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The Importance of Adverse Selection in the Credit Card Market: Evidence from Randomized Trials of Credit Card Solicitations

Analyzing unique data from multiple large-scale randomized marketing trials of preapproved credit card solicitations by a large financial institution, we find that consumers responding to the lender's *inferior* solicitation offers have poorer credit quality attributes. This finding supports the argument that riskier type borrowers are liquidity or credit constrained and, thus, have higher reservation loan interest rates. We also find a more severe deterioration *ex post* in the credit quality of the booked accounts of inferior offer types relative to superior offers. After controlling for a cardholder's observable risk attributes, demographic characteristics, and adverse economic shocks, we find that cardholders who responded to the inferior credit card offers are significantly more likely to default *ex post*. Our results provide evidence on the importance of adverse selection effects in the credit card market.

JEL codes: D12, D82, G2
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IN HIS SEMINAL PAPER, Akerlof (1970) shows that in a market with asymmetric information between buyers and sellers, adverse selection is likely to

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result. Over the years, numerous papers have extended Akerlof's theory. For example, Stiglitz and Weiss (1981) show how asymmetric information can prevent a credit market from clearing and lead to the rationing of credit. Bester (1985) shows that endogenously chosen collateral may offset the problem of information asymmetry and the market can clear. Empirical evidence of asymmetric information in the consumer credit markets includes:[1] credit cards (Ausubel 1999), home mortgage and automobile loans (Edelberg 2003), home equity credit (Agarwal et al. 2006), subprime automobile loans (Adams, Einav, and Levin 2009), and personal loans (Karlan and Zinman 2009).

In this paper, we test for adverse selection in the credit market using unique data from multiple large-scale randomized marketing trials of preapproved credit card solicitations by a large financial institution that issues credit cards nationally. Our paper is closely related to Ausubel (1999) who also investigates the importance of adverse selection in the credit card market. However, we provide additional evidence by focusing on the credit market toward low-risk "prime" borrowers (population). If adverse selection is present in a population with relatively good credit quality, we should expect that the adverse selection effects could have been even stronger had the lender reached out to a lower credit quality population. Hence, our study can be considered as a minimal test of the importance of adverse selection in the credit card market.

To preview our results, we find that consumers who responded to the lender's credit card solicitation exhibit significantly higher credit risk attributes than those who did not respond. When we compare the credit risk characteristics of responders across contract offer types within a marketing trial, we find that consumers who responded to the *inferior* offer types (e.g., higher APR offer) exhibit poorer credit quality characteristics than those responding to *superior* offer types. These patterns are quite striking and support the argument that higher risk consumers, assuming that consumers are aware of their own credit risk type, have fewer options for acquiring funds to smooth consumption (i.e., they are liquidity or credit constrained). And therefore, they have a higher reservation credit card interest rate. Taken together, these observations provide preliminary evidence that the lender may be susceptible to potential adverse selection problems.

We find that the credit quality of the booked accounts of inferior offer types more severely deteriorates *ex post* relative to that of superior offers. Moreover, we also find that for unobservable reasons, cardholders who responded to the *inferior* credit card offers are significantly more likely to default *ex post*. Overall, our results provide evidence on the existence of adverse selection in the credit card market.

The paper proceeds as follows. Section 1 describes the market experiments and data. Section 2 compares the observable risk characteristics of responders to those of nonresponders and then compares the responder's risk type across credit card offers.

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1. Numerous studies have tested for the role of asymmetric information in the auto and health insurance markets. For example, Genesove (1993) analyzes the market for used cars and finds weak evidence for adverse selection, while Chiappori and Salanie (2000) examine the French market for automobile insurance and find no evidence of adverse selection. Altman, Cutler, and Zeckhauser (1998) study the health insurance market and find evidence of adverse selection.

Finally, we test for adverse selection in Section 3 and provide concluding remarks in Section 4.

1. EXPERIMENT DESIGN AND DATA DESCRIPTION

Our data come from a large financial institution that issues credit cards nationally. As part of routine marketing campaigns between January and May 2001, the lender conducted several large-scale randomized trials of preapproved credit card solicitations by mailing out seven distinct solicitation offers under three different marketing trials to a large random population of over 2.3 million consumers. The lender generated the mailing list by targeting the *prime* borrowers who have relatively good FICO scores. In order to conduct the trial, the lender purchased extensive credit bureau information (including FICO scores) for the entire mailing list of consumers.

The first marketing trial, A, had three offers. The first offer, A1, was 0% interest on purchases for the first 8 months with a subsequent or "go-to" rate of 9.99%. The second offer, A2, was 0% interest on purchases for the first 12 months with a go-to rate of 9.99%. Finally, the third offer, A3, was 0% interest on purchases for the first 8 months with a go-to rate of 8.99%. All three offers required a balance transfer (BT; no minimum amount required), and the interest rate on the BT was the go-to rate. Both offers A2 and A3 are clearly superior offers to A1 because (i) borrowers can have four additional months of 0% APR on purchases under A2, and (ii) borrowers will face a 100 basis point lower go-to rate after 8 months under A3. It is not possible to determine whether offer A2 is superior/inferior to offer A3 because both the duration for the 0% purchase and the go-to rates are different. So for our purposes, we will only compare offer A1 to offer A2 and offer A1 to offer A3.

The second marketing trial, B, had two offers. The first offer, B1, provided a fixed 9.99% interest on purchases and balance transfer for life. The second offer, B2, provided a fixed 8.99% interest on purchases and balance transfer for life. In this case, offer B2 is clearly superior to offer B1 because it carries a 100 basis point lower interest rate. Finally, the third marketing trial, C, had two offers. The first offer, C1, provides a 0% interest on purchases, balance transfers, and cash advances for the first 6 months with a go-to rate of 14.99%. The second offer, C2, provides a 0% interest on purchases, balance transfers, and cash advances for the first 6 months with a go-to rate of 12.99%. Offer C2 is superior to offer C1 because its go-to rate is 200 basis points lower.

As previously mentioned, the bank mailed out 2.3 million solicitation offers over a 5-month period (January to May 2001) under the three marketing trials. By July 2001, a total of 6,448 (0.28%) consumers had responded to the solicitations. Of these respondents, the bank rejected 1,389 (21.5%) applications due to deterioration in credit risk characteristics of the consumer and issued a credit card to 5,059 consumers. For these booked accounts, we are able to track the debt repayment patterns of each

cardholder over the next 24-month period (until July 2003) after the lender issued the credit card.

In addition to capturing the *ex post* default behaviors of the cardholders, our data include two additional key pieces of information: a cardholder's updated FICO credit score and internal payment behavior score. A credit score, whether a generic FICO score or an internal behavior score, is an index constructed to evaluate an individual's relative risk of default conditional on his/her credit profile. For example, a lower FICO score implies a higher probability of a consumer defaulting on his outstanding debt in the next 24 months. The credit card lender in our study obtained an applicant's external credit risk (FICO) score at the time of solicitation and then updated the FICO score on a quarterly basis after credit issuance. In addition, the lender also developed an internal behavior scoring model to assess the likelihood that a credit account will become delinquent in the near future (e.g., the next 6 months). The quarterly updated FICO score captures a consumer's repayment behavior on all currently open credit trades and, therefore, is informative on the extent to which the cardholder faced adverse economic shocks to his/her household portfolio that hindered his/her ability to meet debt obligations on all outstanding credit. The internal behavior score reveals the relative risk type of the cardholder based on the internal repayment behavior with this credit card lender. These two risk scores summarize a cardholder's relative risk type for the lender.

2. OBSERVABLE INFORMATION

Table 1 compares the average credit risk characteristics of: (i) responders versus nonresponders for each offer type within a marketing trial and (ii) responders across offer types within a marketing trial for six credit bureau variables. Specifically, we focus on the following risk attributes: (i) total credit card line amount (for all credit cards), (ii) total credit card utilization rate (total credit withdrawn as a fraction of total credit availability on all credit cards), (iii) account age (the length of time the customer's credit file has existed at the credit bureau), (iv) delinquency behavior (30+days past due), and (v) FICO score.

2.1 Responders versus Nonresponders

The third and fourth columns of Table 1 compare the number and percentage of responders and nonresponders for each offer type in a given marketing trial. First, the results show that the lender offered a disproportionately higher percentage of inferior offers within each marketing trial (A1, B1, and C1). Of the 951,651 solicitations under marketing trial A, for example, the lender sent 646,370 (68%) A1 offers to consumers, but only sent 150,643 (15.8%) A2 offers and 154,548 (16.2%) A3 offers.

Furthermore, the response rate for superior offers (A2, A3, B2, and C2) is higher than that for the inferior offers. Consumers were more than twice as likely to accept offer A2 as they were to accept offer A1 (0.56% response rate for A2 offer versus a 0.27% response rate for A1 offer). The difference in the response rate for A1 and

TABLE 1
CREDIT RISK CHARACTERISTICS OF RESPONDERS AND NONRESPONDERS

Offer type	Nonresponders and responders	Frequency	Response rate (%)	Balance transfer ($)	Credit line ($) all cards	Utilization (%) all cards	Account age	30+ DPD prior 12 months	FICO score
A1	Nonresponders	644,624		0	21,068	8	131	0.08%	773
	Responders	1,746	0.27%	1,503	19,557**	13**	83**	0.31%**	742**
A2	Nonresponders	149,800		0	20,409	9	123	0.04%	772
	Responders	843	0.56%	1,926	23,506**	15**	92**	0.12%**	744**
A3	Nonresponders	154,090		0	22,429	9	137	0.04%	772
	Responders	458	0.30%	1,922	22,100	15**	94**	0.15%**	744**
B1	Nonresponders	542,666		0	21,354	8	132	0.18%	773
	Responders	1,058	0.19%	363	15,163**	14**	80**	0.28%**	740**
B2	Nonresponders	150,118		0	20,369	9	122	0.13%	772
	Responders	708	0.47%	538	18,553**	16**	82**	0.10%**	742**
C1	Nonresponders	493,903		0	21,868	8	135	0.07%	773
	Responders	957	0.19%	2,464	27,772**	14**	94**	0.19%**	743**
C2	Nonresponders	150,076		0	20,400	9	122	0.03%	772
	Responders	678	0.45%	3,078	29,479**	17**	98**	0.11%**	743**
	T-test for diff A1 & A2			−3.60	−4.45	−2.60	−2.79	−5.28	−1.24
	T-test for diff A1 & A3			−2.87	−2.35	−2.12	−2.62	−3.89	−1.01
	T-test for diff B1 & B2			−5.61	−4.05	−2.06	−0.53	−2.77	−1.05
	T-test for diff C1 & C2			−3.41	−1.26	−3.32	−0.95	−2.13	0.00

NOTES: Offer A1 has an APR of 0% for purchases during the first 8 months with a balance transfer rate of 9.99%, and thereafter the APR on purchases goes to 9.99%. Offer A2 has an APR of 0% for purchases during the first 12 months with a balance transfer rate of 9.99% and thereafter the APR on purchases goes to 9.99%. Offer A3 has an APR of 0% for purchases during the first 8 months with a balance transfer rate of 8.99% and thereafter the APR on purchases goes to 8.99%. Offer B1 has no teaser rate offer but the APR on purchases and balance transfer are 9.99% for life. Offer B2 has no teaser rate offer but the APR on purchases and balance transfer are 8.99% for life. Offer C1 has an APR of 0% on purchases and balance transfer for the first 6 months and thereafter the APR on purchases goes to 14.99%. Offer C2 has an APR of 0% on purchases and balance transfer for the first 6 months and thereafter the APR on purchases goes to 12.99%. **Significance at the 5% level.

A3 offers, however, is insignificant (0.27% and 0.29%, respectively). This suggests that consumers for marketing trial A are more sensitive to the duration of the teaser offer than the interest rate. Consumers for marketing trial B with fixed rate for life on purchases and balance transfers are more than twice as likely to choose B2 over B1 (response rates of 0.47% and 0.19% points, respectively, for B2 and B1). Similarly, consumers for marketing trial C are twice as likely to choose C2 over C1 (response rates of 0.44% and 0.19%, respectively, for C2 and C1).

In terms of their credit risk characteristics, responders and nonresponders are strikingly different. Responders across all product offerings have significantly lower FICO scores, by 30 points on average, than nonresponders. Looking at more specific credit risk attributes, responders for offers in the A and B marketing trials, with the exception of offer A2, have a higher credit limit on all open and active credit cards than nonresponders, while responders for offers in the C marketing trial have lower credit limits than nonresponders. Across all offer types, the average credit utilization rate on all open and active credit cards is higher for responders (about 14% average across offers) than nonresponders (about 8% across offers). In addition, the average length of credit history with the bureau is 89 months for responders, while that for nonresponders is 129 months. Responders across all offer types experienced significantly higher delinquency incidences—30+ days past due, in the 12 months prior to responding to the lender's solicitation. Finally, while there is significant variation in many of the observable characteristics, the average FICO scores fall within a narrow range. This is due to the fact that the lender only requested records for *prime* borrowers from the credit bureau.

2.2 Responders' Choice on Offer Types

Now we look at the risk characteristics of the responders by their choice of offer type within each marketing trial. The first market trial, A, has three offer types—A1, A2, and A3. As previously mentioned, offers A2 and A3 are clearly superior to A1, but it is unclear whether A2 or A3 is the superior offer among those two. The results show a statistically insignificant difference in FICO score between responders choosing the inferior offer A1 relative to the superior offer A2 (average scores of 742 and 744, respectively) or in FICO score between responders choosing the inferior offer A1 and the superior offer A3 (average score of 742 and 744, respectively). On the other hand, other risk measures show that responders to the inferior offer A1 may be more credit or liquidity constrained, or riskier than responders to the superior offers A2 and A3. For instance, responders to the inferior offer A1 have on average a significantly lower credit line available on all open and active credit cards than those to the superior offers A2 and A3. Moreover, the percentage of prior 12-month delinquency among the inferior offer A1 responders is significantly higher than that of responders to the superior offer.

Similarly, while the average FICO scores of responders to the inferior offer B1 are insignificantly different from that of responders to the superior B2 offer and the average FICO scores of responders to the inferior offer C1 are insignificantly

different from that of responders to the superior offer C2, other risk measures such as the credit line available on all cards and prior 12-month delinquency incidences show that responders to the inferior offers B1 and C1 may be liquidity or credit constrained relative to the responders of the superior offers B2 and C2, respectively.

Thus far, our results show that the risk characteristics of responders are statistically different from those of nonresponders. These results indicate that higher risk consumers, assuming that consumers are aware of their own credit risk type, have fewer outside options for acquiring funds to smooth consumption. These liquidity or credit constrained borrowers therefore have a higher reservation credit card interest rate.

3. ADVERSE SELECTION

To investigate the importance of adverse selection, we conduct two types of analysis. First, we examine whether there are any changes in the cardholder's credit quality immediately after the lender issued the credit card and, if so, whether the changes differ by solicitation offer types. Specifically, we look at the quarterly updated external credit score (FICO score) and the lender's quarterly updated internal credit risk score (behavior score) 12 months and 24 months after booking.

Second, we test for adverse selection by estimating the likelihood of a cardholder defaulting as a function of a solicitation offer type indicator after controlling for the consumer's demographic characteristics, the consumer's risk attributes observed by the lender at the time the card was issued, and the extent to which the cardholder faces adverse economic shocks *ex post*.

3.1 Changes in Cardholders' Credit Quality after Booking

In Table 2, we assess the extent to which a cardholder's FICO score and internal behavior score changed in the 12 and 24 months after the lender issued the credit card to the consumer. When the credit quality of the cardholder declines significantly and the cardholder did *not* face adverse economic shocks to the family's portfolio *ex post*, we take this as evidence of an adverse selection effect. If the effect of adverse selection is stronger when the terms of credit are less favorable, we would expect a more severe deterioration *ex post* in the credit quality of the booked accounts of inferior offer types relative to superior offers.

Table 2 reports the average FICO score and the internal behavior score for the cardholders (who did not attrite)[2] at 12 and 24 months after the lender issued the borrower a credit card. Both credit scores measure the relative credit risk of an individual account. However, given that a FICO score comes from the credit bureaus and reflects the accountholder's credit and debt repayment activities across all credit products

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2. Attrition refers to accounts that were closed. Voluntary attrition is defined as cardholders who requested to close their accounts. Involuntary attrition is defined as those whose account was closed by the lender, for instance, due to fraud.

TABLE 2

CREDIT SCORES OF BOOKED ACCOUNTS BY OFFER TYPE

Offer type	Frequency			FICO score					Behavior score				
	At booking	At 12 mth	At 24 mth	At booking	At 12 mth	At 24 mth	T-stat 1st 12 mth	T-stat 2nd 12 mth	At 1 mth	At 12 mth	At 24 mth	T-stat 1st 12 mth	T-stat 2nd 12 mth
A1	1329	729	645	744	740	737	−0.96	−0.74	722	711	701	−2.25	−2.17
A2	697	627	509	745	743	737	−1.61	−0.63	742	740	740	−0.72	0.05
A3	368	318	259	746	743	739	−0.91	−0.45	731	725	721	−1.04	−1.60
B1	765	702	658	743	737	735	−0.43	−0.34	732	721	712	−2.35	−1.91
B2	613	588	562	744	740	737	−0.37	−0.43	741	739	734	−0.54	−0.20
C1	727	501	395	744	741	738	−1.08	−0.92	730	721	710	−2.45	−2.06
C2	560	479	462	743	739	739	−0.09	−1.03	739	736	737	−0.78	0.24

NOTES: See notes for Table 1.

he/she holds, it can be informative of the extent to which the borrower faced adverse economic hardships that hindered his/her ability to make the minimum payment on other credit cards or on other loans. The behavior score, on the other hand, reveals the credit quality of the cardholder with this lender who issued this credit card.

The results show that across all offer types, the average FICO scores at 12 or 24 months subsequent to the issuance of this credit card remain similar to what they were at the time of the card issuance. Hence, there was no (economically or statistically) significant deterioration of cardholders' FICO scores, regardless of the offer type. These findings suggest that, on average, cardholders did not experience major adverse economic shocks that hindered their ability to meet debt obligations on other credit outstanding. On the other hand, the behavior scores are significantly lower for cardholders of a particular offer type. Notably, the behavior scores are significantly lower for cardholders who responded to and were issued the *inferior* offer types.

3.2 Offer Types and Cardholders' Ex Post Default

Table 3 presents the results of a logit estimation of the likelihood of a cardholder defaulting as a function of solicitation offer type indicators, while controlling for the cardholder's demographic and risk characteristics observed at the time the lender issued the credit card. Default is defined as 60 days past due. The cardholder's demographic characteristics include age, gender, marital status, and income. We also include zip code fixed effects to control for general macroeconomic conditions, such as unemployment, exemption laws, and divorce rates. The risk attributes observed by the lender at the time of card issuance are: total card and noncard credit utilization, total credit limit, number of credit cards held by the responder, and the amount of debt on any other credit card the cardholder initially transferred to this credit card (i.e., balance transfer). In addition, we also control for the cardholder's FICO score at 3 months prior to default.

With respect to the demographic characteristics, our results reveal that while the cardholder's gender has no significant correlation with default behavior, a cardholder who is younger, is married, or earns higher income is significantly *less* likely to default on his/her credit card debt. Consistent with prior studies (Gross and Souleles 2002, Agarwal et al. 2008), we also find that cardholders with a lower credit limit, higher utilization rate, higher number of credit cards open and active, or higher balance transfer are more likely to default. Moreover, cardholders who transfer a greater amount of debt from other credit cards to this credit card are significantly more likely to default. And cardholders who face a decline in the external risk (FICO) score are significantly more likely to default. The results are consistent across all three marketing trials.

We now focus on the results for the offer type indicator. The omitted offer type is the inferior offer type. All offer type indicators have significant negative coefficients. For marketing trial A, the negative coefficients on the A2 and A3 indicator dummies indicate that responders to these superior offers are, respectively, 5.55% and 4.27% *less*

TABLE 3

DETERMINANTS OF A CARDHOLDER'S LIKELIHOOD OF DEFAULTING

Panel A	Coeff val	Std err	T-stat	Marginal effect
A2 offer indicator	−0.368	0.077	−4.80	−5.55%
A3 offer indicator	−0.166	0.064	−2.57	−4.27%
Behavior score	−0.682	0.115	−5.91	−0.04%
FICO score	−0.521	0.045	−11.50	−0.07%
Balance transfer ($)	0.026	0.010	2.68	0.01%
No. of credit cards	0.291	0.063	4.62	0.12%
Utilization rate (%)	0.759	0.278	2.73	0.43%
Credit limit ($)	−0.084	0.030	−2.82	−0.02%
Borrower age	0.311	0.098	3.16	0.04%
Gender (male = 1)	0.338	0.190	1.78	3.60%
Marital status (married = 1)	−0.261	0.062	−4.21	−6.38%
Ln(income)	−1.048	0.271	−3.87	7.64%
Zip code dummies	Yes			
Time dummies	Yes			
Number of obs/defaults	1413/98			
Pseudo R^2	0.46			

Panel B	Coeff val	Std err	T-stat	Marginal effect
B2 offer indicator	−0.298	0.129	−2.31	−5.00%
Behavior score	−0.600	0.118	−5.07	−0.03%
FICO score	−0.368	0.076	−4.84	−0.04%
Balance transfer ($)	0.026	0.010	2.57	0.02%
No. of credit cards	0.308	0.064	4.81	0.16%
Utilization rate (%)	0.727	0.278	2.61	0.35%
Credit limit ($)	−0.078	0.027	−2.92	−0.03%
Borrower age	0.325	0.103	3.15	0.04%
Gender	0.329	0.188	1.75	3.71%
Marital status	−0.279	0.063	−4.40	−6.60%
Ln(income)	−1.008	0.289	−3.48	7.80%
Zip code dummies	Yes			
Time dummies	Yes			
Number of obs/Defaults	1220/59			
Pseudo R^2	0.49			

Panel C	Coeff val	Std err	T-stat	Marginal effect
C2 offer indicator	−0.503	0.170	−2.95	−4.26%
Behavior score	−0.590	0.119	−4.95	−0.06%
FICO score	−0.394	0.055	−7.15	−0.06%
Balance transfer ($)	0.026	0.010	2.45	0.01%
No. of credit cards	0.317	0.065	4.89	0.15%
Utilization rate (%)	0.767	0.261	2.94	0.42%
Credit limit ($)	−0.086	0.028	−3.02	−0.01%
Borrower age	0.307	0.102	3.00	0.04%
Gender	0.338	0.179	1.89	3.83%
Marital status	−0.284	0.072	−3.93	−7.15%
Ln(income)	−0.999	0.290	−3.45	7.31%
Zip code dummies	Yes			
Time dummies	Yes			
Number of obs/defaults	857/67			
Pseudo R^2	0.47			

NOTES: Default is defined as 60 days past due. The model is estimated as a logit. Panels A, B, and C present results from three different regressions for marketing trials A, B, and C, respectively. The inferior offer type A1, B1, and C1 are the omitted type in marketing trial A, B, and C, respectively. FICO scores capture the credit risk characteristics 3 months prior to default (to avoid endogeneity). BT amount is the balance transfer amount; number of credit cards, utilization, credit limit all capture the credit risk characteristics of the borrower observed by the lender at the time of credit issuance. Finally, the zip code and time dummies capture the macroeconomic characteristics about the borrower.

likely to default. These findings imply that cardholders who responded to the inferior offer (A1) are significantly more likely to default. In the case of marketing trials B and C, we also find a significantly positive correlation between inferior offer types and default behaviors (and a negative correlation between superior offer types and default) *ex post*.

Furthermore, we control for the borrowers behavior score. As explained before, the internal behavior score is developed based on the internal repayment behavior with this credit card lender to assess the likelihood that a credit account will become delinquent in the near future. The results of the previous section show that the credit quality measured by the behavior score severely deteriorates for cardholders who responded to and were issued the *inferior* offer types. Although a cardholder's behavior score is unavailable to the lender at the time of card issuance, it is interesting to know whether the offer type indicators are still powerful predictors of cardholder default. Our results show that, across all three marking trials, the behavior scores are negatively and statistically correlated to default behaviors *ex post*. Most important, all offer type indicators still have negative significant coefficients, implying that cardholders who responded to the inferior credit card offers are significantly more likely to default *ex post*.

Overall, our results provide evidence on the importance of adverse selection effects in the credit card market.

4. CONCLUSION

Our paper uses a unique data set of multiple large-scale randomized market trials of preapproved credit card solicitations to test for adverse selection in the credit card market. First, our descriptive analysis reveals that consumers who responded to the lender's credit card solicitations exhibit significantly higher credit risk characteristics than those who did not respond, and consumers who responded to inferior offer types (e.g., higher APR) exhibit higher credit risk characteristics than those who responded to superior offer types. Consistent with the argument that higher risk consumers have fewer outside options for acquiring funds to smooth consumption (i.e., liquidity or credit constrained), they have a higher reservation loan interest rate.

We then test for adverse selection by estimating the likelihood of a cardholder defaulting on his credit card debt as a function of solicitation offer type, while controlling for information on a cardholder's risk attributes observed by the lender at the time the card was issued, demographic characteristics, and the extent to which a cardholder faces adverse economic shocks *ex post*. We find that cardholders who responded to the inferior credit card offers are significantly more likely to default for unobservable reasons. Moreover, we also find a more severe deterioration *ex post* in the credit quality of the booked accounts of inferior offer types relative to that of superior offers. Overall results provide strong evidence of adverse selection in the credit card market.

Given our finding that adverse selection is present with a population with relatively good credit quality, we should expect that the adverse selection effects could have been even stronger had the lender reached out to a lower credit quality population. Hence, our results should be interpreted as a minimal test of adverse selection in the credit card market.

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