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**Working Paper**

## Time discounting predicts loan forbearance takeup

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## **Time discounting predicts loan forbearance takeup**

EDINA BERLINGER – SÁRA KHAYOUTI – HUBERT JÁNOS KISS

**KRTK-KTI WP – 2022/1**

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## ABSTRACT

During the COVID-19 pandemic, many countries eased the burden of borrowers through loan forbearance. Using a representative sample of the Hungarian adult population, we investigate if time discounting and locus of control predict who takes up loan forbearance. We find convincing evidence that time discounting associates with the resort to forbearance: individuals who discount the future less are less likely to take up forbearance, even if we take into account their educational level and financial status. Data suggest that the channel through which time discounting and loan forbearance are related is savings. There is no statistically significant relationship between locus of control and forbearance take up.

JEL codes: G41, G51

Keywords: loan forbearance, locus of control, time discounting

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# **Az idődiszkontálás előrejelzi, hogy ki él a hitelmoratóriummal**

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## ÖSSZEFOGLALÓ

A COVID-19 világjárvány során számos országban vezettek be hitelmoratóriumot, így enyhítve a hitelfelvevők terheit. A magyar felnőtt lakosság reprezentatív mintáját felhasználva azt vizsgáljuk, hogy az idődiszkontálás és a kontrollhely előrejelzi-e, hogy ki élt a hitelmoratórium lehetőségével. Eredményeink azt mutatják, hogy az idődiszkontálás összefügg a hitelmoratórium igénybevételével: azon egyének, akik kevésbé diszkontálják a jövőt, kisebb eséllyel élnek a hitelmoratóriummal, ami akkor is igaz, ha figyelembe vesszük a végzettségüket és a pénzügyi helyzetüket. Az adatok azt sugallják, hogy a megtakarítási csatornán keresztül kapcsolódik az idődiszkontálás és a hitelmoratórium igénybevétele. Nem találunk statisztikailag szignifikáns kapcsolatot a kontrollhely és a hitelmoratórium igénybevétele között.

JEL: G41, G51

Kulcsszavak: hitelmoratórium, kontrollhely, idődiszkontálás

# **Time discounting predicts loan forbearance takeup**

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## **Abstract**

During the COVID-19 pandemic, many countries eased the burden of borrowers through loan forbearance. Using a representative sample of the Hungarian adult population, we investigate if time discounting and locus of control predict who takes up loan forbearance. We find convincing evidence that time discounting associates with the resort to forbearance: individuals who discount the future less are less likely to take up forbearance, even if we take into account their educational level and financial status. Data suggest that the channel through which time discounting and loan forbearance are related is savings. There is no statistically significant relationship between locus of control and forbearance takeup.

Keywords: loan forbearance, locus of control, time discounting

JEL codes: G41, G51

## **1. Introduction**

Private and public loan forbearance programs have been widely used policy tools during the COVID-19 crisis all over the world. According to the Oxford University's database (Hale et al., 2020), 173 countries applied a nationwide temporary suspension of loan repayments or other contract reliefs for households until mid 2021. The Hungarian forbearance program examined in this paper is unique in international practice for several reasons (Drabancz et al., 2020). First, it is the main economic policy tool to help households cope with the crisis as direct income supports were not provided. Second, participation was mandatory for the banks. Third, all households (and firms) having any types of bank loans on March 20, 2020 were entered into

the scheme automatically, and those who wanted to keep repaying had to opt out. Fourth, it is one of the longest programs; the last prolongation will end on June 30, 2022.

Debt renegotiations, that is, 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 assessment of public and private forbearance programs is mixed. Some papers found this policy tool highly effective (Agarwal et al., 2017; Collins and Urban, 2018), or 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 paper contributes to the empirical debate by investigating the borrowers' side, focusing on the psychological characteristics of those participating in the moratorium.

A growing literature investigates how preferences and personality traits affect financial decisions. There is ample evidence that time discounting correlates with savings (Bradford et al., 2017; Falk et al., 2018), creditworthiness (Meier and Sprenger, 2012), and borrowing (Meier and Sprenger, 2012). Locus of control has been shown to be relevant in saving decisions (Lunt and Livingstone, 1991; Cobb-Clark et al., 2016) and in predicting financial difficulties (Kuhnen and Melzer, 2018). Individuals who believe to a larger degree to have control over the outcomes of their life (as opposed to external factors like luck or God) have more savings and less financial problems.<sup>1</sup>

To the best of the authors' knowledge, this study is the first in the literature examining whether time discounting and locus of control associate with the takeup of loan forbearance. Since taking up forbearance may be due to looming or already present financial hardship, we focus on time discounting and locus of control that have been shown to associate with financial difficulties. As time discounting involves risk by necessity (the future is inherently risky), we always control for risk attitudes. In successive specifications, we add more and more controls (demographic characteristics, educational level, financial status, effects of the pandemic) to see if participants' time discounting and locus of control correlate with their resort to forbearance. We also examine if time discounting and locus of control exert their effect through savings and/or financial difficulties.

We find that individual discount factors associate negatively with the takeup of loan forbearance, even when considering a host of control variables. Our findings suggest that time discounting may affect the takeup of forbearance through savings: individuals who discount the

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<sup>1</sup> Other personality traits also matter for financial decisions. For instance, Brown and Taylor (2014) show the importance of the Big-5 in household finance.

future less have more savings, and as a consequence are less likely to resort to loan forbearance. Locus of control does not significantly correlate with loan forbearance in any specification. Understanding the motives of borrowers may help assess the credit risk of loan portfolios and design more effective crisis management techniques and economic policies.

## 2. Data

The research institute TÁRKI carried out the data collection in November 2020. They interviewed 809 respondents via telephone (due to COVID-19) who are representative of the Hungarian population in terms of gender, age, education level, and settlement type. The collected data 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 i) health, ii) financial situation, and iii) their family's health.

The questions related to financial issues involved i) financial difficulty (a binary 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 he or she has any type of loan), and iii) savings (the number of months that the respondent could live off of their savings without problems ).<sup>2</sup> Here, we focus on forbearance, but take into account the other financial variables as well.

We followed the method of Falk et al. (2018) when measuring time discounting. Respondents had to choose between an earlier amount (fixed at HUF 10000, around USD 35) and a larger later amount (X) that changed in an adaptive manner so that we could approximate the amount to be received later that made the respondent indifferent. There were three hypothetical interdependent questions. This task was carried out on two horizons: now versus 1 month, and 12 months versus 13 months. The discount factor ( $\delta$ ) that equalizes the 10000 HUF in 12 months with  $X_{13}$  in 13 months ( $10000 = \delta X_{13}$ ) is the proxy for time discounting (or patience). Using  $\delta$ , based on the the model of  $(\beta, \delta)$ -preferences (Laibson, 1997), we could also calculate the parameter of time inconsistency ( $\beta$ ) from the equation  $10000 = \beta \delta X_1$ , 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.

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<sup>2</sup> Participants could indicate four categories: they have no savings, they have enough savings for 1-2 months, for 3-4 months, or for more than 4 months. These categories have been converted to a continuous savings variable.

There was a hypothetical question to measure risk attitudes between the questions related to time discounting. 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 10000 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 7 statements and the respondents could indicate to which degree they agreed with the statement on 1-5 scale. We coded the answers in a way that higher scores denote more internal tendencies.<sup>3</sup>

### 3. Findings

Our aim is to see if time discounting and locus of control predict the takeup of forbearance. Note that we only consider individuals who have a mortgage or other bank loan; and hence are eligible for forbearance. We consider two aspects of time preferences: time discounting and present bias. First, we present some descriptives to show how forbearance associates with other financial issues (namely, financial difficulty and savings) and with time discounting and locus of control. Then, we proceed with a regression analysis to see if the correlation persists if we consider more and more control variables, with 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 associate with financial difficulties and savings in line with the literature.<sup>4</sup> Furthermore, the correlations show that time discounting correlates negatively with forbearance, while locus of control seems to be unrelated to it.

	financial difficulties	savings	forbearance
time discounting	-0.096 (***)	0.121 (***)	-0.141 (***)
present bias	0.035	-0.055	0.047
locus of control	-0.167 (***)	0.267 (***)	-0.044

Table 1. Correlations between time preferences, locus of control and financial decisions and outcomes

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 or mortgage). We observe that, without further controls, time discounting correlates negatively with taking up forbearance,

<sup>3</sup> There were 17 respondents who could not or did not want to answer the questions. Their answers are classified as missing.

<sup>4</sup> In the Appendix, we provide further evidence in the form of regressions on the relationships between our main explanatory variables (time discounting and locus of control) and the main financial outcomes (financial difficulties and savings). We are able to reproduce the main findings of the literature reported in Section 1.



indicating that individuals who value the future more are less likely to use it. This association remains significant at the 1% significance level even if we take into account gender, age, settlement type, and the education level of the respondent. Controlling for financial status (that includes employment status and income) and financial difficulties lowers somewhat the significance, nonetheless, individuals (having a loan) who value more the future are significantly less likely to resort to forbearance. The relationship becomes only marginally significant when we include their savings, suggesting that time discounting may be related to forbearance through savings. Possibly, those who discount the future less, have more savings, and hence are less in need to take up forbearance. If we take into account the effects of the pandemic, then the negative association remains, but the significance vanishes.<sup>5</sup>

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<sup>5</sup> We see no significant association neither between present bias and the takeup of forbearance, nor between risk attitudes and the takeup of forbearance.

Logit regression						
Dependent variable: takeup of loan forbearance (=1 if yes)						
	(1)	(2)	(3)	(4)	(5)	(6)
			-			
Delta (discount factor)	-2.289*** (0.694)	-2.218*** (0.726)	1.791** (0.891)	-1.958** (0.917)	-1.684* (0.999)	-1.507 (1.022)
Present bias	0.385 (0.298)	0.339 (0.307)	0.271 (0.369)	0.169 (0.382)	0.081 (0.411)	0.025 (0.431)
Risk (bet in HUF)	-0.00001 (0.00004)	-0.015 (0.037)	-0.006 (0.043)	-0.015 (0.044)	-0.024 (0.017)	-0.022 (0.048)
Internal locus of control	-0.023 (0.022)	-0.017 (0.023)	-0.023 (0.028)	-0.021 (0.029)	-0.036 (0.032)	-0.038 (0.033)
Demographic controls		✓	✓	✓	✓	✓
Financial status			✓	✓	✓	✓
Financial difficulties				✓	✓	✓
Savings					✓	✓
Effects of COVID-19						✓
Constant	1.481* (0.848)	1.228 (1.146)	0.805 (1.392)	0.993 (1.425)	2.244 (1.583)	2.343 (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

Demographic controls: gender, age, settlement type, education level (primary education, no high-school graduation, high-school graduation, tertiary education), control for future bias

Financial status: employment (employed, unemployed, inactive), income, wealth status (good, OK, bad)

Financial difficulties, Savings, Effects of COVID-19: see definitions in Section 2 (Data)

Table 2. Forbearance, time discounting and locus of control – logit regression

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 forbearance.

## **4. Conclusions**

Based on the existing literature, time discounting and locus of control are important non-cognitive determinants of financial decisions and outcomes. Our aim in this study was to see if they also associate with the takeup of forbearance, a policy tool used widely during the pandemic to ease the financial burden of households. We find no relationship between locus of control and the takeup of forbearance, but we document a negative association between time discounting and the use of forbearance. This relationship seems to be mediated by savings: individuals who value the future more, save more and consequently are less likely to utilize loan forbearance.

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## 5. Appendix

Table 3 reports a logit regression on financial difficulties. We add consecutively more and more controls. We see a clear negative association between time discounting ( $\delta$ ) and having financial difficulties, in line with Horn and Kiss (2020). Moreover, we observe a negative correlation between (internal) locus of control and financial difficulties that only fades away when controlling for the effects of the pandemic, in line with Kuhnen and Melzer (2018).

	Dependent variable: has financial difficulties (=1 if yes)			
	(1)	(2)	(3)	(4)
Delta (discount factor)	-1.920*** (0.646)	-1.853** (0.721)	-2.052** (0.861)	-1.944** (0.874)
Present bias	0.436 (0.283)	0.342 (0.308)	0.007 (0.377)	0.052 (0.383)
Risk (bet in HUF)	0.047 (0.035)	0.039 (0.036)	0.062 (0.042)	0.066 (0.043)
Internal locus of control	-0.092*** (0.021)	-0.094*** (0.023)	-0.054** (0.027)	-0.038 (0.029)
Demographic controls		✓	✓	✓
Financial status			✓	✓
Effects of COVID-19				✓
Constant	1.688** (0.743)	1.781 (1.149)	1.286 (1.367)	1.369 (1.551)
Observations	652	652	424	418
Log Likelihood	-229.558	-213.900	-149.566	-146.731
Akaike Inf. Crit.	469.116	453.801	335.132	335.461

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Demographic controls: gender, age, settlement type, education level (primary education, no high-school graduation, high-school graduation, tertiary education), control for future bias

Financial status: employment (employed, unemployed, inactive), income, wealth status (good, OK, bad)

Effects of COVID-19: see definition in Section 2 (Data)

Table 3. Logit regression on if the respondent has financial difficulties paying utility bills, mortgage installments, or other loans

In Table 4, we present OLS regressions whose dependent variables are savings (the number of months a household could live off of their savings). There is a positive association between time discounting and savings (in line with Falk et al., 2018) that persists after including educational level as a control variable. However, the association becomes statistically insignificant when controlling for financial status as well. The positive relationship between (internal) locus of control and savings (in line with Lunt and Livingstone, 1991; Chatterjee, 2011; Cobb-Clark et al., 2016) survives the inclusion of all other controls.

OLS regression				
Dependent variable: Saving (enough for 0,1-2,3-4 or more months)				
	(1)	(2)	(3)	(4)
Delta (discount factor)	1.554*** (0.461)	1.466*** (0.487)	0.809 (0.533)	0.713 (0.546)
Present bias	-0.580*** (0.206)	-0.349* (0.200)	0.019 (0.220)	0.013 (0.225)
Risk (bet in HUF)	-0.012 (0.027)	-0.008 (0.025)	-0.038 (0.028)	-0.039 (0.028)
Internal locus of control	0.127*** (0.017)	0.109*** (0.016)	0.074** (0.017)	0.080*** (0.018)
Demographic controls		✓	✓	✓
Financial status			✓	✓
Effects of COVID-19				✓
Constant	-2.016*** (0.593)	-1.118 (0.767)	1.002 (0.867)	0.413 (0.995)
Observations	589	589	408	402
R <sup>2</sup>	0.120	0.253	0.403	0.408
Adjusted R <sup>2</sup>	0.114	0.238	0.377	0.377
Residual Std. Error	2.176 (df=584)	2.019 (df=576)	1.848 (df=390)	1.853 (df=381)
F statistic	20.002*** (df=4;584)	16.273*** (df=12;576)	15.473*** (df=17;390)	13.114*** (df=20;381)

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Demographic controls: gender, age, settlement type, education level (primary education, no high-school graduation, high-school graduation, tertiary education), control for future bias

Financial status: employment (employed, unemployed, inactive), income, wealth status (good, OK, bad)

Effects of COVID-19: see definition in Section 2 (Data)

Table 4. OLS regression on the relationship between savings, time discounting, locus of control and other determinants