Loan forbearance takeup in the Covid-era - The role of time preferences and locus of control

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ABSTRACT

During the COVID-19 pandemic, many countries eased the burden on borrowers through loan forbearance. Using a representative sample of the Hungarian adult population, we investigate whether time preferences and locus of control are associated with loan forbearance takeup. We find evidence that time discounting correlates with the resort to forbearance: ceteris paribus, more patient individuals are less likely to take up forbearance, even after controlling for their present/future bias, risk aversion, locus of control, demographic characteristics, educational level, financial status, and the effects of the pandemic. However, present bias and locus of control are not significantly associated with loan forbearance.

1. Introduction

Private and public loan forbearance programs have been widely used policy tools during the COVID-19 crisis around the world. According to the Oxford University database (Hale et al., 2020), 173 countries applied a nationwide temporary suspension of loan repayments or other contract reliefs for households until mid-2021. In the US, loans worth $2 trillion (a large share of mortgages, and almost all student loan debts) were in forbearance by the end of 2020 affecting 60 million individuals (Cherry et al., 2021). In Hungary, the forbearance program was the main economic policy tool to help households cope with the crisis, as no direct income support was provided (Drabancz et al., 2021). Participation was mandatory for banks. From an international perspective, it is one of the longest programs, the last prolongation ending on December 31, 2022.

Debt renegotiations, a dynamic bargaining between the lender and the borrower, is a well-researched area (Bergman and Callen, 1991; Chemmanur and Fulghieri, 1994; Hart and Moore, 1998; Moraux and Silaghi; 2014). However, the empirical literature focusing on the evaluation of public and private forbearance programs is mixed. On the one hand, it is a specific "emergency loan" which provides liquidity to distressed borrowers, helping them survive temporary crises. On the other hand, it can significantly increase the moral hazard, leading to a higher risk of default in the long run. Loan forbearance as a policy tool was found to be highly effective (Agarwal et al., 2017; Collins and Urban, 2018), ineffective in the long run (Dobbie and Song, 2020; Bergant, 2020), or dependent on the quality of institutions (Cherry et al., 2021; Godlewski, 2020; Mourad et al., 2020; Piskorski and Seru; 2021). Our study contributes to the empirical debate by investigating the borrowers' side and focusing on the psychological characteristics of those participating in the moratorium.

A growing literature discusses how preferences and personality traits affect financial decisions. There are many preferences and

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personality traits, here we focus on two aspects of time preferences (time discounting and present bias) and locus of control due to their relevance indicated by the literature. There is ample evidence that individuals who discount the future less save more (Bradford et al., 2017; Falk et al., 2018) and have higher creditworthiness (Meier and Sprenger, 2012). Moreover, present-biased individuals are more likely to have credit card debt (Meier and Sprenger, 2010) and financial difficulty (Horn and Kiss, 2020). Locus of control has been shown to be relevant in saving decisions (Chatterjee et al., 2011; Cobb-Clark et al., 2016; Lunt and Livingstone, 1991) and in financial difficulty (Kuhnen and Melzer, 2018). Individuals who believe to a greater degree to have control over the outcomes of their life (exhibiting internal locus of control, as opposed to those with an external locus of control who attribute to external factors like luck or God what happens to them) have more savings and fewer financial problems. Moreover, there is growing evidence that time preferences (Meier and Sprenger, 2015) and locus of control (Cobb-Clark and Schurer, 2013) are stable in time at the individual level.

To the best of the authors' knowledge, this study is the first to examine whether time preferences and locus of control are associated with the takeup of loan forbearance. Since taking up forbearance may be due to looming or (already present) financial hardship or the lack of savings, we focus on time preferences and locus of control that have been shown to associate with these factors. Our hypotheses are built on the findings of the literature that less time discounting, less present bias, and more internal locus of control are positively associated with having more savings and experiencing fewer financial difficulty. Therefore, we expect that individuals who discount the future less and are less present-biased are less likely to resort to loan forbearance, ceteris paribus. Similarly, we hypothesize that internal locus of control tendencies correlate with less participation in loan forbearance.[1] Moreover, our study also sheds light on whether time preferences and locus of control are associated with loan forbearance takeup (if they are) only through the proposed channels (savings, financial difficulty, and the effects of COVID-19), or is there a genuine relationship beyond these channels.

Using representative data on the Hungarian adult population, we observe that time discounting correlates with loan forbearance while present bias and locus of control do not. Regression analysis confirms these findings. In successive specifications, we add more and more controls (demographic characteristics, educational level, financial status, and effects of the pandemic) to see if respondents' time preferences and locus of control correlate with their resort to forbearance. We find that individual discount factors are negatively associated with the takeup of loan forbearance, even when considering all the control variables. Our findings suggest that time discounting may affect the takeup of forbearance through savings and financial difficulty: individuals who discount the future less have more savings and fewer financial difficulty and, as a consequence, are less likely to resort to loan forbearance. Interestingly, time discounting remains significantly associated with participation in the loan forbearance program even after controlling for these channels.

The rest of the study is structured as follows. Section 2 presents briefly the data, Section 3 reports the main findings, and Section 4 concludes.

2. Data

The research institute TÁRKI carried out the data collection in November 2020. They interviewed 809 respondents by telephone (due to COVID-19) who were representative of the Hungarian population in terms of gender, age, settlement type, and education level. The data collected provide information on gender, age, settlement type, region of residence, education level, family (marital status, household size, number of children), employment status, income, and perceived financial situation. Respondents also revealed how the COVID-19 pandemic affected their own health, the health of their family members, and their own financial situation (we refer to these effects as Effects of COVID-19 in the analysis below).[2]

The questions related to financial issues involved i) financial difficulty (a variable on the inability to pay utility bills, mortgage, or other debt in the last year, that is, in 2020), ii) the takeup of loan forbearance (binary variable on whether the respondent resorted to it, given that she had any type of loan), and iii) savings (the number of months that the respondent could live on their savings without problems).[3] We focus on loan forbearance, but take into account the other financial variables as well since they may constitute potential channels.[4]

We followed the staircase (or unfolding brackets) method of Falk et al. (2018) when measuring time preferences. Respondents repeatedly had to choose between an earlier amount (fixed at 10,000 HUF, approximately equivalent to 35 USD at that time) and a larger later amount (X). The later amount changed in an adaptive manner so that we could approximate the amount that made the

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[1] In Supplementary material A, we use a conceptual map to describe the potential relationships between the personality traits and financial variables, complemented also by the effects of the pandemic. In Appendix A, we present a simple theoretical model that incorporates both time preferences and locus of control. Our model leads to the same predictions.

[2] Supplementary material B contains a more detailed presentation of our measures on the effect of COVID-19 and its associations with the other variables of interest.

[3] Questions were asked in this order. Concerning financial difficulties, respondents could indicate that 1) they did not have such outlays, 2) yes, they had payment problems, and 3) no payment problems. Concerning loan forbearance, respondents could express that 1) they did not have a loan, 2) they had a loan but did not use loan forbearance, and 3) they had a loan and used loan forbearance. Regarding savings, respondents could indicate four categories: 1) they have no savings, 2) they have enough savings for 1-2 months, 3) for 3-4 months, or 4) for more than 4 months. These categories have been converted to a continuous savings variable. Apart from the options mentioned for each question, respondents could also indicate if they did not know the answer, or did not want to answer.

[4] Note that if a respondent does not have a loan, then she cannot be eligible for loan forbearance. Moreover, having payment problems related to existing loans is also conditional on having loans. However, the financial difficulty variable is broader in the sense that it includes the possibility that the respondent has problems paying utility bills. Hence, a respondent can experience financial difficulty even without having loans.

respondent indifferent between receiving the earlier or the later payment. There were three hypothetical interdependent questions. This task was carried out on two time horizons: now versus 1 month, and 12 months versus 13 months. In line with the literature, the discount factor (δ) that equalizes the 10,000 HUF in 12 months with X13 in 13 months (10,000 = δX_{13}) is the proxy for time discounting (or patience). Using δ, based on the model of (β, δ)-preferences (Laibson, 1997), we could also calculate the parameter of time inconsistency (β) from the equation 10,000= $\beta \delta X_1$, where X_1 denotes the larger amount to be received in a month versus now. $\beta < 1$ indicates present bias, $\beta > 1$ indicates future bias, and $\beta = 1$ denotes time consistency.[5]

As time discounting involves risk by necessity (the future is inherently risky), we also measured risk attitudes with a hypothetical question to disentangle them. We followed Sutter et al. (2013) and proxied risk aversion by the amount placed as a bet in a gamble. The maximum amount that could be put at risk was 10,000 HUF.

Following Kuhnen and Melzer (2018), we used the Pearlin mastery scale (Pearlin and Schooler, 1978) to measure locus of control. This measure consists of seven statements, and the respondents could indicate to what degree they agreed with the statement on a 1–5 scale. We coded the answers so that higher scores denoted more internal tendencies. Locus of control does not correlate either with the discount factor (Pearson correlation = 0.044, p-value = 0.229), or the present bias (Pearson correlation = 0.053, p-value = 0.152).[6]

3. Findings

Our aim is to see whether two aspects of time preferences (time discounting and present bias) and locus of control are associated with the use of loan forbearance. Note that we only consider individuals who were eligible for forbearance, i.e. those who had a mortgage or other bank loan. First, we present some descriptive statistics to show how forbearance is associated with other financial variables (namely financial difficulty and savings), time discounting, present bias, and locus of control. Then, we proceed with the regression analysis to see if correlations persist when considering more and more control variables, paying special attention to potential channels.

Table 1 shows the correlations between the variables of main interest. It indicates that time discounting and locus of control are associated with financial difficulty and savings in line with the literature.[7] Furthermore, the correlations show that time discounting correlates negatively with forbearance, while locus of control seems to be unrelated to it. The association between present bias and the financial variables has the expected sign in all cases, but the correlation is never significant.

Table 2 shows the output of a logit regression where the dependent variable is if the respondent uses loan forbearance (in case she has any loan).[8] We observe that – while controlling for present bias, future bias, internal locus of control, and risk preferences – δ, the discount factor correlates negatively with taking up loan forbearance, indicating that individuals who value the future more are less likely to use forbearance. This coefficient is both statistically and economically significant. The average marginal effects calculated from the model show that individuals whose discount factor is higher by one standard deviation are 9.26% less likely to use forbearance. The association between forbearance takeup and discount factor remains significant at the 1% significance level even if we take into account the respondents' gender, age, settlement type, education level, financial status (that includes employment status

Table 1
Correlations between time discounting, present bias, locus of control, and the financial variables of interest.

	Forbearance	Financial difficulty	Savings
Time discounting	−0.141 ***	−0.096***	0.121 ***
Present bias	0.047	0.035	−0.055
Locus of control	−0.044	−0.167 ***	0.267 ***

Notes: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.
Pearson correlations and their significance. The discount factor δ represents time discounting from the (β, δ)-model, while present bias is a dummy variable (=1, if $\beta < 1$). Locus of control is the aggregated value from seven 5-point Likert scale questions, where higher scores correspond to a stronger internal locus of control. Forbearance is a dummy variable showing whether the respondent took up forbearance (conditional on having a loan). Savings is a continuous variable created from 4 categories. Financial difficulty is a dummy indicating whether the respondent had difficulty paying their loans or utility bills in the last year.

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[5] The discount factor and present bias are positively correlated (Pearson correlation =0.269, p-value<0.001), but this correlation is partly mechanic since present bias (being more impatient now than later) is more likely to occur if the discount factor is higher.

[6] This is in line with the literature, as studies generally report a low correlation between locus of control and time preferences (e.g. Becker et al., 2012; Kuhnen and Melzer, 2018).

[7] In Supplementary material C, we provide further evidence in the form of regressions on the relationships between our main explanatory variables (time preferences and locus of control) and the main financial outcomes (financial difficulties and savings). We are able to reproduce most of the main findings of the literature reported in the Introduction.

[8] Baseline groups of the categorical variables are the following: settlement type - town, education level - tertiary, perceived financial situation - okay, employment - employed, savings - no savings, financial difficulties – no payment problems.

Table 2

Forbearance, time discounting, and locus of control – logit regression.

| | Dependent variable: takeup of loan forbearance (=1 if yes) | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Delta (discount factor)	−2.289***	−2.218***	−2.227***	−2.181***	−2.350***	−2.222**
	(0.694)	(0.726)	(0.749)	(0.775)	(0.833)	(0.865)
Present bias	0.385	0.339	0.302	0.214	0.124	0.088
	(0.298)	(0.307)	(0.313)	(0.324)	(0.344)	(0.357)
Internal locus of control	−0.023	−0.017	−0.013	−0.007	−0.013	−0.011
	(0.022)	(0.023)	(0.023)	(0.024)	(0.026)	(0.027)
Risk, future bias	✓	✓	✓	✓	✓	✓
Demographic controls		✓	✓	✓	✓	✓
Financial status			✓	✓	✓	✓
Financial difficulty				✓	✓	✓
Savings					✓	✓
Effects of COVID-19						✓
Constant	1.481*	1.228	1.036	0.931	2.032	2.031
	(0.848)	(1.146)	(1.201)	(1.232)	(1.353)	(1.654)
Observations	324	324	321	321	300	291
Log Likelihood	−206.098	−201.844	−199.813	−189.514	−173.757	−169.652
Akaike Inf. Crit.	424.195	429.687	433.626	417.028	391.514	389.303

Notes: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Weighted logit regressions on the takeup of loan forbearance using the stepwise regression method.

The delta discount factor represents time discounting from the (β, δ)-model, while present bias is a dummy variable (=1, if $\beta < 1$).

Locus of control is the aggregated value from seven 5-point Likert scale questions, where higher scores correspond to a stronger internal locus of control.

Higher values of risk preference represent more risk-tolerant respondents.

Future bias is the opposite of present bias (=1, if $\beta > 1$).

Demographic controls: gender, age, settlement type (the capital, other towns, or village), and education level (primary education, no high-school graduation, high-school graduation, tertiary education).

Financial status: employment (employed, unemployed, inactive), perceived financial situation (good, okay, bad).

Financial difficulty: whether the respondent has problems paying their loans (if they had any) or utility bills.

Savings: measured by the number of months the respondent could live off of their savings.

Effects of COVID-19: see definitions in Section 2 (Data), lower values indicate that the pandemic had a worse effect on the respondent.

and perceived financial situation), savings, and financial difficulty. Note that the coefficient barely changes in subsequent specifications, suggesting that there is a genuine and stable association between time discounting and resort to loan forbearance that is less likely to be affected by potential confounders. The association remains significant at the 5% significance level even after considering the effects of the COVID-19 pandemic.

Appendix B contains a robustness check in which we include the self-reported income when considering financial status. We obtain qualitatively the same results as the coefficient of the discount factor is negative and significant at least at 5% in the specifications (1)–(4). However, once we control for savings and the effects of COVID-19, the significance vanishes. Our preferred model is the one without self-reported income, as about one third of the respondents do not report their income, so we lose many observations. Moreover, not reporting income correlates with the perceived financial situation, raising issues of self-selection.

We also consider potential channels through which time discounting may operate. More concretely, we assume that the association of time discounting with the takeup of loan forbearance may be mediated by savings (higher discount factor correlates with higher savings that, in turn, makes it less likely to resort to loan forbearance), financial difficulty (lower discount factor correlates with a higher probability of financial difficulty that, in turn, leads to the takeup of loan forbearance), or the effect of the COVID-19 pandemic (time discounting may be associated with suffering from COVID-19 which, in turn, may correlate with the use of loan forbearance). Table C1 in Appendix C contains all possible combinations of these potential channels, together with the control variables that we considered before. In line with natural expectations, savings correlate negatively with the takeup of loan forbearance, while financial difficulty is associated with a higher probability of resorting to loan forbearance. However, suffering from COVID-19 does not correlate with the takeup of loan forbearance. Importantly, the coefficient of the discount factor is remarkably stable and significant in all specifications, suggesting that time discounting plays an important role beyond these channels.

Even though the coefficient of present bias has the expected sign in all specifications (indicating that present-biased respondents are more likely to take up loan forbearance), it is never significant. Turning to the locus of control, even though the sign of the coefficient is

consistently negative (suggesting that individuals with more internal tendencies are less likely to resort to forbearance), in no specification do we observe a significant relationship between locus of control and loan forbearance.

4. Conclusions

Based on the existing literature, time preferences and locus of control seem to be important non-cognitive determinants of financial decisions and outcomes. Our aim in this study was to see if they are also associated with the takeup of loan forbearance, a widely used policy tool during the pandemic to ease the financial burden on households. We find that present bias and locus of control are not associated with the takeup of forbearance, but we document a negative relationship between the discount factor and the use of forbearance. This relationship is stable, even if we control for present/future bias, risk preferences, locus of control, several demographic and socioeconomic variables, savings, financial difficulty, and the effects of the COVID-19 pandemic.

Our study has several limitations. We use cross-sectional data, so we are able only to document associations. Our analysis may suffer from omitted variable bias. Notably, we do not have data on the interest rates that the respondents face. Interest rates may be a confounder if they are associated both with loan forbearance takeup and personality traits. Suppose that a group of respondents faces high interest rates (for instance, on their personal loan), while another group enjoys lower rates. If interest rates correlate with personality traits (higher rates being associated with higher discount factors and lower internal locus of control) and also affect loan forbearance takeup (individuals with higher interest rates being more likely to participate in loan forbearance), then we would observe the same associations between time discounting and loan forbearance that we see in our data. More research is needed to find out if such confounders are behind our results.

Contrary to the predictions of our theoretical model (presented in Appendix A), locus of control does not significantly correlate with loan forbearance (though, as we show in Supplementary material C, it is significantly associated with savings and financial difficulty). This nil result may be due to several factors. First, the set of eligible respondents to participate in loan forbearance is restricted relative to the sample as only those with a loan could take advantage of it. Within this smaller set of respondents, locus of control does not correlate with the takeup, while in the whole sample locus of control is associated with savings and financial difficulty. Second, to have savings or to avoid financial difficulty may require more effort than participating in a highly regulated and widely promoted loan forbearance program. If locus of control exerts its effect through effort, then the difference in the required effort may explain why it has a reduced or no role in the takeup of loan forbearance. Future research will tell whether this nil result is specific to our sample, or is a general finding.

Understanding how borrowers' personality traits are associated with their financial decisions has become a burgeoning research field. Findings in this area can help lenders provide better services and improve their risk management models and may be also helpful for policy-makers to design better policies in the future.

CRediT authorship contribution statement

Edina Berlinger: Conceptualization, Validation, Writing – review & editing. **Hubert János Kiss:** Conceptualization, Methodology, Validation, Writing – original draft. **Sára Khayouti:** Methodology, Software, Validation, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Data will be made available on request.

Acknowledgement

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2022.103250.

Appendix A – A simple theoretical model on time preferences, locus of control, and the takeup of loan forbearance

In this appendix, we propose a simple theoretical model to provide a prediction on how time preferences and locus of control affect the resort to forbearance.

Consider a model with two periods, $t = 1,2$. Assume an agent with a well-behaved concave utility function. The agent has some endowment (e.g. income) in both periods (I_1, I_2). Suppose that the agent has a fixed amount of loan (L) to be repaid in period 1. Loan forbearance embodies the possibility to delay the repayment until period 2. For simplicity, we disregard interest rates and any penalty if she pays back in period 2 instead of period 1. We also assume that the agent has enough endowments in both periods to pay back the loan, so $I_1 \geq L$, $I_2 \geq L$.

Several studies (e.g. Kuhnen and Melzer, 2018) argue that locus of control shapes the perception about the consequences of acting. More precisely, individuals with more internal tendencies may believe that their efforts or sacrifices made today are more likely to bring benefits in the future. In this vein, we conceptualize locus of control as an effort choice problem. Regarding loan forbearance, we consider the effort to pay back the whole amount of the loan in period 1 (that is, the effort made to avoid paying back in period 2 that can be interpreted as avoiding the use of loan forbearance). The more effort is made in period 1, the more probable it is that the loan is paid back in period 1. We assume that effort (denoted by e) is chosen in period 1, and $e \in [0,1]$. Effort is costly, and, for simplicity, we assume a quadratic cost function $c(e) = \frac{\gamma e^2}{2}$, with $\gamma > 0$. Locus of control is captured by the parameter $s \in [0,1]$, higher s denoting more internal tendencies.

The agent chooses an effort level (e) to maximize the perceived expected utility after considering the cost of effort. Following Kuhnen and Melzer (2018), we suppose that the agent believes that the probability of paying back the loan in period 1 is $e*s$, that is the effort made by the agent multiplied by her internal locus of control. Hence, an agent with the maximum internal locus of control ($s = 1$) who makes the maximum effort ($e = 1$) believes that with probability 1 she will repay the loan in period 1. On the other extreme, an agent with very low internal tendencies ($s = 0$) believes that whatever effort she makes, she will not be able to pay back the loan in period 1.

If the agent pays back the loan in period 1, then her utility in that period is $u(I_1 - L)$, while her utility in period 2 is $u(I_2)$. If the loan is repaid in period 2, then utilities in the periods are $u(I_1)$ and $u(I_2 - L)$. Period 2 utility is discounted by δ. β represents the present bias parameter.

The agent's optimization problem is the following:

$$max_e \quad -\frac{\gamma e^2}{2} + es[u(I_1 - L) + \beta\delta u(I_2)] + (1 - es)[u(I_1) + \beta\delta u(I_2 - L)]$$

The first-order condition of the optimum is

$$e = \frac{s(\beta\delta[u(I_2) - u(I_2 - L)] - [u(I_1) - u(I_1 - L)])}{\gamma}$$

Ceteris paribus, the lower δ is, that is the more the agent discounts the future, the lower the optimal effort e is. Lower effort implies a lower probability to repay the loan in period 1. Therefore, higher time discounting (that is, a lower δ) entails a higher probability to pay back the loan in period 2, that is a higher probability to resort to loan forbearance. Present bias β has a similar effect. *Ceteris paribus*, the lower β is, that is the more present-biased the agent is, the lower the effort in period 1 is to repay the loan. Hence, more present bias may lead to enhanced use of loan forbearance.[9]

Regarding the effect of locus of control, there are two possibilities: $\frac{(\beta\delta[u(I_2) - u(I_2 - L)] - [u(I_1) - u(I_1 - L)])}{\gamma}$ is either positive or non-positive. In the first case, it is easy to see that, ceteris paribus, the higher s is, indicating more internal locus of control, the more effort the agent makes. More effort in our model implies that the probability of the loan being repaid in period 1 is higher, that is the less likely the agent is to resort to loan forbearance. If $\frac{(\beta\delta[u(I_2) - u(I_2 - L)] - [u(I_1) - u(I_1 - L)])}{\gamma}$ is zero or negative, then given our assumption that e is non-negative, a corner solution of $e = 0$ is obtained. In this case, internal locus of control does not play a role. Overall, internal locus of control either mitigates the likelihood of using loan forbearance or has no role.

Appendix B – Robustness check

In this appendix, we reproduce Table 2, but we include self-reported income in the set of variables that capture financial status. Using self-reported income implies losing a considerable amount of observations. Furthermore, missing values correlate with variables such as perceived financial situation. Given these issues, our preferred model does not include self-reported income, but we investigate its effects as a robustness check.

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[9] In this simple framework, δ and β cannot be distinguished. Nevertheless, we differentiate them in the model to demonstrate how they affect participation in loan forbearance.

Table B1
Forbearance, time discounting, and locus of control (logit regressions controlling for self-reported income).

| | Dependent variable: takeup of loan forbearance (=1 if yes) | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Delta (discount factor)	−2.289***	−2.218***	−1.791**	−1.958**	−1.684*	−1.507
	(0.694)	(0.726)	(0.891)	(0.917)	(0.999)	(1.022)
Present bias	0.385	0.339	0.271	0.169	0.081	0.025
	(0.298)	(0.307)	(0.369)	(0.382)	(0.411)	(0.431)
Risk (bet in HUF)	−0.00001	−0.015	−0.006	−0.015	−0.024	−0.022
	(0.00004)	(0.037)	(0.043)	(0.044)	(0.017)	(0.048)
Internal locus of control	−0.023	−0.017	−0.023	−0.021	−0.036	−0.038
	(0.022)	(0.023)	(0.028)	(0.029)	(0.032)	(0.033)
Demographic controls		✓	✓	✓	✓	✓
Financial status			✓	✓	✓	✓
Financial difficulty				✓	✓	✓
Savings					✓	✓
Effects of COVID-19						✓
Constant	1.481*	1.228	0.805	0.993	2.244	2.343
	(0.848)	(1.146)	(1.392)	(1.425)	(1.583)	(1.877)
Observations	324	324	215	215	206	201
Log Likelihood	−206.098	−201.844	−143.591	−137.421	−124.683	−121.587
Akaike Inf. Crit.	424.195	429.687	323.182	314.843	295.365	295.174

Notes: *p < 0.1; **p < 0.05; ***p < 0.01.
Weighted logit regressions on the takeup of loan forbearance using the stepwise regression method.
The delta discount factor represents time discounting from the (β, δ)-model, while present bias is a dummy variable (=1, if $\beta < 1$).
Locus of control is the aggregated value from seven 5-point Likert scale questions, where higher scores correspond to a stronger internal locus of control.
Higher values of risk preference represent more risk-tolerant respondents.
Demographic controls: gender, age, settlement type (the capital, other towns, or village), and education level (primary education, no high-school graduation, high-school graduation, tertiary education).
Financial status: employment (employed, unemployed, inactive), perceived financial situation (good, okay, bad), income.
Financial difficulty: whether the respondent has problems paying their loans (if they had any) or utility bills.
Savings: measured by the number of months the respondent could live off of their savings).
Effects of COVID-19: see definitions in Section 2 (Data), lower values indicate that the pandemic had a worse effect on the respondent.

As Table B1 indicates, the discount factor consistently correlates negatively with the takeup of loan forbearance, in line with the previous findings. However, the coefficient decreases and loses significance once we consider savings and the effects of COVID-19. In harmony with the analysis without self-reported income, present bias and locus of control are not associated in a significant way with the resort to loan forbearance.

Appendix C – Potential channels

In this Appendix, we consider whether savings, financial difficulty, or COVID-19 may be potential channels that mediate the effect of time discounting. Hence, we include them separately and also in all possible combinations in specifications that additionally control for risk attitude, future bias, demographic controls, and financial status.

Table C1 shows the regression output of the analysis focusing on potential channels. In specification (1) we do not include either of the potential channels. In the next specifications, we include those channels one by one. Hence, in specifications (2), (3), and (4) we include the effects of COVID-19, savings, and financial difficulty, respectively. The pandemic (as captured by our questions on its effects) seemingly did not affect the use of loan forbearance significantly. More savings, ceteris paribus, decrease the likelihood of taking up loan forbearance. The same is true about financial difficulty: those who have problems paying loans or utility bills are more likely to take advantage of the loan forbearance scheme, relative to those who have loans, but no payment problems. Qualitatively, these findings hold also as we consider pairs of the channels, or if we include all of them. It is noteworthy that although the coefficient of time discounting changes somewhat from specification to specification, it is quite stable throughout the analysis and its significance does not vanish.

Table C1

Possible channels through which time discounting affects forbearance (logit regressions using financial difficulty, savings, effects of COVID-19).

	Dependent variable: takeup of loan forbearance (=1 if yes)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Delta (discount factor)	−2.227***	−1.838**	−2.444***	−2.181***	−2.062**	−2.350***	−2.016**	−2.222**
	(0.749)	(0.775)	(0.803)	(0.775)	(0.841)	(0.833)	(0.792)	(0.865)
Present bias	0.302	0.307	0.211	0.214	0.210	0.124	0.193	0.088
	(0.313)	(0.322)	(0.332)	(0.324)	(0.346)	(0.344)	(0.333)	(0.357)
Internal locus of control	−0.013	−0.009	−0.015	−0.007	−0.011	−0.013	−0.004	−0.011
	(0.023)	(0.024)	(0.025)	(0.024)	(0.027)	(0.026)	(0.025)	(0.027)
Risk, future bias, demographic controls, financial status	✓	✓	✓	✓	✓	✓	✓	✓
Effects of the pandemic on health		0.095			0.273		0.141	0.302
		(0.280)			(0.291)		(0.294)	(0.305)
Effects of the pandemic on relatives' health		−0.120			−0.253		−0.187	−0.304
		(0.249)			(0.262)		(0.254)	(0.267)
Effects of the pandemic on the financial situation		−0.257			−0.241		−0.182	−0.168
		(0.164)			(0.178)		(0.170)	(0.186)
Savings: 1–2 months			−0.772**		−0.847**	−0.503		−0.634*
			(0.357)		(0.370)	(0.374)		(0.384)
Savings: 3–4 months			−0.363		−0.438	−0.063		−0.175
			(0.447)		(0.462)	(0.467)		(0.482)
Savings: 4< months			−1.515***		−1.498***	−1.208**		−1.241**
			(0.512)		(0.519)	(0.527)		(0.531)
Financial difficulty: no loan or problems paying utility bills				16.120		17.145	15.414	15.133
				(602.431)		(994.222)	(638.404)	(638.404)
Financial difficulty: could NOT pay loans or utility bills				1.238***		1.104***	1.167***	1.060***
				(0.357)		(0.379)	(0.369)	(0.393)
Constant	1.036	1.070	2.386*	0.931	2.260	2.032	0.995	2.031
	(1.201)	(1.466)	(1.328)	(1.232)	(1.602)	(1.353)	(1.518)	(1.654)
Observations	321	311	300	321	291	300	311	291
Log Likelihood	−199.813	−193.546	−182.711	−189.514	−176.437	−173.757	−185.414	−169.652
Akaike Inf. Crit.	433.626	427.093	405.422	417.028	398.875	391.514	414.828	389.303

Notes: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Weighted logit regressions on financial difficulty using the stepwise regression method.

The delta discount factor represents time discounting from the (β, δ)-model, while present bias is a dummy variable (=1, if $\beta < 1$).

Locus of control is the aggregated value from seven 5-point Likert scale questions, where higher scores correspond to a stronger internal locus of control.

Higher values of risk preference represent more risk-tolerant respondents.

Future bias is the opposite of present bias (=1, if $\beta > 1$).

Demographic controls: gender, age, settlement type (the capital, other towns, or village), and education level (primary education, no high-school graduation, high-school graduation, tertiary education).

Financial status: employment (employed, unemployed, inactive), income, perceived financial situation (good, okay, bad).

Effects of COVID-19: see definition in Section 2 (Data), lower values indicate that the pandemic had a worse effect on the respondent.

Savings: measured by the number of months the respondent could live off of their savings.

Financial difficulty: baseline category consists of those who had no difficulty paying their loans or utility bills in the last year.

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