Financial literacy and credit card arrears

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Objective

The causes of credit card problems & default in Turkey

- Unavoidable external shocks?

- Financial literacy and credit card usage behavior?

Financial literacy

'A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing.' (OECD)

Does financial literacy lead to better financial outcomes for consumers?

Higher levels of financial knowledge have been associated with:

- being a good money manager (Hogarth et al. 2002)

- better financial practices and financial management, like paying bills on time, tracking expenses, saving, or having an emergency fund (Hilgert et al. 2003, Courchane & Zorn 2005)

- higher likelihood of planning and better planning for retirement (Lusardi & Mitchell 2006, 2008)

Higher levels of financial knowledge have been associated with:

- being more likely to invest in stocks (Van Rooij et al. 2011, Yoong 2010)

- being less likely to make suboptimal investment decisions (Choi et al. 2011, Hastings et al. 2008)

- lower levels of credit card debt (Norvilitis et al. 2006)

- higher levels of credit card debt (Robb 2007)

- making less costly borrowing decisions (Moore 2003)

Other aspects of financial literacy

- Debt literacy: people with lower levels of debt literacy are more likely to make costly borrowing decisions (Lusardi & Tufano 2009)

- Numerical ability
  - Subprime mortgage borrowers with lower numerical ability are more likely to be delinquent and miss more mortgage payments (Gerardi et al. 2010)
  - Higher retirement savings (Banks & Oldfield 2007)

- Attitude towards debt: A more positive attitude towards debt results in a higher level of credit card debt (Chien and Devaney 2001)

Number and transaction volume of credit cards in Turkey
Source: BKM

Year	No. of Credit Cards	Transaction Volume (mil TL)
2003	19.863.460	40.334
2004	26.681.128	65.688
2005	29.978.243	86.494
2006	32.433.333	109.159
2007	37.335.179	142.787
2008	43.394.025	186.549
2009	44.392.614	204.742
2010	46.956.124	236.472
2011	51.360.809	293.819
2012	54.342.148	311.041
2013	56.835.221	363.847
2014	57.005.902	418.350
2015 (September)	57.988.000	355.789

Credit card arrears in Turkey

Rapid increase in credit card default incidence in first half of 2000s.

Banks criticized for

- Encouraging excessive consumption

- Charging very high interest rates

- Exploiting cardholders

Regulations in 2005-2006: Interchange fee regulation, regulations on contracts, credit limits, interest rate ceiling

Year

.70%

2006

- Banks' market powers declined (Akın et al. 2013)

- Defaults did not decline.

Number of cards

Data

- Nationwide Survey on Credit Card Usage (Akın, Aysan, Yıldıran) April-June 2009

- Randomly selected 2576 cardholders in 22 province centers selected at NUTS2 level, and 9 towns

- Questions on
  - Credit card choice
  - Credit card usage
  - Financial situation

Measuring financial literacy

There is no universally agreed-upon measure.

The three financial literacy questions of the 2004 Health and Retirement Study (Lusardi & Mitchell) have become widely accepted.

HRS questions

1. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: >$102, =$102, <$102?

2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

3. Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund.""

OECD question categories
Atkinson & Messy (2012)

- **Financial knowledge**
  - basic division, time value of money, interest paid on a loan, calculation of interest plus principle, compound interest, risk and return, definition of inflation, diversification

- **Financial behavior**
  - long-term financial goal setting, keeping watch of financial affairs, timely bill payment, considering purchases, has a household budget, actively saving or buying investments, shopping around for financial products

- **Financial attitude**
  - spend vs save attitude, living for today, attitude towards spending money

Explanatory variables

	Financial Literacy	

Information
- CC interest rate
- CC annual fee
- Deposit insurance

Activeness
- Acquisition of card
- Shop around for cc
- Attemp to avoid annual fees

Sophistication
- Auto-order
- Tax/insurance payment
- Internet banking
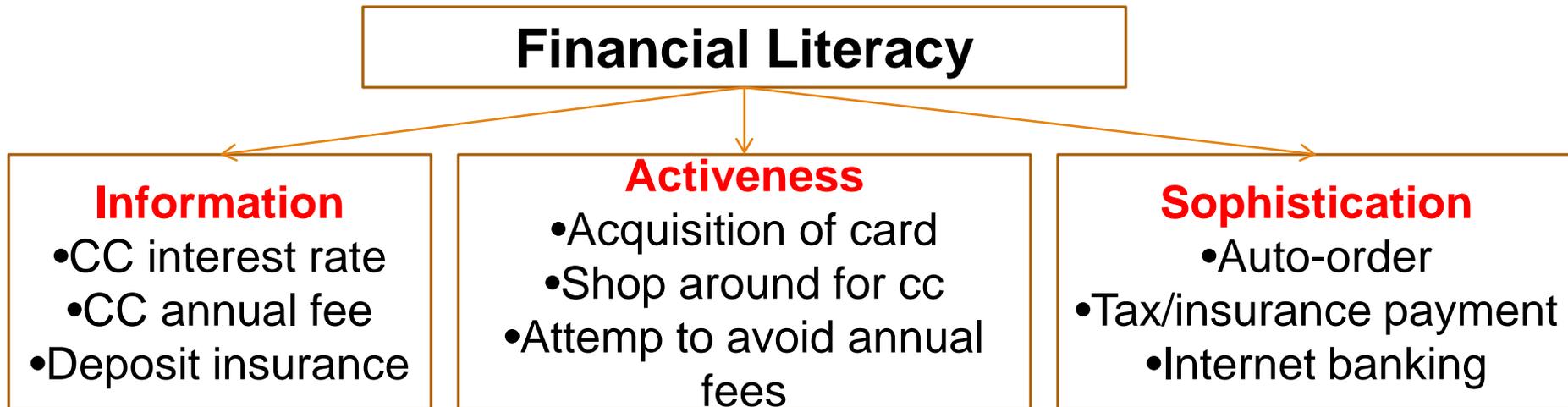
Using principal component analysis, the information from the three variables (knowing interest rate, knowing annual fees paid, knowing deposit insurance limit of state) are grouped to form a composite index *Information* (measuring financial knowledge).

Similar for **Activeness** (using one's financial knowledge) and **Sophistication** (involvement with the financial system and bank products).

(Summary)

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┌─────────────────┐
│     Shocks      │
└─────────────────┘
        ╱        ╲
       ╱          ╲
┌──────────────┐      ┌──────────────────────┐
│ Income Shock │      │  Expenditure Shock   │
└──────────────┘      └──────────────────────┘
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Reasons for failure to pay the minimum amount due (Yes-No)

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ment   15%

Reasons for failure to pay the full amount due but more than the minimum (Yes-No)

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%

<mark>An unexpected necessary spending came up such as for an illness, or an accident</mark>

Irrational usage of credit cards

Credit cards are both payment and credit instruments at the same time.

High interest rates make such borrowing rational only for short-term loans and small amounts.

Insufficient income offered as a reason for not paying the minimum amount due→ irrational to try to finance oneself with credit cards

Other evidence for inefficient use

Do you think that you make unnecessary shopping because you have credit cards?

Answer	Frequency	Percentage
Yes	446	56,17%
No	348	43,83%
Total	794	100,00%

How effective are the following reasons for this unnecessary shopping? (1-5)

	Mean
The psychological comfort of not paying at the time of shopping	3,92
Low monthly payments due to installments	3,46
Attractiveness of credit card promotions and discounts	3,11
Unable to keep track of expenditures because of not paying cash	2,83

Summary statistics of variables forming financial literacy variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest rate knowledge	647	.0772798	.2672414	0	1
Annual fee knowledge	647	.5672334	.4958424	0	1
Deposit insurance	647	.1236476	.3294338	0	1
Acquisition of card	647	.5162287	.5001232	0	1
Attempt to avoid annual fees	647	.1885626	.3914634	0	1
Researched card	647	1.851623	1.216346	1	5
Automatic order	647	.2905719	.4543776	0	1
Tax/insurance payment	647	.1004637	.3008498	0	1
Internet banking	647	.2627512	.4404689	0	1

Other independent variables

- Owning a single credit card
- Total credit card limit
- Household fixed expenditures
- Household income & squared (<20.000 TL a month)
- Household size
- Wealth (sum of value of motor vehicles and property owned)
- Gender
- Married
- Age & squared
- Education
  - Primary or less (base) — Secondary school — High school — University
- Occupation
  - Civil servant (base) — Self-employed — Farm & seasonal worker
  - Private sector — Unemployed — Retired & out of labor force
  - Not retired & out of labor force
- Region
  - Coastal — Black Sea — Middle Anatolia — Eastern (base)
- Living in a town

I. Determinants of financial difficulties experienced by cardholders

Paying less than minimum amount due in a credit card bill is resorting to a very expensive type of credit

→ indicative of financial difficulties

Dependent variable is the answer to:

◦ "What is the number of months you paid less than the minimum amount due in the last twelve months?"

Sample: those who paid less than the full credit card bill (less or more than minimum amount due) at least once in the last 12 months

([Full sample](#))

Number of months minimum payment requirement was not met (regression sample)

	Freq.	Percent	Cum.
0	194	30.08	30.08
1	74	11.47	41.55
2	136	21.09	62.64
3	110	17.05	79.69
4	48	7.44	87.13
5	31	4.81	91.94
6	41	6.36	98.29
7	4	0.62	98.91
8	5	0.78	99.69
10	2	0.31	100.00
Total	645	100.00	

Estimation

The independent variable (number of months in which less than minimum due amount was paid) is count data: takes on nonnegative integer values only.

Negative binomial regression is selected as it is more flexible to handle any possible overdispersion in the data than the Poisson regression.

Negative binomial regression results
Dependent variable: number of months the cardholder pays less than minimum amount due

FL: Information	-0.020		Primary school or less	-0.002
	(-0.29)			(-0.02)
FL: Activeness	0.018		Secondary school	-0.035
	(0.27)			(-0.23)
FL: Sophistication	-0.046		High school graduate	-0.089
	(-0.66)			(-0.81)
Income shock	0.430		Self employed	0.072
	(5.32)***			(0.48)
Expenditure shock	0.162		Farm & seasonal worker	0.128
	(1.71)*			(0.62)
Insufficient income	0.274		Private sector	-0.049
	(3.36)***			(-0.39)
Single card	0.083		Unemployed	-0.075
	(0.95)			(-0.38)
Total credit card limit	0.000		Retired & out of labor force	-0.179
	(1.77)*			(-1.00)
Fixed expenditures	0.000		Not retired & out of labor force	-0.102
	(1.61)			(-0.40)
Household income	-0.000		Coastal region	0.220
	(-1.11)			(1.28)
Household income squared	0.000		Black Sea region	0.239
	(0.61)			(1.13)
Household size	0.006		Middle Anatolia region	0.241
	(0.22)			(1.25)
Wealth	0.000		Lives in a town	0.051
	(0.38)			(0.38)
Gender	0.000		Constant	0.895
	(0.00)			(1.78)*
Married	0.089		*lnalpha*	-0.884
	(0.88)			(-6.00)***
Age	-0.043		*LR chi2(30)*	57.57***
	(-1.85)*		*Number of observations*	645
Age squared	0.000			
	(1.73)*			

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Determinants of financial difficulty

External shocks cause financial difficulty.

Being financially more literate does not prevent being in financial difficulty and borrowing on credit card with bad terms (overdue payment interest rate).

Insufficient income coefficient significant → those who try to finance themselves irrationally with credit cards are more likely to have financial problems.

2. Determinants of credit card default

Taking financial difficulties one step further: default

Dependent variable: takes on value 1 if respondent experienced a default in 2008-2009, 0 otherwise.

unknown timing of default

Binary logit & probit estimation

Same explanatory [variables](#)

Table IX: Frequencies and Percentages of Respondents Who Faced Default

Default Year	Frequency	Percentage
1997	1	0,72
1998	1	0,72
1999	3	2,16
2000	6	4,32
2001	4	2,88
2002	4	2,88
2003	5	3,60
2004	6	4,32
2005	13	9,35
2006	15	10,79
2007	8	5,76
2008	32	23,02
2009	41	29,50
Total	139	100

Binary logit & probit results
Dependent variable: takes on value 1 if respondent experienced a default in 2008-2009, 0 otherwise

	Logit	Probit		Logit	Probit
FL: Information	-0.616	-0.315		(2.16)**	(1.99)**
	(-2.24)**	(-2.26)**	Primary school or less	0.205	0.055
FL: Activeness	0.006	0.013		(0.36)	(0.18)
	(0.02)	(0.09)	Secondary school	0.655	0.335
FL: Sophistication	-1.095	-0.552		(1.16)	(1.15)
	(-3.02)***	(-3.20)***	High school graduate	0.250	0.127
Income shock	0.619	0.321		(0.55)	(0.55)
	(1.89)*	(1.91)*	Self employed	-0.940	-0.418
Expenditure shock	0.341	0.203		(-1.60)	(-1.38)
	(0.96)	(1.07)	Farm & seasonal worker	-0.521	-0.184
Single card	-0.458	-0.237		(-0.69)	(-0.46)
	(-1.36)	(-1.34)	Private sector	-0.855	-0.435
Total credit card limit	0.000	0.000		(-1.80)*	(-1.73)*
	(0.29)	(0.61)	Unemployed	0.631	0.353
Insufficient income	1.007	0.516		(1.02)	(1.04)
	(2.88)***	(2.92)***	Retired & out of labor force	-2.226	-1.071
Major expense	0.000	0.000		(-2.95)***	(-2.82)***
	(1.90)*	(1.74)*	Not retired & out of labor force	-1.169	-0.565
Household income	-0.001	-0.000		(-0.98)	(-0.99)
	(-1.73)*	(-1.63)	Coastal region	-0.175	-0.041
Household income squared	0.000	0.000		(-0.30)	(-0.13)
	(2.14)**	(1.90)*	Black Sea region	-0.025	0.109
Household size	-0.206	-0.103		(-0.03)	(0.27)
	(-1.73)*	(-1.64)	Middle Anatolia region	0.100	0.066
Wealth	0.000	0.000		(0.15)	(0.18)
	(1.20)	(1.24)	Lives in town	-1.153	-0.645
Gender (1 for women, 0 for men)	-0.839	-0.407		(-1.64)	(-1.76)*
	(-1.91)*	(-1.87)*	Constant	0.981	0.320
Married	0.002	0.017		(0.54)	(0.33)
	(0.01)	(0.08)	*Number of observations*	647	647
Age	-0.156	-0.081	LR chi2(30)	72.26***	71.30***
	(-1.90)*	(-1.80)*	Pseudo R2	0.18	0.18
Age squared	0.002	0.001			

Determinants of default

Income shocks can have longer lasting implications than expenditure shocks and may lead to credit card default.

Those who use credit cards as a long-term financing tool face default more often.

Even if financial difficulties due to shocks cannot be avoided, the financially literate are better at overcoming them and avoiding default.

Conclusion

Everybody is prone to financial difficulties due to external shocks, regardless of their financial literacy level.

However, those who are more likely to end up with default seem to be the financially less knowledgeable and less sophisticated.

Irrational usage of credit cards leads to financial difficulties and also to default.

These results may be helpful in explaining a part of the growing percentage of credit card troubles, despite the regulations imposed on the market.

Appendix

Number of months minimum payment requirement was not met (entire sample)

	Freq.	Percent	Cum.
0	2,039	79.22	79.22
1	94	3.65	82.87
2	159	6.18	89.04
3	130	5.05	94.09
4	53	2.06	96.15
5	39	1.52	97.67
6	48	1.86	99.53
7	5	0.19	99.73
8	5	0.19	99.92
10	2	0.08	100.00
Total	2,574	100.00	

Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Default	647	.0942813	.2924458	0	1
Number of < minimum	645	2.103876	1.965558	0	10
Information	647	.0117636	.5888786	-.686711	1.003745
Activeness	647	-.0120137	.5797851	-.7301383	1.435288
Sophistication	647	-.0206259	.6299214	-.451576	1.577809
Income shock	647	.4822257	.5000706	0	1
Expenditure shock	647	.2148377	.4110275	0	1
Insufficient income	647	.6166924	.4865684	0	1
Fixed expenditures	647	1235.15	852.7519	100	6000
Single card	647	.4219474	.4942523	0	1
Total credit card limit	647	4832.068	8080.5	200	100000
Household income	647	2230.071	1486.988	0	12000
Household size	647	3.755796	1.450641	1	13
wealth	647	57327.43	304987.5	0	7507000
female	647	.2488408	.4326759	0	1
married	647	.7032457	.4571807	0	1
age	647	37.15611	11.06533	19	80
agesq	647	1502.828	917.0778	361	6400
primary	647	.2534776	.4353385	0	1
secondary	647	.1267388	.3329375	0	1
high_school	647	.3786708	.4854312	0	1
self_emp	647	.1638331	.3704104	0	1
farm_season	647	.0479134	.2137484	0	1
private	647	.4188563	.4937535	0	1
unemployed	647	.0602782	.2381857	0	1
ret_out_lab	647	.1282844	.3346649	0	1
unret_out_~b	647	.0309119	.173213	0	1
coast	647	.7125193	.4529378	0	1
blacksea	647	.0911901	.288102	0	1
middle_ana~a	647	.1313756	.338072	0	1
town	647	.0942813	.2924458	0	1

Logistic regresion (odds ratios instead of logistic coefficients)

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Logistic regression                                 Number of obs   =        647
                                                    LR chi2(30)     =      72.26
                                                    Prob > chi2     =     0.0000
Log likelihood = -165.95031                         Pseudo R2       =     0.1788
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takip	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
hhincome	.9994921	.0002935	-1.73	0.084	.998917	1.000068
hhincomesq	1	2.65e-08	2.14	0.032	1	1
hhsize	.814229	.096838	-1.73	0.084	.6449281	1.027973
wealth	1.000001	4.69e-07	1.20	0.231	.9999996	1.000001
female	.4319693	.18997	-1.91	0.056	.1824376	1.022802
married	1.001978	.3952487	0.01	0.996	.4624725	2.170853
age	.855146	.0703802	-1.90	0.057	.7277542	1.004838
agesq	1.002046	.000949	2.16	0.031	1.000188	1.003908
primary	1.22729	.7065671	0.36	0.722	.397099	3.793108
secondary	1.925159	1.088623	1.16	0.247	.6355303	5.831726
high_school	1.2835	.5871987	0.55	0.585	.5235678	3.146436
self_emp	.390454	.2300212	-1.60	0.110	.1230599	1.238863
farm_season	.5941871	.4450655	-0.69	0.487	.1368817	2.579295
private	.4252317	.2023975	-1.80	0.072	.1672936	1.080866
unemployed	1.879702	1.160075	1.02	0.306	.5607413	6.301087
ret_out_lab	.1080052	.0815349	-2.95	0.003	.0245957	.4742752
unret_out_lab	.3106402	.3710442	-0.98	0.328	.029891	3.228312
coast	.8395146	.4922071	-0.30	0.765	.2660536	2.649033
blacksea	.9753332	.7799971	-0.03	0.975	.2034356	4.67605
middle_anatolia	1.105645	.7331885	0.15	0.880	.3014095	4.055782
town	.3155828	.2217907	-1.64	0.101	.079596	1.251225
information	.5401817	.1482559	-2.24	0.025	.3154445	.9250323
aktif2	1.006361	.2760144	0.02	0.982	.5878889	1.722712
sophist	.3343811	.1213269	-3.02	0.003	.164207	.6809133
tek_card	.6324658	.2134618	-1.36	0.175	.3264001	1.225529
totalcclimit	1.000005	.0000171	0.29	0.770	.9999714	1.000039
insuff_income	2.736722	.9569125	2.88	0.004	1.379122	5.430737
major_expense	1.000444	.0002342	1.90	0.058	.9999853	1.000904
inc_sok1	1.857862	.607559	1.89	0.058	.978708	3.526743
exp_sok1	1.406488	.4979289	0.96	0.335	.7027344	2.815016
_cons	2.667915	4.872751	0.54	0.591	.0743901	95.68172