CREDIT CARD DEBT: NESCIENCE OR NECESSITY?[1]

Abstract

This paper attempts to assess whether the driving factor behind the rising credit card indebtedness of consumers in Turkey is financial illiteracy. Using the results of a nationwide survey, the authors conclude that even though credit card borrowing frequency and debt amount are affected by components of financial literacy, being credit-constrained has a very pronounced impact. An exploratory analysis finds that the probability of irrational credit card borrowing is increased by being credit-constrained but not affected by financial literacy. These findings suggest that credit card debt is at least as much a result of necessity as nescience.

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1. Introduction

Rising credit card debt, delinquency and non-performing credit card loans have been a cause of concern in Turkey in recent years, as in the rest of the world. From 2005 to 2013, real credit card debt in Turkey grew by 2.5 times (*Figure 1*). The Banking Regulation and Supervision Agency (BRSA), the regulatory authority in Turkey, started implementing macroprudential measures to curb this rapid growth. From 2010 on, minimum payment levels were increased, card limits were anchored to income, limit increases were regulated, purchases on installments were restricted, and card and cash advance suspension was implemented following delinquency.

Figure 1: Personal credit card debt in Turkey (in 2009 million Turkish Liras (TRY)[4])
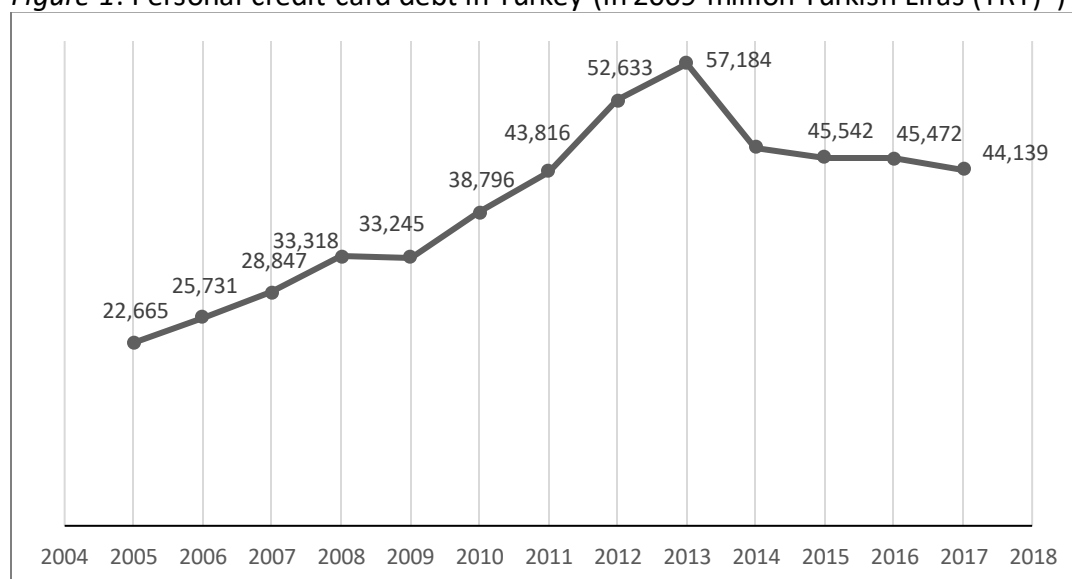
Source: Central Bank of the Republic of Turkey (2017)

Financial literacy, which is one possible reason for overborrowing on credit cards, has been used to refer to different characteristics in academic literature. In some research, it simply denotes a knowledge of financial concepts and products, while in others it also covers the numeracy needed for effective usage of this knowledge, or the application of this knowledge to financial behavior. The broader sense in which the OECD measures financial literacy includes financial behavior and financial attitude as well as financial knowledge (Atkinson and Messy 2012). While financial knowledge refers to information, financial behavior refers to practices such as money management and long-term planning, which are expected to achieve desirable financial outcomes. Financial attitude, on the other hand, comprises a person's attitude towards issues such as debt and spending versus saving for the future.

Financial literacy may have consequences on credit card usage for a variety of reasons. For one thing, the terms and conditions of credit card usage are usually complicated. Even the manner in which interest accrues on balances may be unclear to the average user, making it

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[4] 1 TRY corresponded to about 0.64 USD and 0.47 Euros at the time of the survey (May 2009) according to www.x-rates.com (last accessed on 8 January 2018.)

difficult to compare credit cards with other means of borrowing (Shen 2014). In a different vein, credit card usage may differ among cardholders who exhibit different financial behaviors. For example, a consumer who is prepared for income fluctuations because of financial practices such as having emergency funds may be less likely to resort to credit card borrowing. Likewise, one's attitude towards spending, saving and borrowing may be a factor in one's choice to revolve (i.e. borrowing on one's credit card by not paying off the full balance).

This paper attempts to determine whether the rising credit card debt in Turkey is fueled by financial illiteracy. It contributes to the literature on the effects of financial literacy on financial outcomes as well as the research on credit card indebtedness, using an emerging economy as an example. Using the nationwide Credit Card Consumer Survey conducted on 2,576 credit card holders in Turkey in 2009, we examine the determinants of having credit card debt, and also the determinants of the balance. In addition, we conduct a preliminary analysis on the determinants of irrational credit card borrowing. Apart from financial literacy and credit access variables, financial, life-cycle and demographic controls are used. Consistent with the OECD's classification, we measure financial literacy under three headings: knowledge, behavior and attitude. We find that better financial behavior and attitude decrease the probability of revolving, and that credit card debt increases with an adverse financial attitude. Being credit-constrained also turns out to have a prominent effect on credit card indebtedness. When we estimate the probability of irrational credit card borrowing, we find that financial literacy variables are not significant. Being credit-constrained and income, however, turn out to be effective factors. We conclude that revolving in an optimal or non-optimal way may result more from lack of access to cheaper forms of credit rather than from financial illiteracy.

The results are relevant for policy makers. If consumer behavior and attitude are factors that contribute to the climbing indebtedness rates, then the financial education of consumers, or further regulations on the usage of credit cards to put a check on unhealthy financial decisions, would be relevant policy tools. In the US, the Fair Credit and Charge Card Disclosure Act of 1988 and the Credit Card Accountability Responsibility and Disclosure Act (CARD) of 2009 were designed with the aim of reducing card usage errors resulting from information and numeracy problems. If being credit-constrained causes consumers to borrow too heavily on their credit cards, on the other hand, this is a natural consequence of the market mechanism allocating only appropriately priced funds to these consumers. The reduction of associated delinquency and default rates would necessitate special public measures designed for consumers in precarious financial situations. In the UK, for example, free financial counseling is available to low income consumers, and interest free "budgeting loans" and "crisis loans" can be used by those with a bad credit history.

The remainder of the paper is arranged as follows. Section 2 reviews the literature. Section 3 describes the data and variables. Section 4 explains the econometric strategy. Section 5 discusses the results, and Section 6 concludes.

2. Literature Review

Credit card indebtedness has been studied using various methods. Some studies estimate the determinants of having a positive card balance, some estimate the determinants of the

balance, and some estimate both. *Table 1* shows a list of some these studies by what they estimate, what method they use, and their data. Most of these studies use developed country data.

Table 1: Empirical research on credit card indebtedness

Dependent variable:	Authors	Year	Method	Data
Probability of having credit card debt	Hamilton & Khan	2001	Logistic regression	UK bank data
	Norvilitis et al.	2006	Multiple regression	US college students
	Bertaut, Haliassos, & Reiter	2009	Bivariate probit	US Survey of Consumer Finances (SCF)
	Allgood & Walstad	2011	Probit analysis	US National Financial Capability Study
	Wang, Lu & Malhotra	2011	OLS	China questionnaire
Credit card debt amount	Chien & DeVaney	2001	Tobit	US SCF
	Soman & Cheema	2002	OLS	US SCF
	Jiang and Dunn	2013	Pseudo panel	US Consumer Finance Monthly
	Hon & Belotti	2016	Panel study	UK issuer data
Probability of having credit card debt and its amount	Cargill & Wendel	1996	Heckman selection	US SCF
	Kim & DeVaney	2001	Heckman selection	US SCF
	Min & Kim	2003	Type II Tobit	US SCF
	Baek & Hong	2004	Double hurdle	US SCF
	Robb & Sharpe	2009	Double hurdle	US college students
Change in credit card debt	Gross & Souleles	2002	Panel study	US issuer data
	Fulford & Schuh	2015		US Consumer Credit Panel

Some empirical research examining the factors that affect consumer credit card indebtedness also evaluates the impact of financial literacy. A brief summary of the results of these articles can be seen in *Table 2*. Norvilitis et al. (2006) show that financial knowledge decreases the probability of revolving, whereas Robb and Sharpe (2009) find no such effect. Robb and Sharpe (2009) determine that higher financial knowledge increases the revolved amount. Allgood and Walstad (2011) examine how credit card usage behavior changes with respect to interaction variables between measured financial knowledge (high vs low) and self-assessed financial knowledge of subjects (high vs low). They find that people in the high-high category are 16% more likely to pay off their monthly credit card balances than the low-low group.

Table 2: Results of some empirical research on the effect of financial literacy on credit card indebtedness

	Effect	Financial knowledge/ literacy	Financial behavior related	Financial attitude related*
Probability of having credit card debt	–	Norvilitis et al. (2006) Allgood & Walstad (2011)	Cargill & Wendel (1996) Min & Kim (2003) Bertaut et al. (2009)	Cargill & Wendel (1996) Kim & DeVaney (2001) Min & Kim (2003) Baek & Hong (2004) Bertaut et al. (2009) Wang et al. (2011)
	0	Robb & Sharpe (2009)		
Quantity of credit card debt	+	Robb & Sharpe (2009)		
	–		Cargill & Wendel (1996) Min & Kim (2003)	Cargill & Wendel (1996) Kim & DeVaney (2001) Min & Kim (2003) Chien & DeVaney (2001)
	0			Baek & Hong (2004)

*These are variables which increase with a positive financial attitude

Some research tests the effects of variables that would be categorized under the OECD's financial behavior classification. Cargill and Wendel (1996) and Min and Kim (2003) find that those who search for better terms when borrowing or saving are less likely to have an outstanding balance on their cards, and if they do, the amount of the balances is less. Bertaut et al. (2009) find that those who shop around before buying something are less likely to be revolvers. They also find that those who do not save are more likely to revolve.

There is also research that examines the effects of financial attitude-related variables. Kim and DeVaney (2001), Baek and Hong (2004) and Wang et al. (2011) show that a positive approach towards debt (a negative financial attitude) increases the probability of revolving. Kim and DeVaney (2001) conclude that such an attitude increases the amount revolved as well, while Baek and Hong (2004) do not get the same result. Min and Kim's (2003) results show that those who would take out a loan to finance a vacation revolve more often and in larger amounts. Cargill and Wendel (1996), Min and Kim (2003) and Bertaut et al. (2009) conclude that those who think buying things on an installment plan is not a bad idea have a higher probability of borrowing, with Cargill and Wendel (1996) and Min and Kim (2003) predicting also a higher amount of debt for them. Chien and DeVaney (2001) show that people who look favorably on using credit for cars, luxury items, living expenses, education and vacations borrow more on their credit cards. Baek and Hong (2004) find no effect of saving for the future on credit card balances.

3. Data and Variables

The data used in this study is from the Credit Card Consumer Survey conducted in 2009 by Akin, Aysan and Yildiran on 2,576 randomly selected credit card users in Turkey. The survey was carried out in 22 province centers and 9 towns, as the infrastructure needed for credit

card usage is more widely available in urban areas. Cities were randomly selected in each statistical region. Households in each city were chosen using clustered random sample selection. An interviewee was required to have a credit card, and be the decision-maker concerning the choice of credit cards and the payment of credit card bills. If more than one person in a household satisfied these criteria, the interviewee was chosen by alphabetical name order. Hence, the respondents are not necessarily heads of household. For details, please see Akin, Aysan, Ozcelik, & Yildiran (2012). The samples used in the regressions are smaller due to missing observations in some variables.

In the first part of the paper, we estimate two facets of credit card borrowing together: the decision to borrow, and the quantity of debt. Thus, there are two dependent variables:

1) Participation: This is a binary variable showing whether the respondent has a positive credit card balance. 23.71% of the sample have positive balances.

2) Quantity: This is a continuous variable showing the amount of the balance on the interviewee's credit cards. The mean balance in the entire sample is 176.45 TRY, and the average among revolvers is 744.20 TRY (*Table A.1*).

The quantity variable is strongly skewed to the right, as would be expected. In order to mitigate the impact of extreme values, the inverse hyperbolic sine (IHS) transformation is used:

(1) $IHS(y) = \sinh^{-1} y = \log(y + (y^2 + 1)^{0.5})$

This transformation has an advantage over the Box-Cox transformations as it can handle zero values. Hon and Bellotti (2016) also use the IHS transformation of credit card balances in their estimations.

We group the independent variables under five headings: financial literacy, ability to get credit, interest rate, financial situation, life-cycle, and demographic variables. The following subsections explain these groups.

3.1   Financial literacy variable

There is no universally accepted measure of a person's financial literacy level. Many financial literacy indices commonly used in the literature (Hastings and Tejeda-Ashton 2008, Lusardi and Tufano 2009, Robb and Woodyard 2011) are based on three questions used in the 2004 Health and Retirement Study by Lusardi and Mitchell (2008). The first of these questions gives the respondent several choices and asks which one is the likely final amount in a bank after five years of accumulation given a specific interest rate. The second asks the interviewee to assess the purchasing power of savings, given a specified rate of inflation and a deposit interest rate. The third compares the riskiness of a single company's stock with that of a stock mutual fund.

This study breaks down the concept of financial literacy into three components in parallel with the OECD studies. Variables capturing the financial literacy levels of the interviewees are created under the following three headings: i) financial knowledge, ii) financial behavior, and iii) financial attitude.

i) Financial knowledge

The OECD's financial knowledge measure is constructed using the answers to questions on basic division, the value of money through time, the notions of interest and compound interest, inflation and diversification, interest calculation, and the relationship between risk and return (Atkinson and Messy 2012). In the present study, the *financial knowledge index* is based on the following four components:[5]

- The first component is a dummy variable, taking the value 1 if the respondent correctly answers the multiple-choice question "What is the quantity of bank deposits under the guarantee of the state for every depositor for each bank?"[6]

- The second component takes on integer values between 1 and 5. Higher values indicate that "not knowing how to do research" is an important factor in not researching credit cards.

- The interviewees were asked to rate the frequency of their usage of internet banking, telephone banking and ATMs on a 1 to 5 scale, with 5 showing "very frequent". The third component is the maximum of these three values.

- The fourth component is equal to the highest value among the following: a dummy variable for possession of a liquid account, a variable showing frequency of using money transfer from their bank (1-5 scale answer converted into a 0-1 scale), and a dummy variable denoting whether one makes tax or insurance payments via their bank.

Two different knowledge indices are created using these four components. The first is constructed using principal component analysis (PCA), and the second is an unweighted and normalized average of the four components (in which the negative of the second component is used).

ii) Financial behavior

Financial behavior includes an array of positive actions that are expected to be conducive to a consumer's financial well-being. The OECD's behavior index uses questions on whether a consumer makes buying decisions after thinking carefully, makes timely payments, keeps track of one's financial affairs, plans and acts on long-term goals, is responsible and keeps a budget, saves or invests, chooses financial products upon researching, and does not borrow with the aim of making ends meet (Atkinson and Messy 2012). In parallel with these, the *financial behavior index* in the current study is formed using the following four components:

- The first component is a variable on a scale of 1 to 5 that shows the effectiveness of "using credit card bills to keep track of one's expenditures" in using a credit card. Higher values indicate more effectiveness.

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[5] Even though the survey includes interviewees' knowledge about their cards interest rates and penalty interest rates, these are excluded from the index in order to avoid endogeneity. It is possible that one learns about the interest rate after incurring debt.

[6] The correct answer is "up to 50,000 TRY."

- The second is the response to the question on how much comparison shopping the interviewee did when acquiring their main credit card, measured on a scale of 1 to 5, with 1 indicating none.

- The third component is equal to 1 if the interviewee has a time deposit account or conducts investment operations at his bank, and 0 otherwise. This aims to capture whether the consumer has long-term goals and acts on them.

- The fourth component is equal to 1 if the interviewee has an automatic payment order on his bank account, and 0 otherwise. This is an indicator of making timely payments.

One index was created using PCA, and another with the unweighted average of normalized component values.

iii) Financial attitude

Financial attitude assesses a consumer's preferences about spending and saving. The OECD's financial attitude index is based on three statements: "I find it more satisfying to spend money than to save it for the long term," "I tend to live for today and let tomorrow take care of itself," and "Money is there to be spent." The respondent indicates to what degree they agree with these statements (Atkinson and Messy 2012). The *financial attitude index* in this study is constructed using the following components:

- The first component is the answer to "In your decision to use a credit card, how effective is the convenience of borrowing by not paying the whole credit card bill on a scale of 1 to 5," where 1 denotes not effective.

- The second component is the answer to "In your decision to use a credit card, how effective is the convenience of drawing cash on the card on a 1 to 5 scale," where 1 denotes not effective.

The components above assess whether a person views a credit card more as a credit tool rather than a payment method, indicating a more positive attitude towards debt, and a preference over spending versus saving.

- The third component equals 1 if an interviewee gives an affirmative answer to "Do you think you make unnecessary purchases because you have a credit card?" and 0 otherwise.

- The final component is a dummy variable that shows whether one has a pension fund or not. Saving for one's retirement is an indicator of intertemporal spending preferences.

Again, an index is computed with PCA and then another using unweighted normalized averaging. Higher values of the index show a more negative financial attitude.

3.2   "Ability to get credit" variables

A consumer's ability to get credit is approximated by two separate variables. The first one is *credit-constrained*. This dummy variable takes the value 1 if the person has had a credit card application rejected in the last five years, and/or their credit card account has been turned

over to collections at any point because of extended delinquency. It is expected that people who have had either experience would have a worse credit score and become credit-constrained. We expect credit-constrained consumers to rely more heavily on credit card debt since their ability to get cheaper credit is limited. The percentage of the sample that is credit-constrained is 13.60% (*Table A.1*).

Similar variables have been used in credit card debt research. Min and Kim (2003) define the consumers in their sample as those who experienced a credit card or limit increase application rejection in the last five years as credit-constrained. They find that these consumers have a 20-30% higher likelihood of borrowing on their credit cards. These consumers also borrow higher amounts. Baek and Hong (2004) show that having experienced credit rejection in the past increases the probability of revolving.

The second variable is the total limit on all credit cards of the respondent. The mean credit card limit of the individuals in our sample is 4,454.70 TRY. Since it is possible to borrow above the credit card limit by paying a fine, this limit does not constitute a hard upper bound on credit card debt.

Kim and DeVaney (2001) show that a higher credit limit on all of one's credit cards reduces the probability of having credit card debt. By contrast, Wang et al. (2011) show that people with higher credit card limits are more likely to revolve. Kim and DeVaney (2001), Gross and Souleles (2002), Soman and Cheema (2002) and Hon and Bellotti (2016) conclude that credit card balances increase with credit card limit. Soman and Cheema's (2002) explanation rests on the hypothesis that people are not able to predict their lifetime earnings, so they use credit card limits as an estimator. When their credit card limits increase, they increase their spending based on higher expectations of future earnings.

3.3   Interest rate

Interest rate is used as an explanatory variable but it is not expected to be important as it shows very little variation due to the credit card interest rate regulation in effect since 2007. At the time of the survey, the interest rate ceiling was 3.96%. In the sample used in the regressions, the mean interest rate of people's main cards is 3.931% with a standard deviation of 0.176% (*Table A.1*).

3.4   Financial situation

We control for the financial situation of respondents using four variables: *personal income, household expenditures, bank debt* and *informal debt*. Personal income is preferred over household income as we are examining personal credit card indebtedness.

A higher income may mean a lower need to borrow. On the other hand, a higher income brings a greater ability to borrow, and this may lead to higher debt. The evidence on the impact of income on credit card debt is mixed, probably due to these two opposing forces. Some research conclude that a higher income decreases the probability of borrowing on one's credit card (Cargill and Wendel 1996, Min and Kim 2003, Bertaut et al. 2009) while some find the opposite (Allgood and Walstad 2011) or no effect (Kim and DeVaney 2001). Wang et al. (2011) find that the effect of income on the probability of revolving is U-shaped. There is research which concludes that a higher income increases credit card debt amount (Kim and

DeVaney 2001, Baek and Hong 2004) and others which find that credit card debt decreases in income (Chien and DeVaney 2001, Min and Kim 2003). Soman and Cheema (2002) find that credit card balances increase with wages and decrease with total income.

Household expenditures is the sum of monthly expenditures for groceries, rent, utilities, telephone bills, insurance payments, health expenditures, and education. It is conjectured that if a household has high fixed monthly expenditures and hence less disposable income, its members are more likely to need to borrow on their credit card.

Bank debt includes all debt to banks except credit card debt, and *informal debt* includes loans from family, friends, employers or other sources. Periodic debt services reduce one's disposable income and may leave one more vulnerable to income and expenditure shocks, thus fueling credit card borrowing. We expect that *bank debt* is more likely to have rigid payment deadlines and amounts, exacerbating this effect. Another possible effect of the debt variables is on the ability to borrow. Those who have high levels of debt (especially to banks) may be unable to take out further non-card loans if they have reached their borrowing limits. Hence, they may resort to borrowing on their credit cards instead (so long as their limits permit).

Kim and DeVaney (2001) and Hamilton and Khan (2001) find that having a loan increases the probability of revolving. Baek and Hong (2004) find that having a home equity loan increases one's credit card debt. Robb and Sharpe (2009) find that, in their sample of students, having other debt increases both the probability of having credit card debt and the amount of this debt. They interpret this result as possible evidence that students are using credit cards because of insufficient financial resources and state that "the potential use of higher cost credit card debt to either substitute for or augment other lower cost means of credit (e.g., student loans) warrants further investigation. If this is happening, solutions would point to expanding relatively low-cost credit rather than expanding financial instruction" (p. 37). Baek and Hong (2004) find no evidence that getting loans from friends and relatives affects the amount of credit card debt.

The results of the probit analysis reject the hypothesis of no heteroscedasticity. The problem can be alleviated by changing the functional form of the debt variables using the IHS transformation. We use this transformation on all variables measured in TRY, all of which are the ones in the "ability to get credit" category.

3.5   Life-cycle variables

The life-cycle hypothesis states that individuals try to maximize their lifetime utility from consumption, and to this end, they may save or borrow at various stages during their life span. Since our subjects are not necessarily household heads, we concentrate on age, its square (to capture any possible nonlinear relationship) and marital status to capture life cycle.

When they are young and are just starting to work, people tend to consume more than they earn, smoothing out their lifetime consumption by borrowing from their future selves. In middle age, they save more and begin accumulating wealth for retirement. Some research supports the age hypothesis for the probability of having credit card debt (Cargill and Wendel 1996, Hamilton and Khan 2001, Min and Kim 2003, Bertaut et al. 2009) and for credit card

debt amount (Soman and Cheema 2002, Fulford and Schuh 2015).

Marital status is captured using four dummy variables: single, married, widowed, and divorced/separated. Min and Kim (2003) and Bertaut et al. (2009) conclude that being married increases the probability of revolving. Chien and DeVaney (2001) and Robb and Sharpe (2009) find that being married increases the amount of credit card debt whereas Min and Kim (2003) do not find such an effect. Allgood and Walstad (2011) find that divorced or separated people are 7% more likely to carry a balance on their cards. Wang et al. (2011) conclude that married people with a child older than six are more likely to revolve.

3.6 Demographic variables

Four demographic factors are controlled for in the regressions: gender, education, occupation and region of residence.

Woman is the dummy variable denoting gender. Women account for 28.22% of the sample (*Table A.1*). Min and Kim (2003) and Wang et al. (2011) conclude that men are more likely than women to revolve, while Allgood and Walstad (2011) find weak evidence for the opposite hypothesis. Soman and Cheema (2002) and Min and Kim (2003) find that men have higher credit card balances.

Education levels of individuals are captured with six dummy variables: *no schooling/left school, primary school graduate, middle school graduate, high school graduate, university graduate,* and *graduate degree holder*. Kim and DeVaney (2001), Min and Kim (2003) and Bertaut et al. (2009) show that being more educated negatively affects the probability of having credit card debt whereas Allgood and Walstad (2011) find no such effect. Baek and Hong (2004) conclude that people with a high school diploma or some college education are more likely to revolve than consumers with less than high school education. Chien and DeVaney (2001), Kim and DeVaney (2001), Soman and Cheema (2002) and Baek and Hong (2004) conclude that a higher level of education leads to a higher amount of credit card debt but Min and Kim (2003) find no effect on credit card debt amount.

Occupation types are controlled via six dummy variables: *public sector employee, private sector employee, self-employed, farmer/seasonal worker*, and *unemployed*. Bertaut et al. (2009) find that households with a self-employed head are less likely to revolve. Baek and Hong (2004) determine that employed people are more likely to revolve, though this variable does not impact the borrowing amount. Chien and DeVaney (2001) show that being in a managerial position or professional occupation increases the amount of credit card debt.

Region of residence is based on the twelve Nomenclature of Territorial Units for Statistics regions on which the survey was based. Instead of twelve, we use eleven regions, having merged two similar ones (to avoid some observations from being omitted due to perfect prediction). These are the Istanbul, Aegean, Mediterranean, Southeast, Western Anatolia, Eastern Marmara, Western Black Sea, Central Anatolia, Central Eastern and Northeastern Anatolia, Eastern Black Sea and Western Marmara regions.

4. Econometric strategy

The credit card balances of 76.29% of the sample is zero (*Table A.1*). Our sample consists only of people with credit cards, so the zeros we observe cannot be involuntary. Rather, they must be the corner solution to consumer optimization, unless they are produced by a different process. When a corner solution is in question, the Tobit model is the usual estimation method. In the Tobit model, the dependent variable is the amount of observed credit card debt:

(2) $\quad y_i = max(0, y_i^*)$

where *y** is the latent variable, which depends on a set of explanatory variables *X*:

(3) $\quad y_i^* = X_i'\beta + u_i.$

Credit card debt is bounded on the left with zero. We assume that

(4) $\quad u_i | x \sim N(0, \sigma^2)$

gives the distribution of the error term. The likelihood function can be derived as:

(5) $\quad L = \prod_{y_i=0} \left[1 - \Phi\left(\frac{x_i'\beta}{\sigma}\right) \right] \prod_{y_j>0} \left[\frac{1}{\sigma} \phi\left(\frac{y_j - X_j'\beta}{\sigma}\right) \right]$

where Φ is the cumulative distribution function and ϕ is the probability density function for the standard normal random variable. The Tobit model does not the allow participation and quantity decisions to be estimated separately. It is possible, however, that these decisions are affected in different ways by the same factors, or even by different variables. Cragg's (1971) alternative setup allows such a scenario by treating the two decisions as separate dependent variables. The borrowing decision is given by:

(6) $\quad b_i = \begin{cases} 0 & if \ Z_i'\gamma + \varepsilon_i \leq 0 \\ 1 & if \ Z_i'\gamma + \varepsilon_i > 0 \end{cases}$

where *Z* is the set of variables affecting this decision. These variables may coincide with *X*. The error terms have a standard normal distribution and are independent from u_i. The likelihood function becomes:

(7) $\quad L^* = \prod_{y_i=0} \left[1 - \Phi(Z_i'\gamma)\Phi\left(\frac{x_i'\beta}{\sigma}\right) \right] \prod_{y_j>0} \left[\Phi(Z_i'\gamma)\frac{1}{\sigma}\phi\left(\frac{y_j - X_j'\beta}{\sigma}\right) \right]$

The analyses in parts (a) and (b) of section 5 are carried out using the maximum likelihood estimators from Cragg's formulation. This formulation allows the first tier to be estimated using probit estimation, and the second tier using a truncated normal distribution.

5. Results

a) Probability of Having Credit Card Debt:

The first-tier results are presented in *Table 3*. The probability of having credit card debt is estimated using two different sets of financial literacy indices in (a-b) and (c-d). The results are similar across the specifications. We take regression (b) as our benchmark, considering all results.

Table 3: Determinants of probability of revolving

	(a) PCA financial literacy indices	(b) PCA financial literacy indices (benchmark)	(c) Averaged financial literacy indices	(d) Averaged financial literacy indices
Financial knowledge index	-0.028523 (0.031016)	-0.025989 (0.031075)	-0.075964 (0.189773)	-0.065123 (0.190012)
Financial behavior index	-0.065181** (0.031284)	-0.066452** (0.031317)	-0.558294*** (0.159044)	-0.560466*** (0.159085)
Financial attitude index	0.190860*** (0.028075)	0.191410*** (0.028077)	1.737181*** (0.166560)	1.738729*** (0.166578)
Credit-constrained	0.761847*** (0.083436)	0.711770*** (0.105459)	0.689798*** (0.084551)	0.652054*** (0.106882)
Bank debt	0.050696*** (0.007915)	0.045668*** (0.008812)	0.051148*** (0.008039)	0.046374*** (0.008973)
Bank debt×Credit-constrained		0.024642 (0.019719)		0.022179 (0.019819)
Informal debt	0.059521*** (0.010877)	0.063086*** (0.012302)	0.057917*** (0.011034)	0.062406*** (0.012518)
Informal debt×Credit-constrained		-0.012158 (0.026123)		-0.016340 (0.026178)
Household expenditures	0.096144 (0.062431)	0.099787 (0.062624)	0.104516 (0.063642)	0.108537* (0.063855)
Personal income	-0.012206 (0.029200)	0.012725 (0.029182)	0.009151 (0.029645)	0.009846 (0.029640)
Credit card interest rate	7.566512 (19.102280)	7.567827 (19.132490)	7.100311 (19.737230)	7.227440 (19.780380)
Age	0.029440 (0.019900)	0.030885 (0.019960)	0.031650 (0.020215)	0.032830 (0.020265)
Age squared	-0.000424* (0.000237)	-0.000438* (0.000238)	-0.000427* (0.000241)	-0.000438* (0.000241)
Woman	-0.084567 (0.075668)	-0.084236 (0.075696)	-0.074354 (0.076970)	-0.074372 (0.076990)
Number of observations	2286	2286	2286	2286
Log likelihood	-1073.736	-1072.8447	-1036.1465	-1035.3254
LR χ^2 [df]	356.65***[35]	358.43***[37]	431.83***[35]	433.47***[37]
Pseudo R^2	0.1424	0.1431	0.1724	0.1731

Note: Probit estimation is used (first tier of the double hurdle model). The dependent variable is a dummy taking on the value 1 if credit card balances are positive. Standard errors are shown in parentheses. All variables measured in TRY are in IHS form. Marital status, education level, occupation and region of residence are controlled for in all estimations. *, **, and *** denote 10%, 5% and 1% levels of significance, respectively.

The results show that better financial behavior and attitude decrease the probability of having credit card debt. Financial knowledge, on the other hand, does not seem to be a factor. These results present evidence that the occurrence of credit card debt can be reduced by improving consumers' financial practices and their attitude with regard to spending-saving decisions.

The credit-constrained borrow more often on their credit cards. A consumer possessing the sample mean characteristics in other variables is 24.79% more likely to borrow on their credit card if they are credit-constrained. To compare this with the effect of financial literacy, we check how much the average person's probability of revolving decreases when they are moved from the 25th to the 75th percentile in their *financial behavior index* value (more than one standard deviation). The resulting change is only 3.05%. When we do the same for *financial attitude*, going from the 25th to 75th percentile (more than one standard deviation) increases the probability of revolving by 9.74%. The effect of being credit-constrained is notably more pronounced than these.

A higher level of debt, either to banks or other sources, increases the probability of revolving. The probability of revolving for the average person with no debt is 19.15%, while this probability rises to above 30% when there is a debt of 5,000 TRY of either kind. If the consumer has 5,000 TRY of debt of each kind, the probability of revolving jumps to over 50%. Robb and Sharpe (2009) conclude that for students, higher debt leads to higher credit card debt because of the unavailability of low-cost credit. In this light, this coefficient supports the result that being credit-constrained causes credit card indebtedness.

Of the remaining variables, marital status and education controls (not reported in the table) turn out to be effective. The married turn out to be the least likely to revolve with 21.00% likelihood when evaluated at sample averages, and the single the second least likely with 26.23%. The widowed have a 31.36% probability of revolving and the divorced/separated are the most likely to have credit card debt with 36.55%.

Those with no schooling have an extremely high probability of revolving (66.50% when evaluated at sample averages), and university graduates have the smallest probability at 17.49%. Probabilities for the remaining levels of schooling vary between 23.38% and 25.51%.

b) Quantity of Credit Card Debt:

The second-tier regression results are presented in *Table 4*. Neither financial knowledge nor financial behavior has any effect on the amount of credit card debt. A negative financial attitude increases credit card debt, though this result's significance is not robust to index type. Using regression (b), the credit card balances of the average persons at the 75th and 25th percentiles (more than one standard deviation apart) of the financial attitude index differ by 54.24 TRY.

Being credit-constrained causes one's credit card balances to increase. *Figure 2* shows the predicted credit card debt levels for the credit-constrained and non-constrained average persons with different credit card limits. The credit-constrained revolve in larger amounts for any given limit. The average person with a 6,000 TRY credit card limit borrows 68.38 TRY more if they are credit-constrained than not.

Table 4: Determinants of credit card debt quantity

	(a) PCA financial literacy indices	(b) PCA financial literacy indices (benchmark)	(c) Averaged financial literacy indices	(d) Averaged financial literacy indices

Financial knowledge index	-0.002300 (0.035216)	-0.016314 (0.034770)	-0.022936 (0.210536)	-0.097908 (0.207635)
Financial behavior index	-0.030476 (0.034968)	-0.017586 (0.034482)	-0.153589 (0.172829)	-0.102140 (0.170321)
Financial attitude index	0.084034** (0.032881)	0.081864** (0.032403)	0.247412 (0.185790)	0.222399 (0.183283)
Credit-constrained	0.153001** (0.077014)	0.344322*** (0.101615)	0.153226** (0.077216)	0.349124*** (0.101798)
Total card limit	0.354261*** (0.037564)	0.342474*** (0.037001)	0.355955*** (0.037517)	0.344609*** (0.036948)
Bank debt	0.031624*** (0.008316)	0.056648*** (0.009993)	0.031795*** (0.008346)	0.057087*** (0.010040)
Bank debt×Credit-constrained		-0.070924*** (0.016581)		-0.071521*** (0.016626)
Informal debt	-0.014959 (0.009868)	-0.0273951** (0.012086)	-0.013433* (0.009888)	-0.025216** (0.012118)
Informal debt×Credit-constrained		0.031025 0.020842		0.029035 (0.020950)
Household expenditures	0.058958 (0.069432)	0.033274 (0.069154)	0.052799 (0.069588)	0.027363 (0.069341)
Personal income	0.001037 (0.033258)	-0.000704 (0.032696)	-0.004134 (0.033246)	-0.003899 (0.032683)
Credit card interest rate	38.276550* (22.303430)	38.396070* (21.914130)	39.078650* (22.406620)	39.042950* (22.015240)
Age	-0.004659 (0.021469)	-0.002362 (0.021178)	0.005150 (0.021594)	-0.003080 (0.021311)
Age squared	-0.000091 (0.000255)	-0.000078 (0.000252)	-0.000093 (0.000257)	-0.000081 (0.000253)
Woman	-0.099574 (0.088016)	-0.102083 (0.086478)	-0.099112 (0.088619)	-0.101914 (0.087072)
Number of obs.	542	542	542	542
Log likelihood	-628.15926	-618.56908	-630.43437	-620.84898
Wald χ^2 [df]	274.45*** [36]	303.86***[38]	267.62***[36]	296.77***[38]

Truncated regression estimation is used, with 0 as the lower limit. The dependent variable is the quantity of credit card debt (IHS-transformed along with all other variables measured in TRY). Standard errors are shown in parentheses. Marital status, education level, occupation and region of residence are controlled for in all estimations. *, **, and *** denote 10%, 5% and 1% levels of significance, respectively.

Figure 2: Predicted credit card balances at different total credit card limits (evaluated at sample averages) for credit-constrained and non-constrained consumers based on regression (b) in *Table 4* (in TRY)
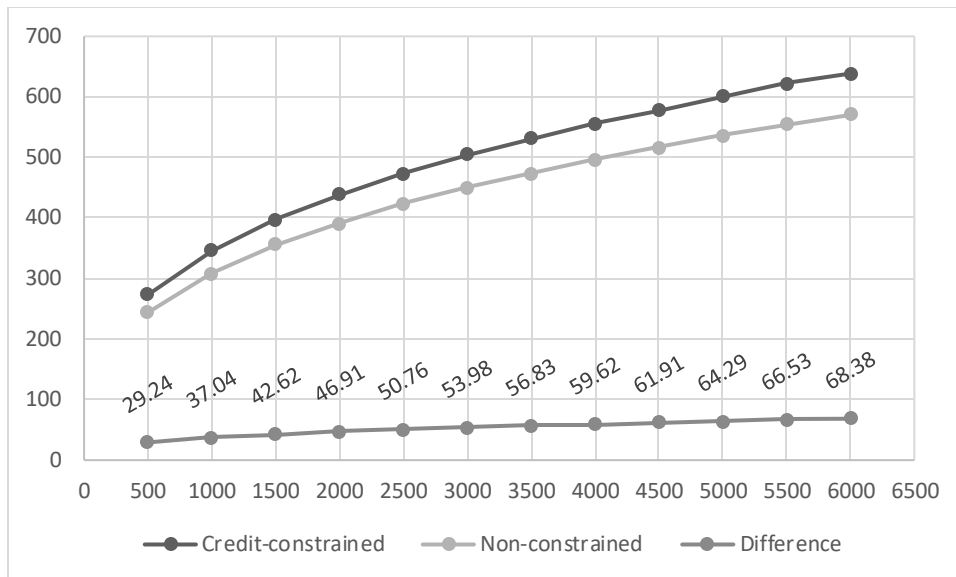
As in the participation regression, the coefficient of *bank debt* is positive and significant. The interaction of this variable with *credit-constrained* has a negative coefficient. Credit card debt decreases with bank debt (albeit very slowly) for the credit-constrained, whereas the balances of the non-constrained increase. This may be the result of credit card limits preventing the credit-constrained from revolving in higher quantities when facing bank debt.

Informal debt is significant and has a negative coefficient, unlike the result from the participation regression. Those who have informal debt borrow smaller amounts on their credit cards, suggesting that people who have other means of borrowing utilize these sources rather than borrowing heavily on their credit cards.

The coefficient of *credit card interest rate* is marginally significant and positive. The positive sign does not make sense, as higher credit card rates are not expected to bring about higher balances. In the regression sample, almost 80% of the credit cards with interest rates lower than the ceiling are issued by state banks. It is possible that state bank card owners, who are mostly retired people or state employees, tend to borrow less.

Out of the remaining variables, occupation turns out to be significant. *Figure 3* shows the predicted credit card debt levels for various occupations when the other variables are at mean values. The unemployed group borrows the most. This group is probably unable to get collateralized credit and instead uses expensive card credit. The self-employed and farmer/seasonal workers borrow more heavily, too, most likely due to the more erratic nature of their earnings. The reason that those out of the labor force are predicted to borrow a relatively small amount may be because these people have low limits or they are not the main providers in their households.

Figure 3: Predicted credit card debt balance by occupation (evaluated at sample averages) based on regression(b) in *Table 4* (in TRY)
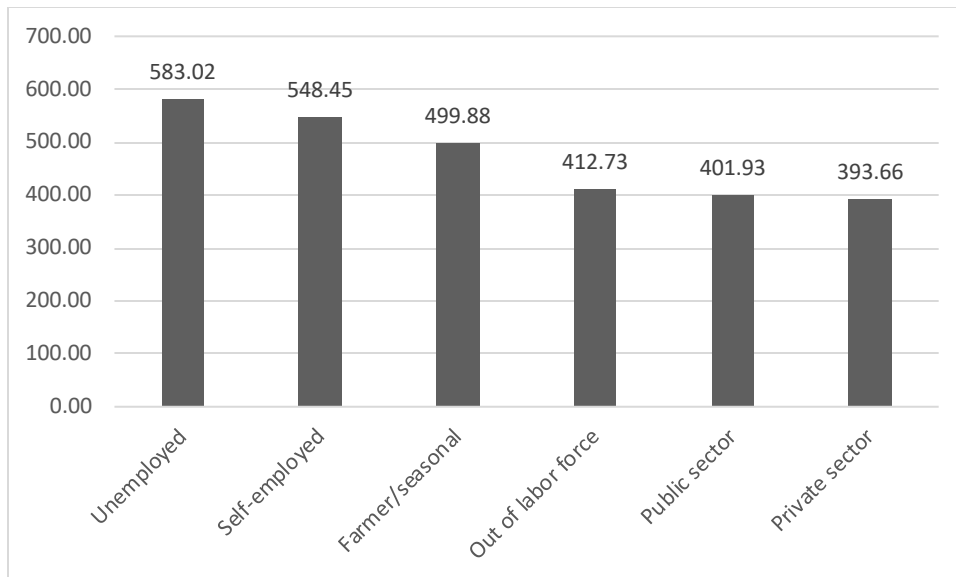
c) Probability of Having Irrational Credit Card Debt:

Even though credit cards are credit instruments as well as a payment medium, carrying a balance is considered to be a negative behavior in some of the existing research (Mottola 2013, Xiao et al. 2014, Limbu 2017). According to one view, credit cards are convenient debt instruments to compensate for small external shocks to one's budget, but they are usually not the optimal choice for borrowing large amounts for long periods, given their relatively high interest rates compared to other types of credit. A disadvantageous borrowing decision may be the result of financial illiteracy, as shown by Lusardi and De Scheresberg (2013). In this light, the analysis in the previous subsection may be seen as assessing rationality.

Consumers may be making a rational decision in utilizing the credit option of their cards, however (Shen 2014). Brito and Hartley (1995) state that even though the interest rate may be high compared to other types of loans, revolving has low transaction costs, possibly making it the better alternative to smooth consumption and meet budget shocks. Cargill and Wendel (1996) show that the gain from moving debt from a credit card to lower cost alternatives is too low to justify the search cost in most cases. Additionally, keeping liquid funds in the face of possible shocks is costly. Using credit cards as an alternative precaution avoids such a liquidity cost and this should be taken into account when considering credit card interest rates.

In this subsection, we present an exploratory examination of irrational credit card borrowing. We depict rationality by comparing roughly the monetary costs of borrowing on one's credit card and taking out a consumer loan. Making an exact comparison requires knowing the minutiae of the revolving patterns. Even though the data set does not contain such details, we can devise a rough measure to identify at least a prominent group of irrational borrowers.

If i is the interest rate on a credit card loan of amount A which will be paid back in equal installments in N months, then the amount of one credit card payment (P_{CC}) is shown with the annuity payment formula:

(8) $P_{CC} = \frac{iA}{1-(1+i)^{-N}}$

We do not know the amounts borrowed and paid back by a revolver each month; however, we know the maximum amount they borrowed during the past 12 months. We also know the number of months in which the consumer revolved by paying more than or equal to the minimum amount due (resulting in the consumer's regular interest rate, which we will call i_1) and the number of months in which the consumer borrowed by paying less than the minimum amount due (resulting in the consumer's penalty interest rate, which we will call i_2). Let us call these numbers of months n_1 and n_2, respectively. If we assume that the consumer borrowed only this maximum amount during the last twelve months and call it A, and if we assume that they paid it in $(n_1 + n_2)$ installments, we can come up with an expression for total credit card payment (TP_{CC}) by the consumer:

$$(9) \qquad TP_{CC} = (n_1 + n_2)P_{CC} = \frac{(n_1 + n_2)iA}{1-(1+i)^{-(n_1 + n_2)}}$$

We are ignoring the discounting from month to month in the last year as well as any possible annual credit card fees. In many cases, consumers were able to cancel these fees simply by making a phone call to the bank. The interest rate for each consumer will be calculated as a weighted average of n_1 and n_2:

$$(10) \qquad i = \frac{n_1}{(n_1 + n_2)}i_1 + \frac{n_2}{(n_1 + n_2)}i_2$$

We need to compare TP_{CC} to the total payments that would be made if this amount was borrowed as a consumer loan to be paid back over the same number of months (TP_{CL}):

$$(11) \qquad TP_{CL} = (n_1 + n_2)P_{CL} + c = \frac{(n_1 + n_2)rA}{1-(1+r)^{-(n_1 + n_2)}} + c$$

In the equation, P_{CL} stands for the monthly payment for a consumer loan, r is the interest rate on the consumer loan, and c is the fixed cost of taking a consumer loan. We will use $r=0.0194$ and $c=150$ TRY, as these were the most common consumer loan interest rate and fixed charge around the time of the survey.

After calculating TP_{CC} and TP_{CL} for each person, we construct an *irrationality index* which equals 1 if (9) is greater than (11), and 0 otherwise. Of the revolvers in the sample, 14.29% are categorized as irrational borrowers (*Table A.1*).

We then estimate the determinants of *irrationality index* using a probit model. *Table 5* presents the results of these estimations. We take (b) as our benchmark regression.

Table 5: Estimates of the probability of having irrational credit card debt

	(a) PCA financial literacy indices	(b) PCA financial literacy indices (benchmark)	(c) Averaged financial literacy indices	(d) Averaged financial literacy indices
Financial knowledge index	0.021384 (0.076567)	-0.040996 (0.077834)	-0.155505 (0.446304)	-0.249157 (0.452259)
Financial behavior index	-0.063589 (0.075291)	-0.047863 (0.076251)	-0.340892 (0.382565)	-0.298789 (0.387553)

|				
Financial attitude index	0.107850 (0.071122)	0.097501 (0.072268)	0.537857 (0.406956)	0.512690 (0.415991)
Credit-constrained	0.502968*** (0.157026)	0.856703*** (0.232330)	0.500785*** (0.157390)	0.860744*** (0.231943)
Total card limit	0.490932*** (0.082228)	0.485226*** (0.082982)	0.497715*** (0.082368)	0.492235*** (0.083122)
Bank debt	0.070014*** (0.016367)	0.098587*** (0.021351)	0.070352*** (0.016319)	0.100208*** (0.021366)
Bank debt×Credit-constrained		-0.072688** (0.033727)		-0.075403** (0.033546)
Informal debt	-0.015535 (0.020925)	-0.013926 (0.026658)	-0.015133 (0.020950)	-0.014918 (0.026893)
Informal debt×Credit-constrained		-0.007479 (0.043232)		-0.004415 (0.043641)
Household expenditures	0.159243 (0.156817)	0.156874 (0.159213)	0.149332 (0.155804)	0.147098 (0.158517)
Personal income	-0.164583** (0.066601)	-0.173815*** (0.067772)	-0.163838** (0.067220)	-0.173598** (0.068443)
Credit card interest rate	744.296900 (567.541400)	821.779500 (597.842500)	707.66100 (562.920800)	787.958600 (596.754800)
Age	-0.0120761 (0.044575)	-0.018719 (0.045133)	-0.010167 (0.044602)	-0.017022 (0.045200)
Age squared	-0.000033 (0.000516)	0.000090 (0.000522)	-0.000017 (0.000516)	0.000076 (0.000523)
Woman	-0.017674 (0.194321)	-0.036723 (0.196064)	-0.012827 (0.195247)	-0.029920 (0.196994)
Number of observations	676	676	676	676
Log likelihood	-196.72292	-194.31468	-196.90519	-194.30914
LR $\chi 2$[df]	158.98***[36]	163.80***[38]	158.62***[36]	163.81***[38]
Pseudo R^2	0.2878	0.2965	0.2871	0.2965

Note: Probit estimation is used. The dependent variable is the probability of having irrational credit card debt. Standard errors are shown in parentheses. All variables measured in TRY are IHS-transformed. Marital status, education level, occupation and region of residence are controlled for in all estimations. *, **, and *** denote 10%, 5% and 1% levels of significance, respectively.

The coefficients of all financial literacy variables turn out to be statistically insignificant. If some consumers are using their credit card's borrowing feature in a disadvantageous way, it appears that they are not doing so out of a lack of financial savvy. Being credit-constrained, on the other hand, turns out to be a significant determinant. For the average individual, being credit-constrained increases the probability of having irrational credit card debt by 7.52%. Necessity, rather than nescience, seems to cause irrational revolving.

The total limit on all credit cards has a positive and significant coefficient. It is possible that cardholders use their card limit as an estimate of their lifetime earnings, as Soman and Cheema (2002) state. Another possibility is that many consumers are unable to resist the

impulse to spend if they have credit. The BRSA's regulations on credit card limits seem to have been sound measures for controlling irrational borrowing in this light. When we break down the effect of credit card limit by being credit-constrained or not, we see that the probability of a credit-constrained person making an irrational credit card borrowing decision is about twice that of a non-constrained person (*Figure 4*) when they have the same credit card limit.

Figure 4: Effect of total credit card limit on the predicted probability of irrational credit card borrowing by being credit-constrained or not (evaluated at sample averages) based on regression (b) in *Table 5*
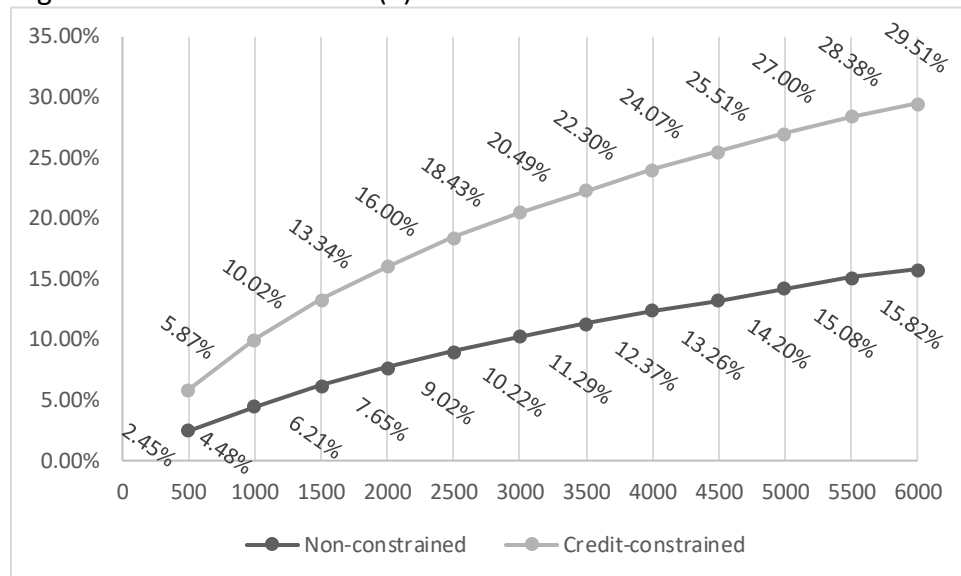

Bank debt has a positive effect on the probability of having irrational credit card debt. Similar to the quantity regression, the interaction of this variable with *credit-constrained* yields a negative coefficient. For non-constrained people, a higher bank debt increases the probability of irrational credit card borrowing in a greater degree than for credit-constrained consumers. This may, again, be the result of the credit-constrained having low credit card limits and being prevented from borrowing more because of this.

Personal income, which was not significant in the previous regressions, turns out to be an important determinant of borrowing on one's credit card in an irrational fashion. The better-off consumers behave irrationally less often. This supports the result that those who borrow irrationally are in necessity rather than being financially illiterate. *Figure 5* shows probability of irrational revolving for various income levels, starting with 666 TRY (the minimum wage at the time).

Of the demographic dummy variables, some turn out to be significant. The probability that the average married will person borrow irrationally is 6.00%. The widowed are 27.01% more likely than the married to borrow irrationally. Those who completed primary school, high school, university and graduate school have the predicted probabilities of 3.58%, 5.17%, 3.94% and 25.50%, respectively, of having irrational credit card debt.

Figure 5: Probability of having irrational credit card debt by monthly personal income (evaluated at sample averages) based on regression (b) in *Table 5*
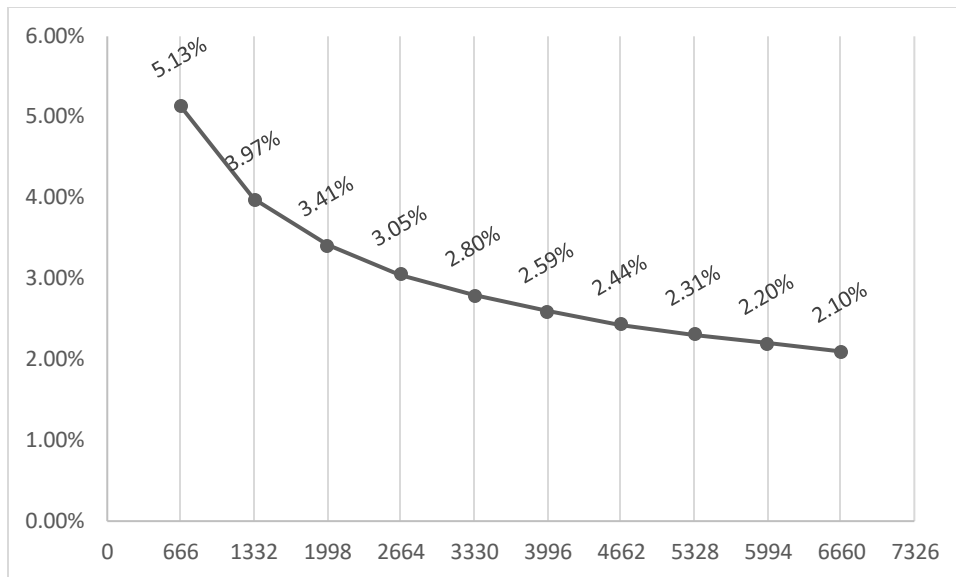
Conclusion

Using the results of a 2009 nationwide survey from Turkey, this paper explores whether financial illiteracy is the driving force behind the fast-growing credit card indebtedness in Turkey. We estimate the probability of revolving and credit card balances, and then carry out an exploratory analysis of the probability of revolving in an irrational configuration.

Better financial behavior and better financial attitude turn out to decrease the probability of revolving. Good financial practices and attitude reduce the need to borrow on one's credit card. Financial education of consumers, or further regulations on the usage of credit cards to put a check on unhealthy financial decisions, may be relevant policy tools to be employed in reducing credit card debt occurrence. The BRSA's regulations seem to have been appropriate decisions in this light. Being credit-constrained, however, has a more pronounced positive impact on the likelihood of revolving. People borrow more often on their credit cards if they do not have access to cheaper forms of credit. Having other kinds of debt also increases the probability of revolving, possibly by reducing disposable income through debt services, or through depleting other credit sources.

When we estimate credit card debt, the only significant financial literacy component is financial attitude, and this result is not very robust. Being credit-constrained turns out to be a significant factor again, increasing credit card debt amount. Having a higher bank debt increases credit card debt for the non-constrained but not the credit-constrained. This may mean that credit-constrained consumers are also constrained by their credit card limits. Having a higher informal debt decreases the amount of credit card debt, suggesting that those with other borrowing alternatives utilize these sources rather than using credit cards in an irrational way.

In an exploratory analysis of the probability of irrational credit card borrowing, none of the financial literacy variables turn out to be significant. Both being credit-constrained and having a lower income, on the other hand, increase the probability of irrational revolving. These imply that necessity, rather than nescience, is the problem leading to irrational credit card borrowing. Having bank debt also increases the probability of irrational borrowing. It is

possible to interpret this result as also suggesting that credit cards are being used because of lack of other financial resources, and making low-cost credit available may be the better alternative to financial education (Robb and Sharpe 2009) in order to reduce irrational credit card usage. The effect of bank debt is stronger for the non-constrained consumers, again suggesting that credit card limits curb irrational revolving for the credit-constrained.

Overall, the evidence does not support the idea that financial literacy is the main reason behind the high credit card debt levels in Turkey. Financial knowledge is not effective at all. Financial behavior and attitude affect the probability of revolving, but being credit-constrained seems to be a more influential factor. An adverse financial attitude increases the revolved amount, but the effect of being credit-constrained otherwise, though curbed by the credit card limits, still appears to be strong. Even though our examination of irrational card indebtedness is exploratory, the findings are consistent with the idea that high credit card indebtedness has more to do with being credit-constrained otherwise and less with financial literacy. If being credit-constrained causes some consumers to overborrow and go into arrears on their credit cards, policymakers may explore options that would make less costly loans available to low-income and credit-constrained consumers as in the UK to decrease the occurrence of delinquency and default.

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Appendix

Table A.1: Summary statistics of variables used in the regressions

	(1) All credit card holders (2286 obs.) (*Table 3*)	(2) Those with a positive balance last month (542 obs.) (*Table 4*)	(3) Those with zero balance last month (1744 obs.)	(4) Test of equality of means/ proportions in columns (2) and (3)	(5) Irrational revolvers (674 obs.) (*Table 5*)
	Mean (Standard deviation)			p-value	Mean (Std. dev.)
Having a positive credit card balance last month	0.24 (0.43)				
Credit card debt amount last month (TRY)	176.45 (772.62)	744.20 (1448.44)			
Irrationality index					0.14 (0.35)
Knowledge index (PCA)	-0.01 (1.16)	-0.06 (1.13)	0.01 (1.16)	0.2144	-0.03 (1.14)
Behavior index (PCA)	-0.02 (1.12)	-0.14 (1.04)	0.02 (1.14)	0.0053	-0.10 (1.04)
Attitude index (PCA)	0.01 (1.17)	0.30 (1.06)	-0.08 (1.19)	0.0000	0.28 (1.10)
Knowledge index (averaged)	0.54 (0.19)	0.53 (0.19)	0.54 (0.19)	0.1263	0.53 (0.19)
Behavior index (averaged)	0.32 (0.22)	0.28 (0.21)	0.34 (0.22)	0.0000	0.29 (0.21)
Attitude index (averaged)	0.55 (0.20)	0.63 (0.19)	0.52 (0.20)	0.0000	0.62 (0.19)
Credit-constrained	0.14 (0.34)	0.30 (0.46)	0.09 (0.28)	0.0000	0.26 (0.44)
Total card limit (TRY)	4454.70 (7809.87)	4802.40 (7636.62)	4346.64 (7861.95)	0.2354	4876.11 (8301.96)
Bank debt (TRY)	2532.87 (9663.94)	3438.41 (10866.43)	2251.45 (9243.84)	0.0125	3410.26 (10790.68)
Informal debt (TRY)	630.76 (3703.60)	1227.97 (4808.97)	445.16 (3265.01)	0.0000	1180.49 (4996.12)
Household expenditures (TRY)	947.61 (594.69)	985.60 (618.16)	935.81 (586.89)	0.0886	995.57 (603.16)
Personal income (TRY)	1423.36 (1368.60)	1411.68 (1194.78)	1427.00 (1418.59)	0.8200	1476.97 (1681.22)
Credit card interest rate	0.03931 (0.00176)	0.03935 (0.00158)	0.03929 (0.00181)	0.5158	0.03931 (0.00170)
Age	37.92 (11.87)	36.96 (11.00)	38.22 (12.12)	0.0303	36.91 (11.03)

Woman	0.28 (0.45)	0.24 (0.43)	0.29 (0.46)	0.0222	0.24 (0.43)
Single	0.25 (0.43)	0.26 (0.44)	0.25 (0.43)	0.5002	0.26 (0.44)
Married	0.71 (0.45)	0.69 (0.46)	0.72 (0.45)	0.1424	0.69 (0.46)
Widowed	0.03 (0.16)	0.03 (0.17)	0.02 (0.15)	0.4820	0.03 (0.16)
Divorced/separated	0.01 (0.10)	0.02 (0.14)	0.01 (0.09)	0.0104	0.02 (0.13)
No schooling/left school	0.01 (0.07)	0.01 (0.11)	0.003 (0.05)	0.0047	0.01 (0.10)
Primary school graduate	0.22 (0.41)	0.24 (0.43)	0.21 (0.41)	0.1380	0.25 (0.43)
Middle school graduate	0.11 (0.31)	0.12 (0.32)	0.11 (0.31)	0.5291	0.12 (0.32)
High school graduate	0.36 (0.48)	0.41 (0.49)	0.34 (0.47)	0.0021	0.38 (0.49)
University graduate	0.28 (0.45)	0.19 (0.39)	0.31 (0.46)	0.0000	0.21 (0.41)
Graduate degree holder	0.03 (0.16)	0.03 (0.16)	0.03 (0.16)	0.8877	0.03 (0.17)
Public sector employee	0.19 (0.39)	0.14 (0.35)	0.21 (0.40)	0.0009	0.15 (0.35)
Private sector employee	0.39 (0.49)	0.41 (0.49)	0.38 (0.49)	0.1986	0.43 (0.50)
Self-employed	0.17 (0.37)	0.19 (0.39)	0.16 (0.37)	0.1498	0.17 (0.38)
Farmer/seasonal worker	0.03 (0.18)	0.05 (0.22)	0.03 (0.17)	0.0156	0.05 (0.22)
Unemployed	0.03 (0.18)	0.06 (0.23)	0.03 (0.16)	0.0010	0.06 (0.23)
Not in labor force	0.18 (0.39)	0.15 (0.36)	0.19 (0.40)	0.0197	0.15 (0.35)
Istanbul region	0.25 (0.43)	0.31 (0.46)	0.23 (0.42)	0.0002	0.33 (0.47)
Aegean region	0.16 (0.37)	0.15 (0.36)	0.16 (0.37)	0.4823	0.14 (0.35)
Mediterranean region	0.13 (0.33)	0.12 (0.33)	0.13 (0.34)	0.5556	0.12 (0.33)
Southeast region	0.04 (0.20)	0.03 (0.16)	0.05 (0.21)	0.0711	0.03 (0.18)
Western Anatolia region	0.12 (0.32)	0.07 (0.26)	0.13 (0.34)	0.0002	0.08 (0.28)
Eastern Marmara region	0.10 (0.30)	0.10 (0.30)	0.10 (0.30)	0.7499	0.09 (0.29)

West Black Sea region	0.05 (0.22)	0.05 (0.21)	0.05 (0.22)	0.5081	0.04 (0.20)
Central Anatolia region	0.04 (0.19)	0.04 (0.20)	0.04 (0.19)	0.6774	0.04 (0.20)
Central Eastern and Northeastern Anatolia regions	0.03 (0.17)	0.02 (0.16)	0.03 (0.18)	0.4586	0.03 (0.17)
Eastern Black Sea region	0.03 (0.16)	0.04 (0.21)	0.02 (0.15)	0.0049	0.04 (0.20)
Western Marmara region	0.05 (0.22)	0.06 (0.23)	0.05 (0.22)	0.8142	0.04 (0.20)