ATLANTIS PRESS

Advances in Social Science, Education and Humanities Research, volume 357

2nd International Conference on Education, Economics and Social Science (ICEESS 2019)

Credit Scores Promote Trustworthiness Better than Deposits: An Experiment based on Consideration of Future Consequences

Yiran Wu*
School of Economics and Management
Beijing University of Posts and Telecommunications
Beijing, P.R.China

Xuemei Xie
School of Economics and Management
Beijing University of Posts and Telecommunications
Beijing, P.R.China

***Abstract*—Replacing deposits with credit scores is being applied in an increasing number of services, including bicycle rental, apartment rental and hotel accommodation services. Whether and why individuals' trustworthiness levels improve after the implementation of credit scores needs to be resolved. This paper establishes a bicycle rental experimental situation, obtains trustworthiness data from the subjects, and explores the interaction between different constraint conditions and the subjects' consideration of future consequences (CFC). The results indicate that the trustworthiness of the deposit group is lower than that of the credit score group. For high CFC individuals, there are no significant differences in the trustworthiness of the control group, deposit group and credit score group. For low CFC individuals who prefer current benefits, the trustworthiness of the deposit group is lower than that of the credit score group and control group when the latter two groups show no significant differences. Our findings demonstrate that credit scores promote trustworthiness better than deposits and that individuals who pay more attention to current benefits are more affected.**

Keywords—deposit free; punishment effect; trustworthiness; consideration of future consequences

I. INTRODUCTION

With the development of the digital economy, replacing deposits with credit scores has become increasingly popular in the rental domain. Many rental services, such as bicycle rental, car rental, apartment rental and hotel accommodation services, use credit scores instead of deposits to ensure that customers behave normatively. Replacing deposits with credit scores means that when individuals rent something, they are free from deposits if their credit scores exceed a required value. If they use the leased item normatively and return it on time, their scores will increase because they demonstrated trustworthy behavior. Conversely, if they flout the usage norms, for instance, by damaging leased items or using them beyond the agreed time, their scores will be reduced. Credit scores are used universally in all rental activities.

Taking bicycle sharing services in China as an example, after replacing the 99 yuan deposit with the Zhima credit score in Wuhan and Changsha, OfO, a bicycle rental service company, found that the number of bicycle repair orders in these two cities fell markedly by 8% in Changsha and 13% in Wuhan.

In general, money is a powerful incentive for individuals. However, virtual credit scores promoted trustworthiness better than a deposit in this case. Is this a unique phenomenon or a case with universal implications? Can this effect pass statistical tests? How can this interesting phenomenon be explained?

Taking the replacement of deposits with credit scores as a practical background, this paper designed an experiment to obtain trustworthiness data from subjects in a deposit group, credit score group and control group and used variance analysis to study the effect differences. In addition, we introduced consideration of future consequences (CFC) as a moderator variable to explore the reaction of individuals who prefer future benefits or current benefits under three situations.

Section 1 provides background information explaining that credit scores promote trustworthiness better than deposits according to OfO's data analysis and raises two interesting problems regarding whether this phenomenon can be replicated in a lab experiment and why credit scores perform better than deposits. Section 2 describes the theory of punishment and CFC and infers the moderating direction of CFC. Section 3 presents the experimental study on the deposit-credit score constraint effect. Section 4 presents the results of the data analysis and demonstrates that the credit score group has a higher trustworthiness level than the deposit group. The reactive influence of the constraint conditions (control, deposit, credit score) and CFC (preference for future benefits, preference for current benefits) on trustworthiness is analyzed through variance analysis and simple effects analysis. Section 5 contains conclusions and several ideas for further work.

II. THEORY AND HYPOTHESES

A. The Influence of Punishment on Trustworthiness

Punishment can change cooperation levels; according to research, the information that punishment conveys and an individual receives can influence this effect.

Punishment that conveys norm information has a better effect. Andrighetto et al. find that cooperation is a product of

norm psychology elicited by norm-signaling and coercive devices [1]. Norms inform individuals about how they are supposed to behave. Material punishment makes the expected consequences of violating norms more certain, thus making norms salient in subjects' minds. The interaction of norm communication and material punishment leads to higher and more stable cooperation at a lower cost for the group than when the two strategies are used separately. Villatoro et al. also prove that humans are motivated not only by the material incentives that punishment imposes but also by the normative information that it conveys [2]. The same material incentive has a different effect on individuals' future compliance depending on the way it is implemented, having a stronger effect when it also conveys normative information. In a field experiment, de Melo & Piaggio reveal that effective punishment requires clarification of the social signal conveyed by the punishment [3]. Indeed, Xiao indicates that if people know that enforcers can benefit monetarily by punishing, they no longer view the punishment as signaling a norm violation [4].

How punishment is interpreted by individuals is another factor that influences its effect on promoting trustworthiness. When people regard punishment as blame for the negative result of their self-interested behavior, punishment can promote trustworthiness. Mulder, Verboon, & De Cremer note that sanctions may promote adherence to moral norms when they are interpreted as retributive rather than compensatory [5]. When sanctions are interpreted as a means to obtain retributive justice (i.e., to punish the perpetrator), they will likely be perceived as moral condemnation of the transgression of a behavioral norm and thus increase adherence to moral norms. However, if people interpret a sanction as a means to obtain compensatory justice, it will more be likely seen as a business transaction and thus decrease adherence to moral norms. In the case study of Houser, Xiao, McCabe, & Smith, subjects interpret punishment as the price for self-interested behavior, and the price is considered an excuse for selfishness [6].

Under credit score conditions, when individuals demonstrate trustworthy rent-return behavior, their credit score will increase, allowing them to enjoy more benefits and convenience. This rule conveys clear information that trustworthiness is encouraged. Individuals realize that renting and returning leased items normatively is a sign of trustworthiness. Thus, an individual's behavior is related to social norms. Conversely, in long-period lease activity, deposits will remain in the hands of businesses and form cash pools. Many businesses divert deposits to investment activity and gain benefits thereby. This activity conveys that businesses ask for deposits for their own profit. Thus, a deposit's effect of conveying norm information is weakened.

In addition, money is usually deducted from a deposit when people break lease rules or damage or lose leased items. Thus, an individual is likely to interpret a deposit as a business compensation or a prize for untrustworthy behavior. This also weakens a deposit's punishment effect.

Hypothesis 1: Individuals' trustworthiness is higher in the credit score condition than in the deposit condition.

B. The Regulation of Trustworthiness by CFC

Punishment theory partly explains why replacing deposits with credit scores promotes an individual's trustworthiness, but in addition to differences in the information that deposits and credit scores convey and its interpretation, the two strategies have another difference. The punishment of deposits is specific, current and instantaneous, whereas a credit score relates to future benefits that are uncertain. Therefore, an individual's time bias may moderate the effect of deposits and credit scores. To explore their effect on people who prefer future or current benefits, we refer to consideration of future consequences (CFC).

Strathman, Gleicher, Boninger, & Edwards proposed the construct called CFC, which is a stable individual difference in the extent to which people consider the distant versus immediate consequences of potential behaviors [7]. Individuals high in CFC consider future outcomes as a matter of course. These individuals believe that certain behaviors are worthwhile because of future benefits, even if immediate outcomes are relatively undesirable or there are immediate costs. They are willing to sacrifice immediate benefits such as pleasure or convenience to achieve more desirable future states. Individuals low in CFC are more concerned with maximizing immediate benefits at the expense of costs or benefits that will not occur for some time, and they place a high priority on such immediate benefits. Thus, when individuals who do not typically consider future consequences encounter information about diminishing landfill space, they may find this future-relevant information unpersuasive. This may be because they think that immediate goals are more important, or they may be more strongly influenced by the more concrete and certain immediate consequences than by uncertain, probabilistic future outcomes. As an efficient psychological evaluation instrument and as an important metric for individual differences in the study of temporal orientation, CFC is used in research on procrastination [8], transformational leadership behavior [9], environmentally sustainable behaviors [10] and other domains.

The amount of a deposit is certain, and people pay deposits immediately. CFC theories imply that individuals that pay more attention to current outcomes will be more affected by deposits.

Hypothesis 2: Deposits' influence on trustworthiness is likely to be stronger when individuals prefer current benefits.

In the credit score condition, non-trustworthy behaviors will drop a person's credit value, thus influencing personal credit records and applications for credit cards, mortgages and car loans. The credit score plays a role in the future. CFC theories imply that individuals that pay more attention to future outcomes will be more affected by credit scores.

Hypothesis 3: Credit scores' influence on trustworthiness is likely to be stronger when individuals prefer future benefits.

III. EXPERIMENT

A. Subjects

A total of 158 college students (age range 18-25, 33.5% male) were recruited from different departments and voluntarily participated in our experiment.

B. Experimental Design

To measure subjects' trustworthiness, we employed the trust game [11], in which a sender lends money to a receiver, and the amount returned to the sender represents the receiver's trustworthiness. We used a bicycle rental situation that most subjects had experienced so that subjects could give the most realistic responses. Therefore, we utilized the possibility of an individual returning a bicycle normatively to measure subjects' trustworthiness. In the control treatment, there was no constraint for the subject. In the deposit and credit score treatments, subjects were asked to consider what, when they pay a 100 yuan deposit or use their credit score to rent a bicycle, is the possibility of them returning the bicycle normatively.

To test our hypotheses, we asked the subjects to complete a CFC scale (CFCS). Strathman developed this scale to measure individuals' CFC characteristics, and it showed good convergent validity and predictive validity. We used SPSS 23 for the reliability analysis. The results suggested that for this study, the internal consistency reliability of the CFCS is good (0.786).

IV. RESULTS

A. Subjects' Trustworthiness under Different Constraint Conditions

The box graph (see fig. 1) demonstrates that the trustworthiness of the deposit group is lowest. The difference between the credit score group and the control group is small, with the trustworthiness of the credit score group being slightly higher. OfO's big data system found that behaviors that resulted in damaged bicycles declined during the rental process after deposits were replaced with credit scores. This phenomenon was replicated in the laboratory experiment. The practical case data and experimental data mutually verified and supported hypothesis 1: "Individuals' trustworthiness is higher in the credit score condition than in the deposit condition".

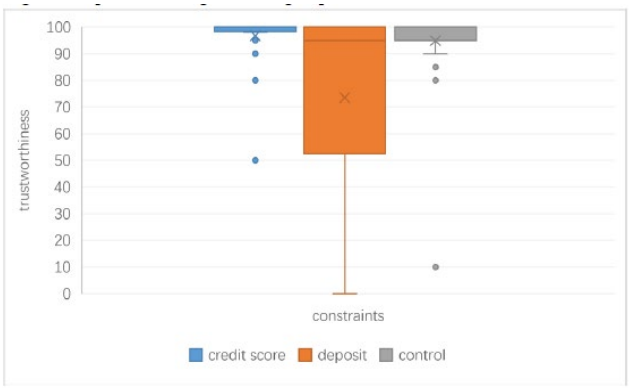


Fig. 1. Comparison among the three groups

B. Reaction Influence of Constraint Conditions and CFC on Trustworthiness

In table I, for constraints, F (2,152) =12.605, p<0.001, the influence effect is significant. For CFC, F (1,152) =9.718, p=0.002<0.05, the influence effect is significant. For their interaction, F (2,152) =3.820, p=0.024<0.05, the influence effect is significant.

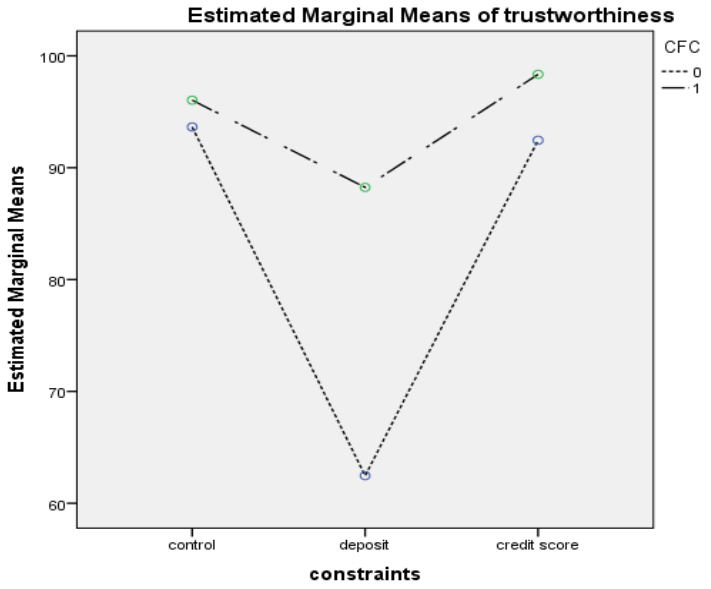
TABLE I. TESTS OF BETWEEN-SUBJECTS EFFECTS FOR THE INFLUENCE OF CONSTRAINTS AND CFC

Dependent Variable: trustworthiness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	24176.796a	5	4835.359	9.358	.000
Intercept	1220949.561	1	1220949.561	2362.836	.000
constraints	13027.205	2	6513.602	12.605	.000
CFC	5021.640	1	5021.640	9.718	.002
constraints * CFC	3947.376	2	1973.688	3.820	.024
Error	78543.059	152	516.731		
Total	1335971.000	158			
Corrected Total	102719.854	157			

[a.] a. R Squared = .235 (Adjusted R Squared = .210)

As fig. 2 shows, the marginal means of different groups change with CFC, and the two lines are not parallel. Individuals' trustworthiness is lower in the deposit group than in the credit score group. When CFC=0, this effect is stronger. Hypothesis 2, "Deposits' influence on trustworthiness is likely to be stronger when individuals prefer current benefits," is supported.



Note: Low CFC and high CFC are represented by 0 and 1, respectively.

Fig. 2. The reaction influence of constraints and CFC

We used syntax for the simple effects test in SPSS, and the results are shown in table II.

TABLE II. PAIRWISE COMPARISONS FOR TESTING SIMPLE EFFECTS FOR CFC

Dependent Variable: trustworthiness

CFC	(I) constraints	(J) constraints	Mean Difference (I-J)	Std. Error	Sig.b	95% Confidence Interval for Differenceb	
						Lower Bound	*Upper Bound*
0	control	deposit	31.176*	6.255	.000	16.074	46.277
		credit score	1.188	6.110	.996	-13.564	15.941
	deposit	control	-31.176*	6.255	.000	-46.277	-16.074
		credit score	-29.987*	5.926	.000	-44.296	-15.679
	credit score	control	-1.188	6.110	.996	-15.941	13.564
		deposit	29.987*	5.926	.000	15.679	44.296
1	control	deposit	7.799	6.614	.561	-8.169	23.767
		credit score	-2.309	6.246	.976	-17.389	12.771
	deposit	control	-7.799	6.614	.561	-23.767	8.169
		credit score	-10.108	6.669	.345	-26.210	5.994
	credit score	control	2.309	6.246	.976	-12.771	17.389
		deposit	10.108	6.669	.345	-5.994	26.210

[b.] Based on estimated marginal means

[c.] *. The mean difference is significant at the 0.05 level.

[d.] b. Adjustment for multiple comparisons: Sidak.

When CFC is low (CFC=0), for the control group and deposit group, the mean difference is significant ($p<0.001$); for the control group and credit score group, it is not significant ($p=0.996>0.05$); and for the deposit group and credit score group, it is significant ($p<0.001$).

When CFC is high (CFC=1), for the control group and deposit group, the mean difference is not significant ($p=0.561>0.05$); for the control group and credit score group, it is not significant ($p=0.976>0.05$); and for the deposit group and credit score group, it is not significant ($p=0.345>0.05$).

The results demonstrate that for individuals who prefer current benefits, deposits lead to the worst trustworthiness, while the credit score's effect is the same as that of having no constraint. For individuals who prefer future benefits, there are no differences among the three conditions. Therefore, Hypothesis 3, "Credit scores' influence on trustworthiness is likely to be stronger when individuals prefer future benefits," is not supported.

V. CONCLUSION

The main findings of our study are threefold. First, credit scores promote trustworthiness better than deposits. Second, for individuals who prefer future benefits, their trustworthiness does not change under deposit and credit score conditions. Third, for individuals who prefer current benefits, their trustworthiness does not change under credit score conditions but is worse under deposit conditions.

Deposits result in lower trustworthiness, and low CFC, which implies that greater attention is paid to current outcomes, makes this effect stronger. Our findings are consistent with previous studies: Arnocky, Milfont, & Nicol show that environmental concern and environmental behavior motivation are positively predicted by CFC-Immediate scores but not CFC-Future scores [10]. Khachatryan, Joireman, & Casavant reveal that preference for biofuels is inversely related to consideration of immediate consequences and positively related to consideration of future consequences [12].

With our study, we generate two contributions to the academic literature. First, we add new supportive evidence of the CFC theory. A previous study focused on the domain of environmental protection, alcohol and mental health [13], and we extended the application of CFC to the credit domain. Second, the CFCS has been examined in English, Italian [14] and Portuguese [15] translations, and the present study confirms that the CFC construct and CFCS can be used for research purposes in the Chinese language.

Furthermore, our results may have important implications. Replacing deposits with credit scores can reduce the threshold for participation in rental activities, improve efficiency and improve user experience. Whether credit scores can effectively guide users to form civilized and trustworthy habits, encourage users to engage in trustworthy behavior, and form a virtuous circle of trusting relationships between merchants and users are some of the key issues to determine whether this model can develop well and sustainably. This paper explains differences in the effects of punishment on trustworthy cooperation from the perspective of future and immediate benefits preference, which can provide a theoretical reference for the application and development of a “deposit free” business model.

REFERENCES

[1] ANDRIGHETTO G, BRANDTS J, CONTE R, et al. Punish and Voice: Punishment Enhances Cooperation when Combined with Norm-Signalling[J]. PLOS ONE, 2013,8(e649416).

[2] VILLATORO D, ANDRIGHETTO G, BRANDTS J, et al. The Norm-Signaling Effects of Group Punishment: Combining Agent-Based Simulation and Laboratory Experiments[J]. SOCIAL SCIENCE COMPUTER REVIEW, 2014,32(3):334-353.

[3] de MELO G, PIAGGIO M. The perils of peer punishment: Evidence from a common pool resource framed field experiment[J]. ECOLOGICAL ECONOMICS, 2015,120:376-393.

[4] XIAO E. Profit-seeking punishment corrupts norm obedience[J]. GAMES AND ECONOMIC BEHAVIOR, 2013,77(1):321-344.

[5] MULDER L B, VERBOON P, De CREMER D. Sanctions and moral judgments: The moderating effect of sanction severity and trust in authorities[J]. European Journal of Social Psychology, 2009,39(2):255-269.

[6] HOUSER D, XIAO E, MCCABE K, et al. When punishment fails: Research on sanctions, intentions and non-cooperation[J]. Games and Economic Behavior, 2008,62(2):509-532.

[7] STRATHMAN A, GLEICHER F, BONINGER D S, et al. The consideration of future consequences: Weighing immediate and distant outcomes of behavior.[J]. Journal of Personality and Social Psychology, 1994,66(4):742-752.

[8] REBETEZ M M L, BARSICS C, ROCHAT L, et al. Procrastination, consideration of future consequences, and episodic future thinking[J]. Consciousness and cognition, 2016,42:286-292.

[9] ZHANG W, WANG H, PEARCE C L. Consideration for future consequences as an antecedent of transformational leadership behavior: The moderating effects of perceived dynamic work environment[J]. LEADERSHIP QUARTERLY, 2014,25(2):329-343.

[10] ARNOCKY S, MILFONT T L, NICOL J R. Time Perspective and Sustainable Behavior Evidence for the Distinction Between Consideration of Immediate and Future Consequences[J]. ENVIRONMENT AND BEHAVIOR, 2014,46(5):556-582.

[11] BERG J, DICKHAUT J, MCCABE K. TRUST, RECIPROCITY, AND SOCIAL-HISTORY[J]. GAMES AND ECONOMIC BEHAVIOR, 1995,10(1):122-142.

[12] KHACHATRYAN H, JOIREMAN J, CASAVANT K. Relating values and consideration of future and immediate consequences to consumer preference for biofuels: A three-dimensional social dilemma analysis[J]. JOURNAL OF ENVIRONMENTAL PSYCHOLOGY, 2013,34:97-108.

[13] MCKAY M T, PERRY J L, PERCY A, et al. Evidence for the reliability and validity, and some support for the practical utility of the two-factor Consideration of Future Consequences Scale-14[J]. PERSONALITY AND INDIVIDUAL DIFFERENCES, 2016,98:133-136.

[14] NIGRO G, COSENZA M, CICCARELLI M, et al. An Italian translation and validation of the Consideration of Future Consequences-14 Scale[J]. PERSONALITY AND INDIVIDUAL DIFFERENCES, 2016,101:333-340.

[15] ECHEVERRIA A V, ESTEVES C, GOMES C V, et al. Portuguese Validation of the Consideration of Future Consequences Scale[J]. The Spanish journal of psychology, 2015,18:E7.