41** (2.56)
delqrate.LD.	0.09 (0.21)	0.08 (0.16)	0.00 (0.01)
fixedassetsA		3.64*** (2.91)	
overheadA			8.61*** (3.27)
constant	518.89*** (8.34)	414.74*** (5.81)	372.38*** (5.67)
Number of Obs.	328	328	302
R-squared	0.6387	0.8411	0.8420
Hausman Chi2(8)	99.44		
P Value of Chi2(8)	(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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