

Consumer Preferences in the Turkish Credit Card Market: A Discrete Choice Analysis

Abstract

Using unique data from a nationwide consumer survey and a discrete choice random utility model, we identify price and nonprice factors that affect consumers' credit card choices. We observe that consumers differ in their preferences for credit cards, and that they value both bank-level and card-level nonprice benefits offered by banks. Large private banks, which are the market leaders, are avoided on the basis of prices, but are preferred on the basis of both bank-level and card-level nonprice benefits. Medium and small private banks are favored on the basis of installment conditions, and are preferred by risky revolvers. Public banks have loyal customer bases, benefit from their bank-level characteristics and are preferred on the basis of low interest rates. Participation banks are preferred on the basis low prices and are avoided on the basis of both bank-level and card-level nonprice benefits. These results suggest that nonprice competition prevails in the Turkish credit card market. We conclude that banks obtain market power through product differentiation and bundling.

Keywords: Credit Card Pricing Puzzles, Discrete Choice Analysis, Nonprice Competition, Product Differentiation, Bundling, Market Power

JEL classification G21, G28, O16

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1. Introduction

We aim to uncover consumer preferences in the Turkish credit card market. Using unique data from a nationwide consumer survey and employing a discrete choice random utility model, we try to ascertain how individuals choose their credit cards. While efforts to explain individual decision-making process have intensified, survey evidence, like experimental evidence, provides new insights into this matter.

The Turkish credit card market has experienced an enormous expansion in the last decade. With an average annual growth rate of 13%, the number of credit cards increased from 15.7 million in 2002 to 55 million in 2012, making Turkey the second country in Europe after the UK in this respect. In the same period, total transaction volume increased from 15 billion to 196 billion USD, amounting to a 29% annual growth rate.¹ Meanwhile, on grounds of high market concentration, high prices, high profitability, and high incidences of delinquency and default, the market underwent a series of regulations: the consumer protection law in 2003, interchange fee regulation in 2005, interest rate regulation in 2006, annual fee regulation in 2013, and the regulations on credit limits, installments and minimum payments in 2013 and 2014.² Given the complex nature of credit card markets and the widespread concerns about cardholders' financial literacy, further regulations are quite likely in the future. By identifying consumer preferences and underlying mechanisms that may lead to high prices, our study aims to contribute to future regulations in this market.

There is a large and growing literature on credit card pricing puzzles, one of which is the interest rate puzzle.³ Although numerous explanations have already been

¹ The Central Bank of the Republic of Turkey and Interbank Card Center.

² See Akin et al. (2013) for more information about the Turkish credit card market.

³ For an extensive review of these puzzles and the economics of credit cards in general, see Scholnik et al. (2008).

proposed as to why credit card interest rates may be “too high” and why their regulation may be warranted, there is little consensus on this issue, leaving a large space for further empirical research.

The uncollateralized nature of credit card loans that leads to higher default risk, large investments in technology that raise operating costs, and small balances that preclude a cost-effective collection process are among the intrinsic justifications for high credit card interest rates (Evans and Schmalensee, 2005). In his seminal paper, Ausubel (1991) attributes high and sticky credit card interest rates to asymmetric information and some sort of consumer irrationality. He categorizes cardholders into three groups: convenience users, who only use the payment services of credit cards; irrational but nonrisky revolvers, who do not intend to borrow on credit cards ex-ante but frequently end up doing so ex-post; and illiquid and risky revolvers, who plan to borrow on their credit cards. Only the cardholders in the last group are sensitive to interest rates. The first two groups, who do not (intend to) borrow, are not. Banks prefer the second group of cardholders. Ausubel (1991) claims that when banks are unable to observe cardholder types, they are reluctant to unilaterally lower their card rates for fear of attracting only the risky illiquid type. Calem and Mester (1995) and Calem, Gordy and Mester (2006) categorize cardholders slightly differently based on impatience, search costs, and switch costs and reach the same conclusion: When information is asymmetric, prices are sticky because if a bank lowers its interest rate, it merely attracts risky or nonprofitable customers.⁴

Akin et al. (2011) argue that asymmetric information is no longer a relevant argument for the Turkish credit card market thanks to sophisticated credit-scoring and information-sharing technologies. Using bank-level data and regressing banks’ credit

⁴ For other explanations about the credit card interest rate puzzle, see Scholnik et al. (2008).

card interest rates on their various bank-level and card-level attributes, they find that banks acquire market power through nonprice competition. They differentiate their cards by providing an array of card-level benefits such as travel miles, bonus points, rewards, installment options for payment, and travel and accident insurance. Moreover, to augment their market power, banks bundle credit card services with general banking services and thus are able to further differentiate themselves by offering bank-level benefits such as expanded branch/ATM networks, and more diversified and higher-quality banking services. For a cardholder who perceives credit cards and other banking services as a bundle, switching to another card with lower rates is very costly, as this entails switching to another bank.

In this study, we test the results of Akin et al. (2011) with individual-level data from a nationwide credit card consumer survey. Focusing on the consumer side of the market, we investigate factors that affect individuals' choice of credit card. Specifically, we intend to determine whether consumers value bank-level and card-level nonprice benefits offered by banks, and whether different types of consumers have different preferences for credit cards. The results of our analysis are of potential use to both regulators and bankers. Optimal regulation design entails the identification of underlying market failures and consumer preferences. Thus, our results may help regulators formulate effective policies that would reduce prices, protect consumers and improve welfare. On the other hand, having lost their market power after the regulations, banks have started to collect annual fees and to economize on the nonprice benefits they are distributing. Hence, discovering consumers' preferences may help them design better strategies to attract new customers and satisfy the existing ones.

Discrete choice random utility models that allow for product differentiation and consumer heterogeneity ideally serve this purpose. Our data are obtained from a credit

card consumer survey, which was conducted with 2,576 credit card users in May 2009. A discrete choice multinomial probit analysis is employed. The dependent variable is the issuer of the respondent's main card. Four types of issuing banks are used: public banks, large private banks, medium and small private banks, and participation banks. We hypothesize that consumers' choice of issuer bank will depend on their preferences for the bank-level and card-level nonprice benefits, their attitudes toward the price of credit card services, their credit card payment behaviors, their search/switch tendency, and their socioeconomic and demographic characteristics.

The findings indicate that consumers differ in their preferences, and that they value both bank-level and card-level nonprice benefits. Large private banks, which are the market leaders, are avoided on the basis of prices, but are preferred on the basis of both bank-level and card-level nonprice benefits. Convenience users and nonrisky revolvers tend to choose the credit cards of these banks. Medium and small private banks are favored on the basis of installment conditions, are preferred by risky revolvers, and benefit from word-of-mouth advertising. Public banks have loyal customer bases, benefit from their bank-level characteristics, and are preferred on the basis of low interest rates. Participation banks are preferred on the basis of low interest rates and annual fees, but they are avoided on the basis of bank-level and card-level nonprice benefits. From these results, we conclude that nonprice competition prevails in the Turkish credit card market. Banks obtain market power and can thus charge high prices through product differentiation and bundling.

The paper is organized as follows: Section 2 reviews the applications of discrete choice models to banking. Section 3 describes the data, sampling and variables. The model and the results are presented in Section 4, and Section 5 concludes.

2. Literature review

The empirical industrial organization literature offers methods for estimating structural demand models that allow for product differentiation and consumer heterogeneity. Following the discrete choice literature, consumers' choice of firms/products is modeled by the following indirect random utility function

$$(1) \quad U_{i,j} = X_{i,j}' \cdot \beta + Z_i' \cdot \gamma_j + \varepsilon_{i,j}$$

where $U_{i,j}$ is the utility of consumer i from choosing firm j , $X_{i,j}$ is the price/nonprice attributes of firm j for consumer i , Z_i is the characteristics of consumer i , (β, γ_j) are the taste parameters to be estimated, and $\varepsilon_{i,j}$ is the unobserved/unmeasured influences on utility. Consumer i chooses firm j , if $U_{i,j} > U_{i,k}, \forall k \neq j$. It has been shown that the probability that firm j will be chosen can be estimated by a multinomial logit model if $\varepsilon_{i,j}$ follows an iid extreme value distribution, and that this probability can be estimated by a multinomial probit model if $\varepsilon_{i,j}$ has a multivariate normal distribution. Since the demand model is derived from a utility function, estimation of a large number of substitution parameters across firms is avoided. Own and cross price elasticities can simply be calculated from the estimated utility parameters. Discrete choice models allow of competition and welfare analyses as well. From own price elasticities and Lerner indices, it is possible to estimate a firm's market power, and from cross price elasticities, it is possible to determine the substitutability between firms. Likewise, with the estimated utility parameters, the impact of a policy change on welfare can be assessed.

Most of the discrete choice models in banking utilize bank-level data. The dependent variable in such models is market share, which is predicted by the probability that these banks will be chosen. To determine the welfare effects of the lifting of geographic barriers in the US and the subsequent bank consolidation in the 1990s, Dick (2008) estimates a structural demand model for bank deposit services. She

finds that apart from prices, consumers respond favorably to branch staffing, geographic density and diversification, and bank age and size. She concludes that despite a rise in prices, welfare increased in most regions due to improvements in nonprice factors. Ho (2009) jointly estimates discrete choice differentiated product demand equations and pricing equations and uses the estimated conduct parameters to identify the market structure in Hong Kong. He concludes that the banking industry became more competitive and consumers were better off after the deregulation in the late 1990s. Akin et al. (2014) estimate discrete choice demand models to uncover consumer preferences in the Turkish deposit and credit markets and find that consumers prefer banks with larger networks and more efficient technologies. They also conclude that banks' market power in credit markets is much lower than in deposit markets. Using a discrete choice model, Adams et al. (2007) uncover utility parameters that affect a consumer's institution choice and measure the degree of market segmentation between banks and thrifts. They find that cross price elasticities between groups of institutions (banks and thrifts) are much lower than those within groups and thus conclude that substitutability between banks and thrifts is low.

Discrete choice models that use individual-level data are quite scarce. Using survey data, Bozcar (1978) addresses a question similar to that posed by Adams et al. (2007): Is competition between banks and finance companies limited by market segmentation on the basis of customer risk? Using a probit analysis and data on socio-economic and life-cycle characteristics of credit users, he examines whether the two institutions segment the market by serving different risk classes of borrowers. Using survey data and a multinomial probit model, Ardic and Yuzeroglu (2007) analyze individuals' choice of bank based on the types of banking services they use, their perceptions of which factors are important in banking, and their socioeconomic

characteristics. To the best of our knowledge, there is no study to date that applies discrete choice models to credit card markets.

If a discrete choice analysis is conducted with individual-level data only, it is not possible to estimate elasticities or make welfare inferences. However, if the main purpose of the study is to identify price and nonprice factors that affect demand, individual-level survey data may be more appropriate. If bank-level data is used for this purpose, endogeneity problems will complicate the analysis, since the left-hand side variable, market share, clearly affects the right-hand side variables, namely price and nonprice factors such as branching, quality, and size. With individual-level survey data, however, as the right-hand side variables consist only of consumer characteristics (preferences, attitudes, perceptions, habits, socioeconomic characteristics, etc.), which are likely to be independent of banks' actions, it is possible to isolate demand factors, temper endogeneity concerns, and elicit the important price and nonprice factors that affect consumer choices. With disaggregated individual-level data, it is also possible to explore heterogeneity in consumer preferences.

3. Data, sampling and variables

With the credit card consumer survey, we aimed at identifying consumers' credit card practices: How they choose and use their credit cards, their search and switch experiences, whether and why they have delinquency or default problems, and whether they have financial literacy and rationality issues, etc.⁵

The survey was conducted with 2,576 cardholders in May 2009. Interviewees were randomly selected from the urban adult population, for which the urban voter population was used as a proxy. The sample was selected from 26 regions of Turkey, determined by the Nomenclature of Territorial Units for Statistics (NUTS) at the

⁵ The questionnaire is available upon request.

second level. Since there was no information available at the time about the number of credit cards by region, the allocation of the survey to regions was based on the number of POS terminals and bank branches. One province was randomly selected from each region. Each selected province's main city (in some cases one or two large towns as well) was chosen for the sample. Households were selected using the clustered random sample selection method. Cluster points were neighborhoods, and cluster size was determined as ten, so a maximum of ten interviews was targeted for each neighborhood. Using voter population as weights, 250 neighborhoods were selected randomly, aiming for a total of 2,500 interviews. After the selection of neighborhoods, streets were randomly chosen in each neighborhood using street data from the Ministry of Finance. Five primary and two backup streets were selected in each neighborhood with the aim of conducting two surveys on each street. Households were randomly selected by supervisors. Since cardholders are generally working people, face-to-face interviews with those who passed two filter questions⁶ were conducted in the evenings or on weekends. The response rate among those who passed the filter questions was 65%. Later, 30% of the interviews were checked for reliability by a follow-up phone call, and in some cases through door checks.

The dependent variable is the type of the issuer bank of the respondent's main card. There were 25 issuing banks in Turkey in 2009. Based on their share of the credit card market, their ownership structures, and their operations, we categorized the banks into four groups: public banks, large private banks, medium and small private banks, and participation banks.

The public banks in Turkey, namely Ziraat Bankası, Vakıfbank, and Halk Bankası, are state-owned banks that were originally established to provide financial

⁶ Do you have a credit card? Do you make the decisions about the choice of credit cards and the payment of credit card bills yourself?

services to farmers, tradesmen and craftsmen. In general, these banks are not as responsive to market conditions as private banks and are not particularly active in the credit card market. They are not only-for-profit organizations. Due to welfare concerns, they may set lower prices than private banks and may have economically nonviable branches in remote and small places. They also dispense public sector employee salaries and retiree pensions.

Private banks adopted modern banking practices earlier than public banks, placed more emphasis on retail banking, and invested heavily in information technology. They are divided into two groups based on market share. The large private banks each have a market share of above 10% in the credit card market. Table 1 illustrates the market share of the top ten banks. Ziraat Bankası and the large private banks have the largest branch/ATM networks and are also the market leaders in the deposit and credit markets. The remaining banks (other than participation banks) are medium and small private banks.⁷

Table 1. Market share of the top ten banks based on the number of credit cards

Bank	Share (%) December 2008	Bank	Share (%) December 2008
Yapı Kredi Bankası	17.9	HSBC	7.0
Garanti Bankası	17.3	Ziraat Bankası	5.3
İş Bankası	11.5	Vakıfbank	4.7
Akbank	10.4	Halkbank	3.5
Finansbank	7.8	Denizbank	3.0

Source: *Banking Regulation and Supervision Agency*

The fourth group is participation banks: Bank Asya, Albaraka Türk, Kuveyt Türk and Türkiye Finans. They have interest-free operations and supply differentiated products, primarily to customers with religious sensibilities. These banks are treated separately from the other three groups due to their different modes of operation.

⁷ Large private banks are Yapı Kredi Bankası, Garanti Bankası, İş Bankası, and Akbank. Medium and small private banks are Finansbank, HSBC, Denizbank, AnadoluBank, Citibank, Eurobank Tekfen, Fortisbank, ING, Millennium Bank, Şekerbank, TEB, Tekstilbank, Turkish Bank, and Turkland Bank.

Some respondents in the sample held more than one card, but we concentrated on what they considered to be their main card. In our sample, 70.02% of respondents chose a large private bank as their main card issuer, while 18.19% preferred medium or small private banks. The share of public banks and participation banks was 9.62% and 2.16%, respectively.

Table 2. Four categories of issuers based on cardholders' main card

Dependent Variable Category	Number of Cardholders	Share (%)
Public Banks	218	9.62
Large Private Banks	1,586	70.02
Medium and Small Private Banks	412	18.19
Participation Banks	49	2.16
Total	2,265	100.00

We aim to determine price and nonprice factors that affect consumer credit card choice. For this purpose, respondents were directly asked to rate *how influential the following 18 factors were in their decision to choose their main card*. They rated each factor on a five-level Likert scale, with 1 being the least influential and 5 the most influential. In Table 3, these factors are grouped in seven categories: bank-level benefits, card-level benefits, card-level advanced benefits, price, influence, loyalty and advertising.

Table 3. Price and nonprice factors affecting credit card choice

Groups	Factors
Bank-level benefits	Widespread branch/ATM network Card of the patronized bank
Card-level benefits	Installment conditions High credit limit More bonus points/rewards/traveler miles Prestigious card Promotion for oil/gas purchases More extensive discount campaigns
Card-level advanced benefits	Extra benefits: insurance, valet parking, etc. Virtual card services Internet and telephone service quality
Price	Low interest rate No or low annual fee
Loyalty	First card of the cardholder Affinity card
Influence	Recommendation from acquaintances Family patronage
Advertising	Informative and effective advertising

Table 4 summarizes and sorts participants' responses given to this question. These responses reflect participants' preferences, that is, the value they attach to these price and nonprice factors. As expected, when choosing a credit card, consumers attach the highest value to bank-level benefits. This finding is prima facie evidence for the bundling hypothesis of Akin et al. (2011). That is, most people perceive credit card services and other banking services as a bundle. Hence, they first choose their bank and/or use the credit card of the bank they already patronize. The testable implication of this hypothesis is that people who value bank-level benefits are likely to choose the credit card of a large private bank or a public bank, as these have a comparative advantage in terms of their bank-level services.

Table 4. Summary statistics of consumer preferences for price and nonprice factors

Characteristic	No. Obs.	Range	Mean	Std. Dev.
Widespread branch/ATM network	2,265	1, 2, 3, 4, 5	3.21	1.38
Card of the patronized bank	2,265	1, 2, 3, 4, 5	3.10	1.43
Installment conditions	2,265	1, 2, 3, 4, 5	3.06	1.40
More extensive discount campaigns	2,265	1, 2, 3, 4, 5	2.87	1.41
Prestigious card	2,265	1, 2, 3, 4, 5	2.63	1.43
More bonus/money point/traveler miles	2,265	1, 2, 3, 4, 5	2.62	1.42
High credit limit	2,265	1, 2, 3, 4, 5	2.52	1.43
First card of the cardholder	2,265	1, 2, 3, 4, 5	2.50	1.49
No or low annual fee	2,265	1, 2, 3, 4, 5	2.36	1.43
Low interest rates	2,265	1, 2, 3, 4, 5	2.32	1.37
Promotion for oil/gas purchases	2,265	1, 2, 3, 4, 5	2.23	1.39
Informative and effective advertising	2,265	1, 2, 3, 4, 5	2.19	1.34
Internet and telephone service quality	2,265	1, 2, 3, 4, 5	2.13	1.36
Recommendation from acquaintances	2,265	1, 2, 3, 4, 5	2.02	1.31
Extra benefits like insurance, promotion, valet parking etc.	2,265	1, 2, 3, 4, 5	1.84	1.22
Family patronage	2,265	1, 2, 3, 4, 5	1.81	1.25
Virtual Card Services	2,265	1, 2, 3, 4, 5	1.69	1.15
Affinity card	2,265	1, 2, 3, 4, 5	1.67	1.15

Card-level nonprice benefits such as installments, discounts, prestige, bonus points, rewards, and travel miles are revealed to be the second most influential group of factors. On the other hand, despite prevalent complaints about prices, most consumers do not seem to pay much attention to them when choosing a credit card:

Annual fees and interest rates rank only 9th and 10th out of the 18 factors. The fact that consumers prioritize nonprice benefits rather than prices suggests that banks have managed to establish nonprice competition in the credit card market and have acquired market power through product differentiation. The testable implication of this hypothesis is that people who value card-level nonprice benefits are likely to choose the credit card of a large private bank, because large private banks have the largest POS terminal networks and cardholders can enjoy these benefits only if their transactions are processed through a POS terminal of their issuer bank.

We do not expect the causality to run the other way round in our model. Recall that respondents were asked to state how much they cared the price and nonprice factor in their decision to choose their main card. These personal preferences are likely to be independent of banks' actions. We expect that cardholders who value bank-level and/or card-level nonprice benefits are likely to choose large private banks as explained above. Converse is unlikely, as it is not plausible to expect that a cardholder, just to justify that he is the patron of a large private bank, will state that he values widespread branch/ATM network or bonuses/rewards/miles. The same argument applies to all factors in Table 4. Hence, we can conclude that the direction of causation is from preferences to choices.

It is interesting to know whether credit card payment behaviors are also likely to affect consumers' credit card choice. Similar to Ausubel (1991) and Calem, Gordy and Mester (2006), we categorize cardholders based on their credit card payment behaviors. Credit scoring systems in Turkey also use credit card payment behaviors to identify consumer risk profiles. We assume that those profiles do not change significantly over time. Our survey provides information on cardholders' behaviors in the 12 months preceding the interview. Accordingly, we categorize the cardholders

into four groups: Convenience users, who never borrow on their credit cards and always pay their balance in full and on time; nonrisky revolvers, who borrow on their cards but who always pay at least the minimum amount on their bills so that they never experience delinquency or default problems; delinquent revolvers, who have failed to pay the minimum amount on their bills at least once in the previous 12 months (this does not include those who stated “I missed the payment due date” as the sole reason for this failure); and defaulted revolvers, who failed to pay the minimum amount in two consecutive months and hence had collection procedures initiated on them by banks.⁸ Table 5 shows that 69% of the respondents are categorized as convenience users, 9% as nonrisky revolvers, 20% as delinquent revolvers and 5% as defaulted revolvers.

In addition to the above cardholder types, we include two variables that are related to customers’ search and/or switch tendency: new customer and change card. If a customer obtained his credit card from a bank where he already had an account, he is considered an existing customer. However, if the individual’s first contact with a bank was through the acquisition of the card, he is considered a new customer. “Change card” indicates whether the respondent has ever changed her main card. We use both these variables as a proxy for low search/switch costs. Such cardholders are expected to hold the credit cards of issuers that offer more favorable terms. As Table 5 shows, 43% of the respondents are new customers and 15% previously switched cards.⁹

⁸ To determine the default category, answers to two questions “Have you ever gone through a collection process initiated by banks?” and “If yes, in which year?” are used. It is not possible to determine exactly the ones who defaulted in the previous 12 months. Since the survey was conducted in May 2009, to be consistent with the other groups, those who defaulted in 2008 and 2009 are included in this group.

⁹ The low incidence of changing main card suggests that switching costs are high. Interviewees are asked about the factors that make switching to another card difficult. “Not wanting to change my bank” is found to be the most important factor. Additionally, those who have changed their main card are asked about the main reason for changing. The most common answer, marked by 55% of the respondents, is “Because I changed my bank.” These findings support the bundling hypothesis as well.

Table 5. Summary statistics of credit card payment behavior and search/switch tendency

Variable	Range	Mean	Std. Dev.
Convenience user	1=Yes, 0=No	0.69	0.46
Nonrisky revolver	1=Yes, 0=No	0.09	0.30
Delinquent revolver	1=Yes, 0=No	0.20	0.40
Defaulted revolver	1=Yes, 0=No	0.05	0.05
New customer	1=Yes, 0=No	0.43	0.50
Change card	1=Yes, 0=No	0.15	0.36

Standard socioeconomic and demographic control variables include occupation, education, age, income, wealth, gender, marital status, and region of residence. Except for occupation and region of residence, we have no a priori expectations about how these characteristics are likely to affect consumers' credit card choices. We expect that public sector employees and retirees who receive their salaries and pensions from public banks are more likely to hold a credit card of a public bank. Craftsmen, tradesmen and farmers are also likely to hold credit cards of public banks, as special services are extended to them. Private banks are largely present in the economically more developed coastal regions, namely the Marmara, Aegean and Mediterranean regions. Hence, we expect that residing in these regions will increase the probability of holding a credit card of a private bank. Public banks, on the other hand, have larger networks in the economically less developed regions, in line with their policy of being present in almost every town. We therefore expect that residing in the Eastern Anatolian Region will increase the likelihood of holding a credit card of a public bank. Summary statistics of these characteristics are given in Table 6.¹⁰

Table 6. Summary statistics of demographic and socioeconomic variables

Variable	Range	Mean	Std. Dev.
Private sector	1=Yes, 0=No	0.39	0.49
Public sector	1=Yes, 0=No	0.19	0.39
Self employed	1=Yes, 0=No	0.16	0.37
Farmer/Seasonal worker	1=Yes, 0=No	0.03	0.18
Unemployed	1=Yes, 0=No	0.03	0.18

¹⁰ Note that we have two out-of-labor-force groups: retired and unretired. The reason is that some retirees continue to work and still receive their pension.

Retired out-of-labor-force	1=Yes, 0=No	0.16	0.36
Unretired out-of-labor-force	1=Yes, 0=No	0.03	0.17
No/Primary/Middle school	1=Yes, 0=No	0.33	0.47
High school	1=Yes, 0=No	0.35	0.47
University	1=Yes, 0=No	0.31	0.46
Age	[18, 80]	37.83	11.92
Household income	[0, 34400]	2208.49	17771.99
Wealth	[0, 7507000]	58856.6	198421.8
Female	1= Female, 0= Male	6	0
Married	1=Married, 0= Not married	0.28	0.45
Divorced/Separated/Widowed	1= Divorced/Separated/Widowed, 0= Not	0.71	0.45
Single	1=Single, 0= Not single	0.03	0.19
Coast (Marmara-Aegean-Mediter.)	1=Yes, 0=No	0.26	
Black Sea	1=Yes, 0=No	0.68	0.47
Eastern Anatolia	1=Yes, 0=No	0.09	0.28
Central Anatolia	1=Yes, 0=No	0.08	0.26
		0.16	0.36

4. Model and results

Using a discrete choice random utility model and unique survey data, we identify price and nonprice factors affecting the likelihood that the credit card of a certain type of issuer is chosen. As we do not have bank-level data, the model in (1) reduces to

$$(2) \quad U_{i,j} = Z_i' \cdot \gamma_j + \varepsilon_{i,j}$$

where $U_{i,j}$ is the utility of consumer i from choosing issuer j (j =public banks, large private banks, medium and small private banks, participation banks). Z_i denotes the characteristics of consumer i and γ_j denotes the set of taste parameters to be estimated. Note that γ_j varies across choices.¹¹ Hence, consumer characteristics may affect the likelihood of choosing different types of issuers differently. For instance, age may increase the likelihood of consumers choosing a public bank and decrease the likelihood of their choosing a medium or small private bank for a credit card. $\varepsilon_{i,j}$

¹¹ For identification, γ_j should vary across choices (Greene 2008).

represents the unobserved/unmeasured influences on utility. Consumer i chooses issuer j , if $U_{i,j} > U_{i,k}, \forall k \neq j$. To avoid the problems associated with the IIA (independence of irrelevant alternatives) properties of logit models, we assume that $\varepsilon_{i,j}$ has a mean-zero multivariate normal distribution. Thus, a multinomial probit model is used to estimate the probability that issuer j will be chosen.

Although we do not have bank-level data for price and nonprice characteristics of credit cards, from consumers' preferences for these characteristics and their choice of issuer bank, we can make inferences about how banks fare on those characteristics. For instance, if a public bank cardholder states that he cares a lot about prices in his choice of credit card, we understand that he perceives that public banks charge lower prices than other banks for their credit card services. Likewise, if a cardholder of a large private bank states that he highly values the widespread branch network of the issuer, we understand that large private banks are perceived to have larger branch networks than other banks.

Since the nonlinearity of discrete choice models makes it difficult to interpret the regression coefficients, in Table 7 we present marginal effects, which indicate the impact of an infinitesimal increase in an explanatory variable on the probability that a certain issuer type will be chosen. Marginal effects are calculated at the sample averages for continuous variables and at 0 for dummy variables.

Bank-level nonprice characteristics, which are the most important factors for the majority of cardholders (Table 4), are also significant in the multinomial probit analysis. If the importance of the branch/ATM network of the issuer increases by one unit for an average consumer, the probability that he will choose a large private bank's credit card increases by 3.9%. More generally, we can say that consumers who value widespread networks are more likely to choose a credit card of a large private bank,

and they are less likely to choose a credit card of a medium or small private bank, public bank or participation banks. Lending credence to the bundling hypothesis, credit card customers of large private banks seem to be enticed by their banks' general banking services. Although public banks also have large branch/ATM networks, this variable seems to reduce their appeal. Since a significant number of the branches and ATMs of public banks are located in towns where economic activity is not very high, cardholders probably do not perceive public banks as having networks as large as their private counterparts.

Table 7. Marginal effects of preferences for price and nonprice factors on the probability of choosing an issuer (computed at sample averages for continuous variables, at 0 for dummy variables).

	Public Banks	Large Private Banks	Medium and Small Private Banks	Participation Banks
Variable	Mrg Effect	Mrg Effect	Mrg Effect	Mrg Effect
Widespread branch/ATM network	-0.009* (-1.89)	0.039*** (4.28)	-0.026*** (-3.16)	-0.004** (-2.18)
Card of the patronized bank	0.013*** (3.05)	0.006 (0.78)	-0.018*** (-2.69)	-0.001 (-0.55)
Installment conditions	-0.004 (-0.65)	-0.017* (-1.80)	0.021** (2.41)	0.000 (0.03)
High credit limit	-0.009* (-1.69)	0.004 (0.43)	0.006 (0.72)	-0.001 (-0.46)
More bonus/rewards/miles	-0.008 (-1.60)	0.052*** (5.47)	-0.039*** (-4.57)	-0.004** (-2.33)
Prestigious card	-0.007 (-1.46)	0.023*** (2.65)	-0.017** (-2.15)	0.001 (0.62)
Promotion for oil/gas purchases	0.009* (1.85)	-0.016* (-1.75)	0.004 (0.45)	0.003 (1.59)
More extensive discount campaigns	-0.006 (-1.08)	0.008 (0.79)	0.001 (0.17)	-0.003* (-1.78)
Low interest rate	0.016*** (3.02)	-0.028*** (-2.91)	0.007 (0.78)	0.006*** (3.17)
No or low annual fee	0.007 (1.53)	-0.020*** (-2.31)	0.009 (1.16)	0.004** (2.49)
First card of the cardholder	0.006 (1.42)	-0.002 (-0.30)	-0.003 (-0.47)	-0.001 (-0.37)
Affinity card	0.013*** (2.27)	-0.006 (-0.50)	-0.007 (-0.66)	-0.001 (-0.37)
Recommendation from acquaintances	-0.009* (-1.67)	-0.007 (-0.78)	0.015* (1.79)	0.002 (1.06)
Family patronage	-0.002 (-0.43)	0.021** (2.08)	-0.017* (-1.84)	-0.002 (-0.93)
Benefits like insurance, valet parking	0.005 (0.77)	-0.015 (-1.31)	0.011 (1.10)	-0.001 (-0.60)
Virtual card services	-0.008 (-1.25)	0.002 (0.21)	0.006 (0.55)	0.000 (0.20)
Internet and telephone service quality	0.000	0.003	-0.005	0.002

	(0.06)	(0.32)	(-0.57)	(0.94)
Informative and effective advertising	0.001	0.001	-0.001	-0.001
	(0.14)	(0.15)	(-0.09)	(-0.84)

2,265 observations, t-statistics are in parentheses. *, ** and *** denote significance levels at 10%, 5% and 1%, respectively.

Another piece of evidence for bundling comes from public banks, which have a high market share in deposit and credit markets. Cardholders who declare that they prefer to use the credit card of the bank they patronize are more likely to hold a credit card of a public bank. That is, the patrons of public banks are more likely than the patrons of other banks to view credit card services and general banking services as a bundle. Or equivalently, given that public banks generally have well-established customer bases that consist mostly of civil servants and elderly/retired people, their patrons are likely to be more loyal/captive than patrons of other banks. The negative and significant marginal effect of this variable on medium and small private banks, on the other hand, suggests that cardholders of these banks are more likely to patronize other banks. That is, such consumers patronize other banks for banking services but receive credit card services from medium and small private banks.

Among card-level nonprice benefits, bonuses/rewards/miles seem to be economically and statistically the most significant one. A one-unit increase in the importance attached to this characteristic increases the probability that a large private bank will be chosen by 5% and decreases the probability that a medium or small bank or a participation bank will be chosen by 4% and 0.5%, respectively. As explained before, cardholders are able to enjoy these benefits only if their transactions are processed through a POS terminal of their issuer bank. So, consumers who value such benefits are likely to choose the credit card of a large private bank because these banks have the largest POS terminal networks. Likewise, the comparative advantage of large private banks being able to make co-branding agreements with popular brands, department stores, and airline companies can explain why consumers who care about

the prestige of their cards are more likely to choose a credit card of a large private bank. The fact that card-level nonprice benefits affect consumers' choice of credit cards substantiates the hypothesis of nonprice competition in the Turkish credit card market: Issuers differentiate their cards through nonprice benefits and thus obtain market power.

Medium and small private banks seem to be favored on the basis of installment conditions. Among those banks, Finansbank is particularly well known for its innovative and aggressive installment promotions such as "*Taksit Atlas*" (postpone your installment payments). On the basis of high credit card limits, public banks seem to be avoided; on the basis of promotion for oil/gas purchases, large private banks seem to be avoided; and on the basis of discount campaigns, participation banks seem to be avoided.

Price factors provide important insights too. Consumers who prioritize low interest rates tend to avoid large private banks and to choose public or participation banks instead. Likewise, consumers who value no or low annual fees tend to avoid large private banks and to favor participation banks instead. Public banks generally charge relatively lower prices than private banks. In line with religious principles, participation banks do not charge interest on credit card debt, and the annual fees they collect are much lower than those of other banks. Price factors are found not to be significant for medium and small private banks. It seems that their prices are perceived to be neither as high as those of large private banks nor as low as those of public and participations banks. Large private banks seem to lose market share on the basis of interest rates and annual fees. However, given that they are the market leaders, they

seem to compensate for those losses by market share gained through bank-level and card-level nonprice benefits.¹²

These results indicate that banks have managed to convert price competition into nonprice competition in the Turkish credit card market and that they have acquired market power through product differentiation and bundling. The results of Akin et al. (2011) are confirmed by our individual-level data as well. Our results provide an alternative explanation as to why credit card interest rates can be much higher than interest rates for other types of credit. Credit cards are highly differentiated products, and cardholders value their differentiated characteristics, whereas other types of credit such as mortgage, vehicle, and consumption loans are relatively homogeneous products, for which price competition is more likely to prevail.¹³ Banks can exercise market power especially over those consumers who perceive credit cards and general banking services as a bundle, because switching to another credit card with more favorable conditions amounts to switching to another bank for them.

As for the other variables, family patronage positively affects large private banks and negatively affects medium and small private banks; recommendations from acquaintances positively affect medium and small private banks and negatively affect public banks; affinity cards positively affect public banks. As influential family members are generally parents, and as large private banks are generally older than their medium and small competitors, it is more likely that the cards used by parents are those issued by large private banks. In contrast, acquaintance recommendations are usually

¹² Large private banks used to charge higher interest rates than other banks before the interest rate regulation in 2006, after which all interest rates, with a few exceptions, converged to the cap imposed by the Central Bank. However, about 70% of the respondents stated that they have acquired their cards before the regulation.

¹³ Akin et al. (2011 and 2014) document that in mortgage, vehicle, and consumption loan markets competition was quite high, demand was elastic, and interest rates closely followed the cost of funds, whereas in the credit card market interest rates remained persistently high independent of the cost of funds before the regulation in 2006.

word-of-mouth and are based on recent experiences. For this reason, they are more likely to affect medium and small private banks since those banks' cards have been in the market for a relatively short time. Those who declared that the recommendation from an acquaintance was influential are less likely to have a credit card of a public bank, because the majority of public bank patrons, state employees and retirees, generally patronize their banks not because of such recommendations but because they have to. Card-level advanced benefits are found not to be influential, probably because they are enjoyed by a small, specific segment of customers. A more surprising empirical result is the insignificance of advertising in the selection process. Banks spend substantial amounts on advertising to make themselves visible to customers, to convey their positioning strategy, and to explain their promotions and offerings, all of which are found to be influential in credit card choice, yet individuals indicate that they are not affected by the advertisements. It is likely that it is the features presented in the advertisements rather than the advertising itself that impress consumers.

The marginal effects of cardholder type and search/switch tendency on probabilities are presented in Table 8. Convenience users are omitted in the regression, so the marginal effects of other types should be interpreted with respect to this group. The striking result is that compared to convenience users, risky revolvers (delinquent and defaulted revolvers) are less likely to choose large private banks and more likely to choose medium and small private banks. More specifically, compared to a convenience user, a delinquent revolver is 4.4% less likely to choose the credit card of a large private bank, and a defaulted revolver is 12% less likely to do so; these delinquent and defaulted revolvers are more likely to choose the credit card of a medium or a small private bank (delinquent ones 5.7% and defaulted ones 9.1% more

likely). Defaulted revolvers are also less likely to choose a participation bank’s card. Consumer type does not predict the selection of public banks.

We conclude that the proportion of convenience users and nonrisky revolvers is higher in large private banks than in other types of bank. The opposite applies to medium and small private banks, where the proportion of delinquent and defaulted revolvers is higher than in other banks. It seems that large private banks are more successful than other banks at picking up “desirable” types of cardholders. On the other hand, medium and small private banks, in an attempt to gain market share and/or increase their interest revenues, seem to target or willingly accept risky revolvers—types that are (likely to be) rejected by other banks—either by offering more favorable terms or by applying more lenient standards.¹⁴

Table 8. Marginal effects of types and search/switch tendency on the probability of choosing an issuer (computed at sample averages for continuous variables, at 0 for dummy variables)

	Public Banks	Large Private Banks	Medium and Small Private Banks	Participation Banks
Variable	Mrg Effect	Mrg Effect	Mrg Effect	Mrg Effect
Nonrisky revolver	0.004 (0.22)	-0.006 (-0.19)	-0.004 (-0.16)	0.006 (0.90)
Delinquent revolver	-0.007 (-0.56)	-0.044* (-1.77)	0.057** (2.47)	-0.005 (-1.45)
Defaulted revolver	0.036 (1.22)	-0.120** (-2.57)	0.091** (2.11)	-0.007* (-1.88)
New customer	-0.067*** (-6.11)	-0.050** (-2.43)	0.120*** (6.53)	-0.003 (-1.04)
Change card	-0.024* (-1.89)	-0.036 (-1.28)	0.050* (1.92)	0.009 (1.31)

2,265 observations, t-statistics are in parentheses. *, ** and *** denote significance levels at 10%, 5% and 1%, respectively.

The new customer variable shows that using the credit card of a bank other than the bank one patronizes decreases the probability that a credit card of a public bank or a large private bank will be chosen by 6.7% and 5%, respectively, and it increases the probability that a credit card of a medium or small bank will be chosen

¹⁴ This outcome may suggest that adverse selection argument of Ausubel (1991) and Calomiris and Mester (1995) is at work here. However, as we explained earlier, we do not think that asymmetric information is a serious problem for the Turkish banking sector.

by 12%. By the same token, if a cardholder states she has previously changed her main card, she is less likely to be a cardholder of a public bank and more likely to be a cardholder of a medium or small private bank. These results suggest that those with lower search/switch costs tend to obtain credit cards from medium and small private banks, which are perceived to offer more favorable installment conditions and charge lower prices than large private banks.¹⁵

Table 9 presents the marginal effects of demographic and socioeconomic characteristics. Private sector employees, university graduates, singles and coastal region residents were omitted in the regression, so the marginal effects should be interpreted with respect to these omitted groups. As we expected, public sector employees, compared to private sector employees, are 8% more likely to choose the credit card of a public bank and 7.8% less likely to choose the credit card of a medium or small private bank. They are also less likely to choose the credit card of a participation bank. Similarly, retirees are 15.5% more likely to hold the credit card of a public bank and 16.1% less likely to hold the credit card of a large private bank. They are also less likely to hold the credit card of a participation bank. Moreover, the farmer, seasonal worker, and unretired out-of-labor-force groups are less likely to choose large private banks' credit cards. Compared to university graduates, high school graduates are more likely to hold the credit card of a public bank. Age and income seem to affect choices only slightly. Compared to singles, married consumers are more likely to choose participation banks. The effects of regional dummies are as expected. Compared to the residents of the coastal regions, residents of the Eastern and Central Anatolian regions are more likely to hold the credit cards of a public bank and less likely to hold the credit cards of a large private bank.

¹⁵ Correlations among variables and variance inflation factors clearly show that multicollinearity is not a concern in our regressions.

In sum, the choice of a public bank as a credit card issuer is positively affected by the preference for the patronized bank's credit card and lower interest rates; it is negatively affected the by the preference for a widespread branch/ATM network and high credit card limits. Patrons of other banks are unlikely to acquire or switch to the credit card of public banks. Being a public sector employee, retiree, high school graduate, and residing in Eastern or Central Anatolia are other factors that increase the appeal of public banks.

Large private banks' cards are preferred on the basis of widespread branch/ATM networks, bonuses/rewards/miles, the prestige of the card, and family patronage. They are avoided on the basis of interest rates, annual fees and installment conditions. Risky revolvers are less likely to hold the credit card of a large private bank. Being a farmer or seasonal worker, a retired/unretired person who is out of the labor force, or a resident of the Eastern or Central Anatolian regions are factors that lower the probability that a large private bank's card will be chosen.

Emphasis on bank-level and card-level nonprice benefits and family patronage lower the probability that a card from a medium or small private bank will be chosen, while emphasis on installments and recommendations increases this probability. Risky revolvers and cardholders with low search/switch costs are more likely to acquire the credit card of a medium or small private bank, while public sector employees are less likely to do so.

Participation banks' credit cards are preferred on the basis of low prices and avoided on the basis of bank-level and card-level nonprice benefits. Being a public sector employee, defaulted revolver, or retiree reduces the probability that a consumer will choose a participation bank's card, while being married increases it.

Table 9. Marginal effects of socioeconomic and demographic characteristics on the probability of choosing an issuer (computed at sample averages for continuous variables, at 0 for dummy variables).

	Public Banks	Large Private Banks	Medium and Small Private Banks	Participation Banks
Variable	Mrg Effect	Mrg Effect	Mrg Effect	Mrg Effect
Public sector	0.080*** (3.48)	0.006 (0.22)	-0.078*** (-3.63)	-0.008** (-2.44)
Self employed	0.004 (0.21)	0.000 (0.00)	-0.005 (-0.20)	0.001 (0.18)
Farmer/Seasonal worker	0.063 (1.30)	-0.104* (-1.69)	0.045 (0.87)	-0.004 (-0.73)
Unemployed	-0.012 (-0.40)	0.034 (0.68)	-0.016 (-0.38)	-0.005 (-1.04)
Retired out of labor force	0.155*** (4.06)	-0.161*** (-3.63)	0.014 (0.39)	-0.008** (-2.08)
Unretired out of labor force	0.062 (1.22)	-0.126** (-1.96)	0.071 (1.27)	-0.007 (-1.51)
No/Primary/Middle school	0.023 (1.39)	-0.031 (-1.13)	0.005 (0.22)	0.003 (0.57)
High school	0.026* (1.73)	-0.006 (-0.24)	-0.022 (-1.02)	0.002 (0.47)
Age	0.001* (1.89)	0.000 (0.38)	-0.001 (-1.25)	0.000 (-1.17)
Household income	0.000 (-1.02)	-0.000* (-1.91)	0.000*** (2.85)	0.000 (0.22)
Household income squared	0.000 (1.08)	0.000 (0.41)	0.000*** (-3.26)	0.000 (.)
Wealth	0.000 (-0.84)	0.000 (1.02)	0.000 (0.81)	0.000 (-1.60)
Female	-0.013 (-1.10)	0.004 (0.18)	0.007 (0.35)	0.002 (0.46)
Married	-0.012 (-0.74)	0.013 (0.50)	-0.009 (-0.40)	0.008** (2.23)
Divorced/Separated/Widowed	-0.001 (-0.02)	-0.052 (-0.87)	0.043 (0.77)	0.010 (0.46)
Eastern Anatolia	0.063** (2.14)	-0.095** (-2.32)	0.023 (0.65)	0.009 (0.96)
Black Sea	0.011 (0.55)	-0.035 (-1.00)	0.022 (0.71)	0.001 (0.19)
Central Anatolia	0.036** (2.02)	-0.053* (-1.88)	0.019 (0.76)	-0.002 (-0.40)

2,265 observations, t-statistics are in parentheses. *, ** and *** denote significance levels at 10%, 5% and 1%, respectively.

5. Conclusion

Using discrete choice analysis and unique survey data, we identify price and nonprice factors that affect consumers' credit card choices. Specifically, we aim to understand whether consumers value bank-level and card-level nonprice benefits offered by banks, whether they view credit card services and banking services as a

bundle, whether different types of consumers have different preferences for credit cards.

We observe that consumers differ in their preferences. Large private banks are avoided on the basis of interest rates and annual fees, but they are preferred on the basis of both bank-level and card-level nonprice benefits. Convenience users, nonrisky revolvers and residents of coastal regions are more likely to choose large private banks' cards. Medium and small private banks are favored on the basis of installment conditions. Risky revolvers and cardholders with low search/switch costs seem to prefer them for their more favorable conditions and/or more lenient standards. Public banks, which generally have loyal customers, benefit from bundling and are preferred on the basis of lower interest rates. Public sector employees, retirees, and residents of Middle and Eastern Anatolian regions are more likely to hold credit cards from these banks. Participation banks are preferred on the basis low interest rates and annual fees; they are avoided on the basis of both bank-level and card-level non-price benefits.

Our results illustrate that consumers value both bank-level and card-level nonprice benefits offered by banks, and make their choices accordingly. We conclude that product differentiation and bundling underlie banks' market power in the Turkish credit card market. Large private banks and public banks seem to reap the benefits of bundling more than the other banks. We also conclude that the highly differentiated nature of credit cards can explain why credit card interest rates can be higher than the interest rates of other types of credit.

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