The Impact of Loan Payment Deferral on Indebted Households and Financial Stability during the Covid-19 Pandemic: Survey Results from Slovakia

Martin CESNAK - National Bank of Slovakia & University of Economics in Bratislava, Slovakia

Andrej CUPÁK - National Bank of Slovakia & University of Economics in Bratislava, Slovakia (andrej.cupak@nbs.sk) *corresponding author*

Ján KLACSO - National Bank of Slovakia

Martin ŠUSTER - Council for Budget Responsibility, Bratislava, Slovakia

Abstract

The Covid-19 pandemic led to a large set of actions taken by the governments in 2020. In this paper, we focus on the loan payment deferral in Slovakia, which allowed households to postpone their loan payments. As during the moratorium banks had no information about the financial situation of clients, this action raised financial stability concerns. Therefore, the National Bank of Slovakia launched a survey among indebted households to keep track of their economic situation during the deferral period. Based on the survey, many indebted households suffered negative income or employment shocks during the first months of the pandemic. The deferral of loan payments was mainly used at the beginning, and gradually households began to prefer individual arrangements with their banks. The Covid-19 crisis disproportionately affected indebted households with high debt service ratios already before the crisis, working in sensitive sectors, less educated, or with large drops in income. Most of the households asking for deferral reported a gradual improvement of their situation. The vast majority of surveyed households expected ability to repay their debt after the moratorium.

1. Introduction

The pandemic has led to a large set of actions taken by governments, central banks, and supervisory authorities. On the one hand, actions included measures

preventing the spread of the Covid-19 virus ranging from increased social distancing to more severe measures generally referred to as lockdowns[1]. On the other hand, another set of measures aimed at preserving employment and partially compensated income losses caused by lockdowns. In the case of Slovakia, the government implemented a broad set of measures during April 2020. These measures included the introduction of a short-time work scheme ("Kurzarbeit"), the payment of partial compensation for the salaries of self-employed persons or employees whose business or employer suffered a drop in sales during the crisis, temporary protection for tenants who were late with their rent payments, or deferral of loan payments. The relief package was generally adopted under the name "Lex Corona"[2].

In this paper, we focus on the possible financial stability implications of the loan payment deferral which allowed Slovak indebted households to postpone the payment of their monthly loan instalments[3]. Some form of a loan payment moratorium was one of the most widespread Covid measures. According to the policy tracker provided by the International Monetary Fund, around two thirds of countries introduced such a deferral (see Appendix part A). 44% of countries implemented it in national legislation. The most frequently used span for the payment moratorium was 3, 6 or 9 months[4]. The impact of this measure on households' credit risk is particularly important for countries such as Slovakia, where loans to households represent almost 45% and loans to non-financial corporations (NFCs) almost 22% of banks' total assets. Moreover, Slovakia had been among the countries with the fastest increase in household indebtedness in the years preceding the crisis (NBS, 2019). At the outbreak of the pandemic, household indebtedness (in terms of debt-to-GDP) was among the highest compared to other Central and Eastern European countries (Figure 1).

The deferral is unique as it makes banks and supervisors "blind" in the sense they have no information about the development of the debtor's financial situation during the moratorium and about the debtor's ability to repay its loans after the moratorium ends[5]. Under any other measure, debtors are obliged to pay their monthly instalments regularly, so banks have direct information on whether they can service their debt. Therefore, while this measure helped debtors under stress, it may

---

[1] Countries imposed a variety of preventive measures to increase social distance, ranging from closing public spaces such as restaurants or non-essential shops, through closing educational institutions, to "stay-at-home" orders for the general population. More information about the measures imposed by countries can be found, e.g., here: https://www.ecdc.europa.eu/en/publications-data/download-data-response-measures-covid-19.

[2] More information about the measures can be found in NBS (2020a) or https://www.whitecase.com/sites/default/files/2020-04/covid-19-slovak-governmental-support-for-companies-200429.pdf.

[3] Households were able to defer loan payments for 6-9 months. Virtually all households were able to apply for the deferral, only households already in arrears were refused.

[4] More details are provided in Appendix part A.

[5] Loan payment deferral and other forms of forbearance are generally part of the banks' toolkit that debtors under financial stress can use to avoid default. However, during COVID, this measure was introduced by the government in a uniform manner and debtors who asked for it were not flagged by the banks. This means that indebted households could use this measure without any impact on their future credit rating.

have masked the financial stability implications of the pandemic by postponing the materialisation of household credit risk.

Figure 1 Evolution of Household Indebtedness in Central and Eastern Europe
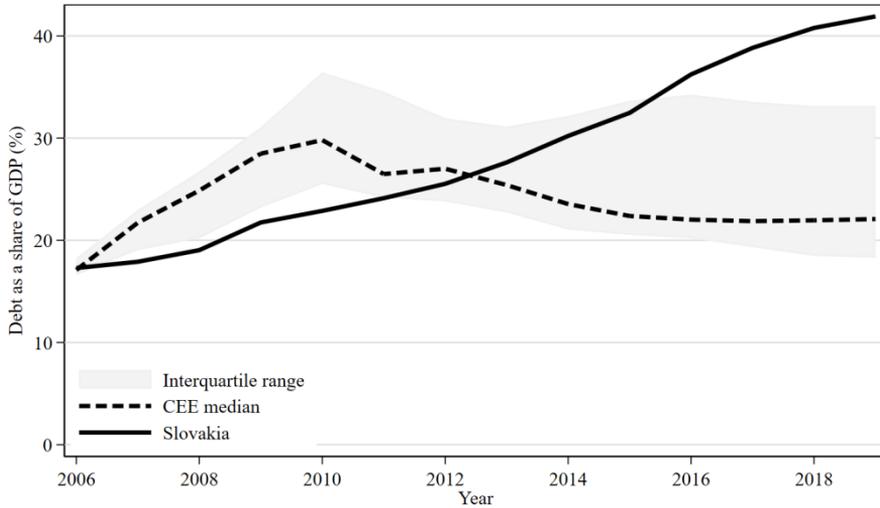
Notes: CEE countries in the chart consist of Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, and Slovakia. Debt-to-GDP is calculated as the ratio of an outstanding volume of nominal loans granted to households by banks at the end of respective years and nominal GDP. Interquartile range refers to the range between the 75th and 25th percentile of the distribution.
Source: ECB SDW, Eurostat.

To collect the necessary information during the moratorium, the National Bank of Slovakia conducted a multi-wave survey among indebted households. The survey focused on the development of their financial situation and their expectations regarding loan repayments after the end of the moratorium in 2021[6]. The survey had a monthly frequency, with approximately 1,000 indebted households being examined from July until December 2020. The sample was representative of the total population of the Slovak indebted households.

The main results of the survey reveal that mostly households with high income losses during the pandemic and households with already high pre-pandemic debt service ratios were more likely to ask for the deferral. Less educated households and households working in more risky sectors were also more likely to ask for the deferral. Furthermore, the share of households expecting serious difficulties in resuming payments after the moratorium was relatively low across all survey waves. The share was higher in the early summer of 2020, when the future economic development was still highly uncertain. Then it increased slightly again towards the

---

[6] The possibility of deferring loan payments was introduced in April 2020, and retail debtors could apply for it until the end of 2020.

last waves, when the second wave of the pandemic renewed stricter government measures.

The paper is organized as follows. Section 2 provides a brief overview of the related literature. Section 3 briefly describes the survey and the actual dataset used. Section 4 presents the main estimation results on the household decision to defer monthly payments, and on the rationale behind economic expectations. Finally, Section 5 concludes and discusses policy implications.

2. Literature Review

It is well known that the pandemic had severe direct as well as indirect economic impact. The direct impact was mostly attributed to the health care costs of treating cases or prevention. Indirect costs were mostly related to the necessary preventive steps introduced by governments, ranging from increased social distancing to more severe measures commonly referred to as lockdowns. The negative impact of the pandemic and the necessary government reaction on income, expenditure and wealth is documented in Hanspal et al. (2020) or Coibion et al. (2020). Moreover, authors show that most of the decline in employment and consumer spending, as well as the negative outlook, can be largely attributed to the lockdowns. The consequences of the lockdown on household consumption are presented in Kratena (2020) as well. The author observes considerable substitution effects between single goods and services. The extent of these effects varies across income deciles of Austrian households.

While the pandemic initially affected the real economy, it could have had negative implications for the financial sector and raised questions about financial stability as well. The introduction of macroprudential supervision, increased capital buffers, and borrower-based measures made the banking sectors throughout the world more resilient than before the global financial crisis. While the financial sector was at the epicentre of the Great Financial Crisis, during the Covid, as Giese and Haldane (2020) pointed out, it was "part of the solution". Nevertheless, financial stability concerns also needed to be considered in the response to the crisis. For a discussion of the necessary steps taken by bank regulators in the US, see Blank et al. (2020). The impact of the response of monetary policy, micro- and macro-supervisors in the Euro area is analysed in Altavilla et al. (2020). They find evidence that in the absence of funding costs and capital relief, banks' ability to support the real economy via the provision of credit would have been severely constrained and that the pandemic would have led to a larger decline in employment than observed. On the other hand, while policy measures helped to maintain the flow of credit to the real economy, a negative price effect of the Covid-19 pandemic on loans to NFCs is documented in Hasan et al. (2020). However, there is still a lack of papers focusing on the financial stability implications of the pandemic through the household credit risk channel.

Our study makes several contributions at a time. We are among the first to launch a unique survey on the impact of the Covid-19 pandemic on the economic and financial situation of indebted households. In this paper, we introduce the survey, describe the main results, and estimate the determinants of the risk characteristics of households opting for payment deferral and the expectations of different types of

households. Although there have been similar surveys launched focusing on the impact of the Covid-19 recession on households (see, e.g., Neri and Zanichelli, 2020), to our knowledge we are among the first to focus on the impact on households' credit risk.[7] While during the Great Financial Crisis and demand-shock driven recessions in general, the materialisation of household credit risk can be observed on the banks' balance sheets in the form of loan defaults or forbearances, during the pandemics (due to government support measures) we observe mainly loans with payment deferral. We expect that most households opted for the deferral due to worsened financial situation; therefore, the decision to defer loan payments can be explained by factors that generally also drive defaults. Second, our survey data allow us to focus also on the main drivers of the expectations of households with a worsened financial situation, which is a unique feature that is not part of the credit risk analysis in general.

Next, while our study focuses only on indebted households, it contributes to the growing literature on the impact of the Covid-19 recession on household financial and consumption behaviour utilizing ad-hoc surveys or administrative microdata. Recent examples of such studies are by Baker et al. (2020), studying the impact of the pandemic on the income and consumption situation of US households, or Brewer and Gardiner (2020), analysing the impact of Covid-19 on household incomes in the UK. By conducting a survey, Clark et al. (2021) identify different vulnerable household groups that might be at risk of financial fragility as a result of the pandemic. Interestingly, the authors highlight the fact that more financially literate households were better prepared to absorb economic shocks stemming from the Covid-19 crisis.

Our study particularly contributes to the strand of the literature that uses detailed microdata to study household credit risk which has attracted growing interest, especially after the Great Financial Crisis. Gerlach-Kristen and Lyons (2018) show on a selected set of European countries that arrears are mainly driven by affordability problems, in the form of unemployment, low disposable income and high mortgage payments. There are several studies that focus on individual countries as well. The metric proposed in Bettocchi et al. (2017) highlights a potential source of financial vulnerability of Italian households linked to adverse movements in disposable income. Besides socio-demographic characteristics, unemployment emerges as an important factor in explaining mortgage defaults in Italy (Aristei and Gallo, 2016). Household default rates have also been studied in Spain (e.g., Blanco and Gimeno, 2012; Aller and Grant, 2018), in the UK and Ireland (e.g., Kelly and O'Malley, 2016; Kelly and O'Toole, 2018) and in Romania (e.g., Mihai et al., 2018). In general, the authors show that rising unemployment, socio-demographic factors such as age or education as well as debt-burden indicators including debt-to-income or debt service-to-income are the most important factors in explaining defaults on retail mortgages or consumer loans.

---

[7] A similar survey, albeit for the non-euro area households has been carried out by the Austrian Central Bank with the results reported in Allinger and Beckmann (2021). In addition to surveys, Cherry et al. (2021) used US registry data to examine debt relief for the government and private households during the pandemic.

Our paper also partially contributes to the current booming literature on household economic expectations. The first strand of the literature, which is relevant to our work, develops around changes in household behavior and expectations due to shocks stemming from crises. For example, Bunn and Rostom (2014) show that highly indebted households in the UK made larger spending cuts during the Global Financial Crisis, particularly due to the uncertainty about their ability to make future debt repayments. Using rich microdata from the US, Hanspal et al. (2020) show that income and wealth shocks during the Covid-19 pandemic are associated with an upward shift in expectations about future debt holdings, working hours, and retirement age. Another strand of studies highlights the relationship between household financial expectations and debt. Not surprisingly, optimistic expectations are positively related to the demand for debt. A non-exhaustive list of studies include Brown et al. (2005, 2008), Keese (2012), Białowolski (2019) or Branten (2022).

3. Data

Our empirical analyses utilise unique survey data collecting information on indebted households in Slovakia, i.e., on retail clients that have at least one bank loan[8]. The survey was carried out as a Computer-Assisted Telephone Interview (CATI). The sampled survey participants were selected from the three largest Slovak banks, covering around two thirds of the overall retail loan portfolio of the banking sector. The fieldwork lasted from July until December 2020 with a monthly frequency, and around 1,000 households were successfully interviewed in each round[9]. The overall response rate was above 20% for all rounds of the survey. From all the surveyed households, 179 participated in all 6 waves.

The survey was conducted in the last two weeks of each month except the November and the December wave, that was earlier a weak and a half due to the Christmas holidays. Participants were sampled based on the quota selection with predetermined socio-demographic as well as financial criteria to construct a representative sample of indebted households in Slovakia[10].

Furthermore, the sample was selected to have a significant overrepresentation of households that utilised the payment moratorium, with a share of around 50% in the microdata, which gradually decreased towards the end of survey period[11]. This

---

[8] The survey thus included indebted households having any type of loans: mortgages, consumer loans or other loans.

[9] The first lockdown in Slovakia lasted from 15 March to 14 June 2020. As the preparation of the survey took some time, it started collecting data just after the end of the lockdown. The financial situation of a large share of households was still affected by the preventive measures, so the first wave largely covered the initial effects of the Covid-19 pandemic. The survey also covered the second wave of the pandemic, which started on 11 August 2020 with some easing measures in November 2020.

[10] While survey participants were selected based on loans potentially granted to individuals, the focus was on the financial situation of the whole household. The share of participants from each bank was selected based on the volume of the loan portfolio of the banks. The estimated number of indebted households was used as the total population for setting the weights. This information is based on the reports that the National Bank of Slovakia regularly receives from each bank containing information on each retail loan.

[11] It has been estimated that around 11% of all retail loans were deferred during the pandemic (see NBS, 2020b, Section 2.1). At the time the survey was conducted, the estimated proportion of indebted

was done as the primary focus of the survey was to follow the financial situation of indebted households opting for deferral specifically and investigate their future expectations.

Table 1 Summary Table of the Survey

Individual characteristics	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Total	991 (100%)	995 (100%)	1,004 (100%)	1,007 (100%)	1,007 (100%)	1,004 (100%)
Income Source						
Employed	555 (64%)	557 (64%)	586 (64%)	639 (64%)	632 (64%)	640 (64%)
Self-employed	277 (8%)	271 (8%)	240 (8%)	213 (8%)	204 (8%)	200 (8%)
Other	159 (28%)	167 (28%)	178 (28%)	155 (28%)	171 (28%)	164 (28%)
Education						
No or primary	29 (11%)	26 (11%)	32 (11%)	28 (11%)	32 (11%)	30 (11%)
High school	500 (64%)	506 (64%)	534 (64%)	546 (64%)	532 (64%)	533 (64%)
University	462 (25%)	463 (25%)	438 (25%)	433 (25%)	443 (25%)	441 (25%)
Age group						
30 and less	205 (14%)	198 (14%)	160 (14%)	139 (14%)	144 (14%)	135 (14%)
31-40	407 (32%)	389 (32%)	390 (32%)	399 (32%)	395 (32%)	382 (32%)
41-50	247 (29%)	269 (29%)	292 (29%)	298 (29%)	292 (29%)	308 (29%)
51 and more	132 (25%)	139 (25%)	162 (25%)	171 (25%)	176 (25%)	179 (25%)
Deferral						
No	380 (93%)	385 (93%)	499 (93%)	597 (93%)	619 (94%)	641 (94%)
Yes	611 (7%)	610 (7%)	505 (7%)	410 (7%)	388 (6%)	363 (6%)

Notes: This table shows the breakdown of the survey sample by the main characteristics used to calibrate the survey weights to the population totals. It shows the raw tabulation of observations within each characteristic as well as the weighted proportions. There were two other variables used in the calibration (income category and loan size) which are not shown due to the large number of categories.

Source: Survey of Indebted Households, National Bank of Slovakia.

To ensure representativeness, survey weights were calibrated to margins including income source and the level of income, education, age categories, the level of monthly instalment (with the outstanding debt level added in the second round), and an indicator of whether a household opted for a loan deferral[12]. Calif 4.0

---

households with a deferral was around 7%. Significant oversampling of households opting for deferral was inevitable, as a share of 7-11% would imply a sample of only around 100 observations.

[12] Although the survey also contained information not available from other sources, it is possible to evaluate some of the survey results ex post. The small proportion of households doubting about their ability to pay back their loans after the end of the moratoria was in line with the development of default rates reported by banks, as reported in NBS (2021a) and NBS (2021b). A more detailed comparison of the results of a follow-up survey with the banks' reports can be found in Box 2 in Cesnak et al. (2021). These results provide some external validity to the survey.

calibration tool[13] was used to construct the weights, which allows for approximate solutions and is able to calibrate weights based on a broad number of calibration criteria (ESS, 2017) following the state-of-the-art principles (Deville and Särndal, 1992). More details about the survey design, survey questions and the construction of weights are described in (Cesnak et al., 2021)[14]. Summary table of the survey participants (both raw tabulations and the weighted proportions) across each wave is detailed in Table 1.

The survey collected information at both household and individual level, designed to capture the impact of the Covid-19 pandemic on the households' economic and financial situation and their future economic expectations. It also collected detailed information on standard socio-demographic characteristics such as age, gender, education, household composition and so on. Description of all variables gathered via the survey entering our analysis is given in Appendix, Table B2.

3.1 Descriptive Statistics

This section highlights selected descriptive statistics based on (weighted) microdata from all six waves. While the debt payment moratorium was intended to help indebted households under financial stress, some debtors could use this deferral to invest or to shift their asset holdings, thus even increase the fragility of the financial sector. Therefore, we focus mainly on the development of income, economic status, and debt burden of the households, as the development of these variables can shed some light on the financial situation of indebted households, especially those asking for deferral.

Figure 2a reports the evolution of household income in the aftermath of the pandemic. In general, the income of the households surveyed in July was 10% lower compared to their pre-crisis level in March 2020. After an improvement in August, there was another drop at the beginning of the second wave of the pandemic starting in September 2020 (Figure 2b) with a gradual improvement toward the end of the year. On the other hand, the drop of income[15] was much more significant in case of households asking for deferral, reaching 30% in July and 20% even in the December wave.

---

[13] The calibration tool is available freely on: https://github.com/SO-SR/Calif.

[14] It is important to emphasize that the over-representation of households that took advantage of the debt payment moratorium allows us to study the impact of the coronavirus pandemic on indebted households in more detail, but on the other hand it does not represent the target population without prevalence. Household weights compensate for differences due to oversampling and ensure that the sample is representative of the target population.
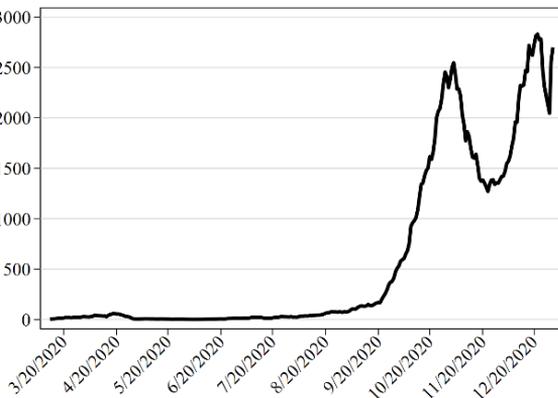
[15] The survey asks about the household's net income. It means that if a household opted for payment deferral, this is not reflected in the income change.

Figure 2 Aggregate Changes in Household Income in Relation to the Pandemic

a) Income change (in % compared to March 2020)
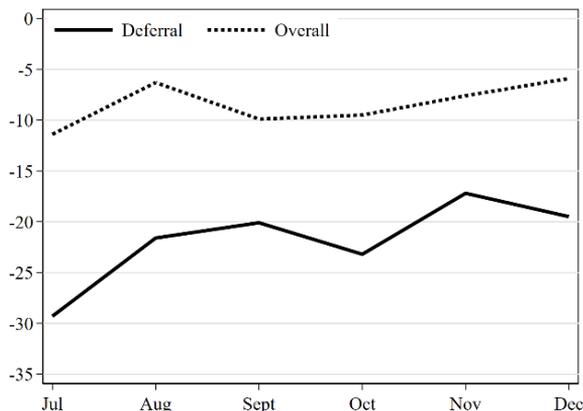
### b) Number of new coronavirus cases

Notes: Statistics in Figure 2a) are calculated using survey weights. The aggregate change is defined as the weighted sum of the changes in the incomes of all indebted households divided by the weighted sum of their incomes before the crisis.
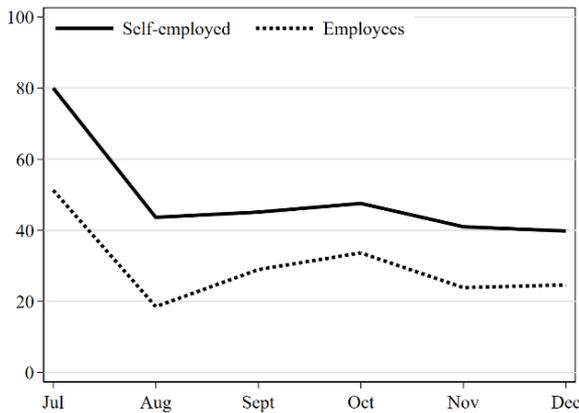
Source: Survey of Indebted Households, National Bank of Slovakia; National Health Information Centre.

Figure 3 Share of Households Experiencing Negative Impact of the Pandemic on their Employment Situation (in %)

a) Negative impact by opting for deferral
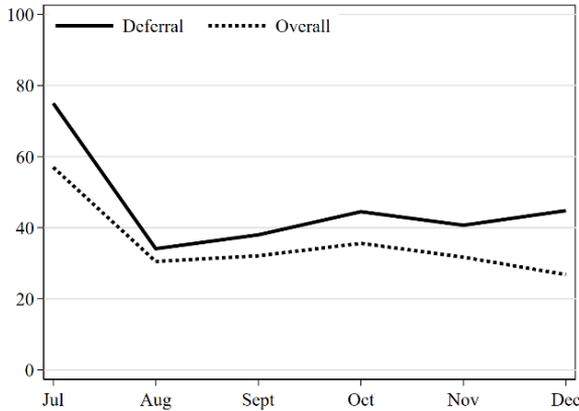
*b) Negative impact by the type of work*

Notes: Statistics are calculated using survey weights. We consider an impact to be negative if at least one household member's employment situation was negatively affected by the pandemic. Figure 3b) considers only changes in the employment situation of the reference person in the household.

*Source:* Survey of Indebted Households, National Bank of Slovakia.

Closely related to the change in income, the survey results suggest that many of the indebted households were negatively affected by the pandemic in terms of job loss, reduced working hours, or other types of negative impact on their economic status (Figures 3a and 3b). In the July wave, 60% of the respondents were negatively affected by the crisis, while this share gradually decreased. On the other hand, the share of households asking for deferral fell only in August and then rose slightly again, remaining above average over the whole period. Based on the survey results, self-employed household members were more affected by the pandemic than employed household members.

Figure 4 DSTI by the Type of Household (in %)

a) Median value of DSTI
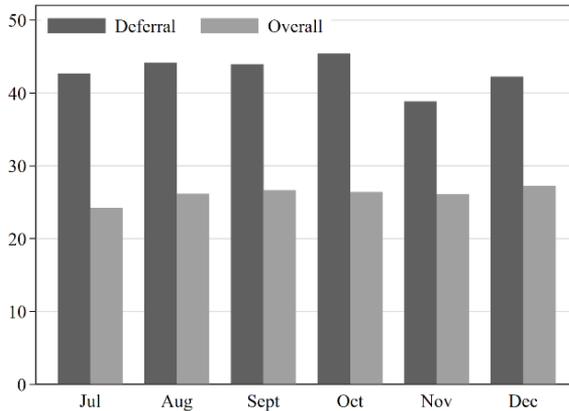
*b) Share of households with DSTI over 60% or under 0%*
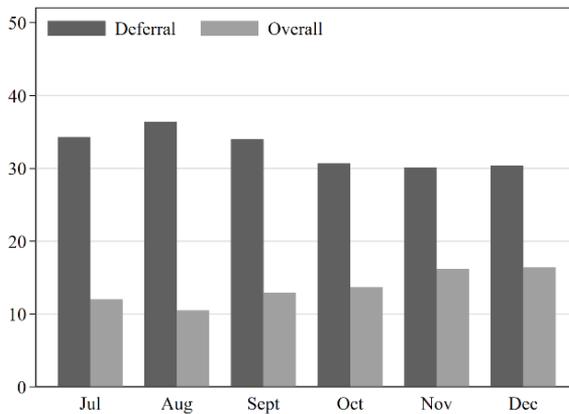
Notes: Statistics are calculated using survey weights. Median values in Figure 4a) are calculated on the sample of positive values while negative values are stacked next. A DSTI below 0% means that the income of a debtor is not sufficient to cover even the subsistence minimum. The 60% threshold is based on the DSTI limit established from 1st January 2020.

Source: Survey of Indebted Households, National Bank of Slovakia.

An important factor that may explain the use of deferral is the debt burden, as a high debt burden before the crisis meant that even a small drop in income could have led to financial stress. To do this, we calculate the pre-crisis debt service-to-income (DSTI) ratio of the households based on the definition implemented by the National Bank of Slovakia and their income and monthly instalments as of March 2020. The median DSTI ratio was higher for households asking for deferral (Figure 4a). There was also a higher proportion of households with deferral that have a risky DSTI (Figure 4b), i.e., a DSTI above the 60% limit introduced by the NBS in 2020.

Figure 5 Share of Indebted Households by Education and Sector Sensitivity (in %)

a) Share of debtors with university education
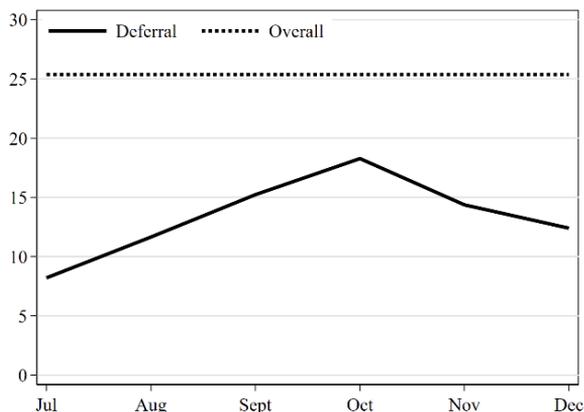
b) Share of debtors working in sensitive sectors
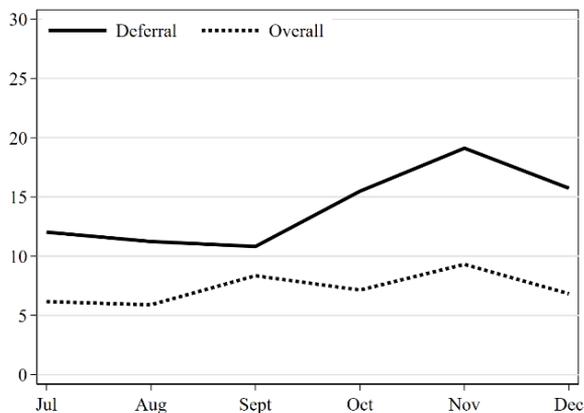
Notes: Statistics are calculated using survey weights. In Figure 5b) we consider the following sectors to be sensitive: Accommodation and food services; Arts, entertainment and recreation.

Source: Survey of Indebted Households, National Bank of Slovakia.

Two other important factors in relation to the deferral are the level of education and the sector of employment of the household members (Figures 5a and 5b). Education may be directly related to the debt ratio, as well as to financial literacy. While the share of debtors with a university education was 25% overall[16], this share was lower in the "deferral category" at 10-15% across all survey waves. The sectors most negatively affected were accommodation and food services, and art, entertainment, and recreation (more in Cupák et al. 2020). The share of debtors with

---

[16] This share is constant for all waves as education was one of the factors entering the construction of the sample as well as the calculation of sample weights.

payments deferral in these sectors was significantly more frequent across all survey waves. This share even increased during the last survey waves, reaching almost 20% in November.

Figure 6 Share of Households with Negative Expectations (in %)

a) Share of negative expectations among all households
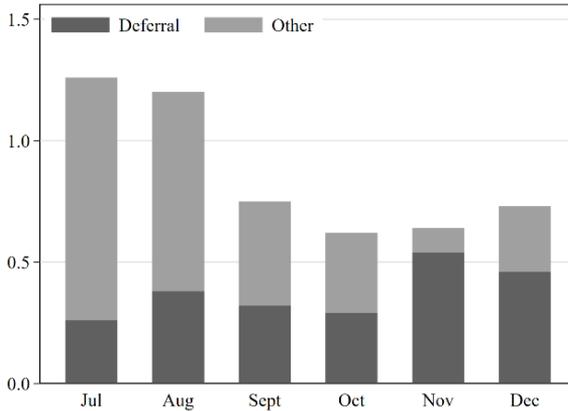
b) Share of households with negative expectations by type of household

Notes: Statistics are calculated using survey weights. Figure 6a) shows the share of households having negative expectations among all surveyed households. Figure 6b) shows the share of households having negative expectations among those asking for deferral and among those not asking for deferral separately.

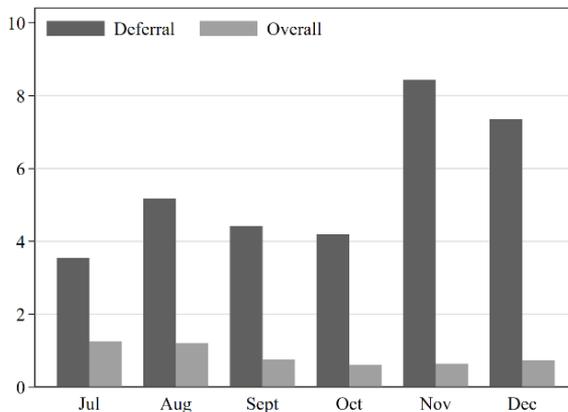*Source:* Survey of Indebted Households, National Bank of Slovakia.

In terms of one of the outcome variables studied, only a relatively small proportion of households reported negative expectations across all waves (Figures 6a and 6b). The highest share of households with negative expectations was among households opting for deferral. The share among these households was slightly increasing towards the end of the survey, but even in this group the share stayed well below 10%. As most of the households having negative expectations are indeed

households with deferral and banks do not have information about their financial situation during the moratoria, this is an important information about the possible future default of these households.

4. Estimation Strategy and Results

In this section, we provide empirical analysis of the factors explaining the use of loan deferrals as well as expectations of households with deferral.

4.1 Factors Explaining the Use of Deferral

We start by estimating a cross-sectional probit regression[17] of determinants of opting for a loan payment deferral[18]. The estimation equation takes the following form:

$$Pr(Y = 1|X, Z, \delta) = \Phi(\alpha + \beta X + \gamma Z + \delta), \tag{1}$$

where Y is a binary outcome variable taking a value of 1 if the household opted for a deferral, and 0 otherwise. X is a set of explanatory variables including the change in income levels due to the crisis, any change in income conditions of economically active household members – either employed or self-employed[19], pre-crisis DSTI ratio or the change in the DSTI since the onset of the crisis[20]. Φ is the standard CDF. We also control for a set of variables captured by Z such as education, age, gender, as well as regional and bank fixed effects, δ.[21]

Based on the descriptive results, we expect a strong relationship between the decision to opt for a deferral or other type of easing and the change in income as well as the level of DSTI before the crisis. We estimate equation (1) only based on the first wave of the survey. More than 80% of all the deferrals took place during the first lockdown between March and June 2020.[22] As we aim to explain the factors leading households to ask for a deferral, we need to relate their decision to their financial situation the closest to the decision, which is in our case the July wave of the survey. During that period, still a lot of households were under financial stress. During the later waves the flow of new deferrals was minimal, and the financial situation of

---

[17] In principle logit regression techniques, such as the one developed by Firth (1993), to analyse rare events would be more applicable. However, in our case of having intentional overrepresentation of the rare events in the survey, and application of the standard probit regression considering the survey weights is sufficient.

[18] As loan payment deferral is applicable only in case a household has at least one loan, our population contains all indebted households. While the selection process was not completely random, we use weighted estimations to match the true distribution of indebted households as much as possible.

[19] No change, one partner lost his/her job or has reduced working hours, or all partners lost their jobs or reduced working hours.

[20] The change in the DSTI is only a theoretical value and is calculated based on the change in income. The loan payment deferral is not taken into account.

[21] We acknowledge that there could also be cross-country interactions of policies that affected consumers locally. Allinger and Beckmann (2021) found in a sample of 11 CEESE countries that household income earned from abroad (presumably from one's own family members) significantly reduced the likelihood of domestic households opting for loan arrears. However, we do not have the underlying data in our survey to verify such a hypothesis.

[22] This information is based on the reporting of the banking sector.

households might have improved. Therefore, estimating the probability of asking for deferral based on the later rounds could lead to biased results.

Note that there is some controversy in the literature on when weights should be used in regression analysis (see e.g., Deaton, 1997; or Cameron and Trivedi, 2005). Despite this fact, we account for weights in the probit regressions, since the information about opting for a loan deferral was used for the weight's calibration due to substantial oversampling of those households.

We estimate different specifications of the probability to opt for a deferral and present the results in Table 3. All specifications include standard socio-demographic characteristics of the respondent, such as university education, age[23], and sex as well as the pre-crisis level of DSTI. As possible explanatory variables such as changes in economic status, changes in income or working in a sensitive sector are highly correlated, the first specification includes only changes in the economic status of the household members. The second specification includes a dummy that is equal to 1 if the respondent works in a sensitive sector. The third specification includes change in income (IHS transformed), while the other specifications (4 to 7) consider several combinations of the covariates. All specifications also include region and bank fixed effects to capture any supply-side effects of the credit market.

The estimation results do indeed show a significant impact of changes in income/economic status on the decision to defer[24]. The change in income enters the regression with a negative sign, i.e., the greater the fall in income due to the crisis, the more likely a household was to use the deferral. The change in the economic status also has the expected sign: if the job of one or both household members was negatively affected, these households were more likely to opt for a deferral. Finally, employment in a sensitive sector also increased the likelihood of a request for deferral. These findings are generally consistent with other existing research on the determinants of deferral use during the pandemic. For example, Allinger and Beckmann (2021) found that households experiencing a negative income shock were more likely to actively use arrears in a sample of 11 non-euro area countries in Central and South-Eastern Europe.

---

[23] We also included age squared in the regression, but the results were not significantly different. Therefore, we only present results with simple age in the paper.

[24] The survey focused on the negative implications of the pandemic, i.e., households were asked whether their economic situation worsened due to the pandemic or whether they asked for deferral due to the pandemic. Therefore, we can interpret the results as a causal effect of the pandemic and not just as a correlation.

Table 2 Probit Estimates of the Determinants of the Use of Deferral (Wave 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Some household members report changes in economic status	0.030***			0.029***	0.012		0.012
	(0.011)			(0.011)	(0.012)		(0.012)
All household members report changes in economic status	0.039***			0.035**	0.014		0.011
	(0.014)			(0.014)	(0.015)		(0.015)
Work in a sensitive sector		0.036*		0.021		0.018	0.016
		(0.021)		(0.022)		(0.020)	(0.021)
Income change (IHS transformed)			-0.006***		-0.005***	-0.006***	-0.005***
			(0.001)		(0.002)	(0.001)	(0.002)
Before-crisis DSTI (Arctangent)	0.114***	0.117***	0.098***	0.114***	0.100***	0.099***	0.100***
	(0.020)	(0.022)	(0.019)	(0.020)	(0.019)	(0.019)	(0.019)
University education	-0.032***	-0.033***	-0.025**	-0.031***	-0.025**	-0.024**	-0.025**
	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Age	-0.001**	-0.002***	-0.001	-0.001**	-0.001*	-0.001**	-0.001**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.017	-0.017	-0.015	-0.015	-0.015	-0.014	-0.013
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Region and bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R2	0.19	0.18	0.21	0.19	0.21	0.21	0.21
N obs.	974	974	973	974	973	973	973

Notes: Marginal effects presented are evaluated at the mean of explanatory variables. Robust standard errors are presented in parentheses. Regressions are estimated using survey weights. Dummy variable for "None of household members reported change in economic status" is the reference category of the respective dummy variable sets. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on (0, π) and the most frequent DSTI values up to 60% are mapped almost linearly.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Our findings also relate to factors in the pre-crisis period. As expected, the higher the pre-crisis DSTI, the higher the probability of opting for deferral. This suggests that households operating more on the margin in terms of their monthly cash flow were more likely to be adversely affected by the crisis. Another interesting result is that households with higher education were less likely to use the deferral. This result is in line with Jurča et al. (2020), who found that one of the main determinants of the probability of becoming unemployed and financially stressed is the level of education. In addition, the effect of higher education[26] can be linked to the findings of Clark et al. (2021), who show that more financially literate households in the US were better prepared to absorb the economic shocks of the crisis. The effect of age on the probability of using debt moratoria is negative and precisely measured, which is consistent with the Allinger and Beckmann's (2021)

---

[26] While education and financial literacy cannot be mapped 1:1, recent survey data from Slovakia show that financial literacy increases significantly with educational attainment (see Cupák et al., 2023). We can therefore consider tertiary education as a good proxy for financial literacy.

finding that retired individuals were significantly less likely to use the deferral option during the pandemic. Overall, the results point to a significant impact of the crisis on opting for deferral, but many households entered the pandemic in an already risky position. Nevertheless, this result confirms that the loan payment deferral was to a large extent used by debtors in financial stress. This measure thus helped to lower the sudden materialisation of household credit risk and had positive financial stability implications after the onset of the pandemic. Low pseudo R^2 may point to the necessity of analysing the effects of the pandemic on households based on survey or other microdata, as macro variables can mask relatively high heterogeneity among households.

4.2 Factors Explaining Negative Expectations

An important information in the survey is the expectations of indebted households opting for the deferral regarding the ability to repay their debts after the end of moratoria, i.e., in 2021. To empirically study the main determinants of the future household expectations among households under moratoria regarding their ability to start repaying the loans, we estimate the following cross-sectional probit regression:

$$Pr(Y = 1|X, Z, \delta) = \Phi(\alpha + \beta X + \gamma Z + \delta), \tag{2}$$

where the notation remains the same as in Equation (1), except Y being a dummy variable taking values of 1 if the household expects that it will not be able to pay back its liabilities, and 0 otherwise. Again, income change and the pre-crisis DSTI are strong candidates for driving the expectations. Unfortunately, the estimation of expectations using a panel regression framework is not possible due to the small number of observations of households with negative expectations included in several consecutive waves. Therefore, the analysis in this part is again based on the weighted cross-sectional data.

The results for each wave of the survey are presented in Appendix, Tables C1 to C6. Again, we estimate different specifications by including several covariates in a stepwise approach as many of them are correlated with each other (e.g., income change and employment status, pre-crisis DSTI and DSTI change). We report results for both weighted and unweighted regressions.

It appears that economic resources, namely income, is the key driver of negative expectations, as the change in income enters the regression with a significant negative coefficient in the majority of cases. The higher the drop in income, the lower the probability that the household expected to repay its debt after the end of the moratoria. The evolution of the marginal effects of the income change is summarized in Figure 7. Alternatively, in a few cases, the change in employment status also enters the regression with a significant and negative coefficient, implying that households experiencing a negative employment shock were less likely to expect to repay their debt.

The level of financial burden captured by the pre-crisis DSTI or the change in the DSTI enters the regression with significant coefficients mainly for the data from the first three waves without using weights. While the change in the DSTI reflects changes in income, a positive coefficient on the pre-crisis DSTI implies that

households with higher debt burden before the crisis had a higher probability of expecting difficulties in repaying their debts.

Interestingly, the regression based on the first wave in July indicates a significant effect of the type of work of the respondent. Households, where the respondent was self-employed were more likely to have negative expectations. This may be related to the still high level of uncertainty about future economic developments at the time of the first wave of the survey.

Figure 7 Marginal Effects of the Change in Income on the Probability to Have Negative Expectations about the Ability to Repay Loans after the End of Moratorium
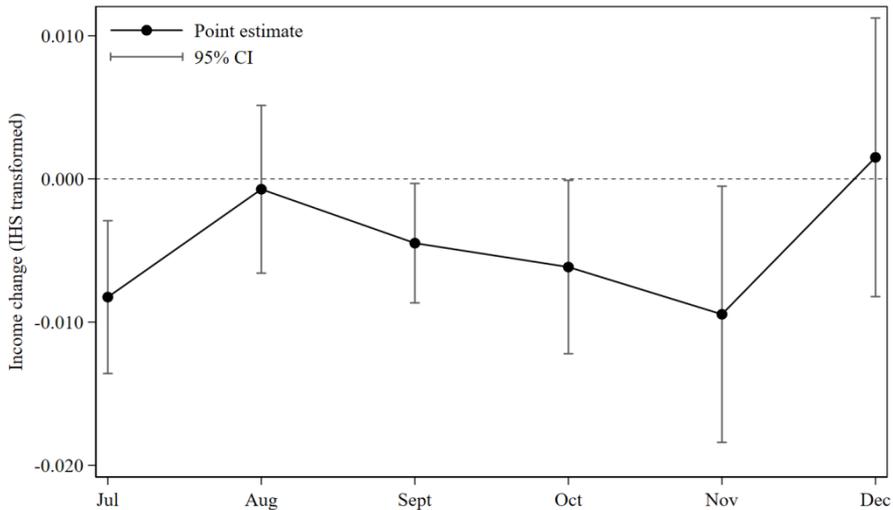
Notes: This figure plots marginal effects of the change in income on the probability to have negative expectations regarding the ability to start repaying the debts once the debt payment moratorium policy is lifted. It is based on the regressions across 6 waves presented in Appendix, Tables B1 to B6, specification (5).

Source: Survey of Indebted Households, National Bank of Slovakia.

Furthermore, since our outcome variable – households' expectations about their future ability to repay loans after the end of the moratorium – is ordinal in nature, we estimate a series of ordered logit regressions in the manner of, for example, Malovaná et al. (2023). This exercise should serve as an extension of the probit analysis, where we only analysed the negative expectations. In our case, the dependent variable can be logically grouped into three main expectations categories: "Fully able to repay loans", "Partially able to repay loans", and "Unable to repay loans".

Figure 8 presents the main results of this sensitivity analysis. Consistent with the probit regression estimates, the probabilities of the predicted outcomes vary substantially across the distribution of our main explanatory variable of interest – a change in household income due to the Covid-19 pandemic. Figure 8 shows that households whose income fell the most were significantly more likely to expect difficulties in repaying their debts in the future. The patterns are very similar across all waves of the survey, with the exception of the last wave, conducted in December,

where the change in income appears to have no effect at all, similar to the marginal effect reported in our probit analysis (Figure 7).

Figure 8 Probability of Predicted Expectation Categories Together with 95% Confidence Intervals
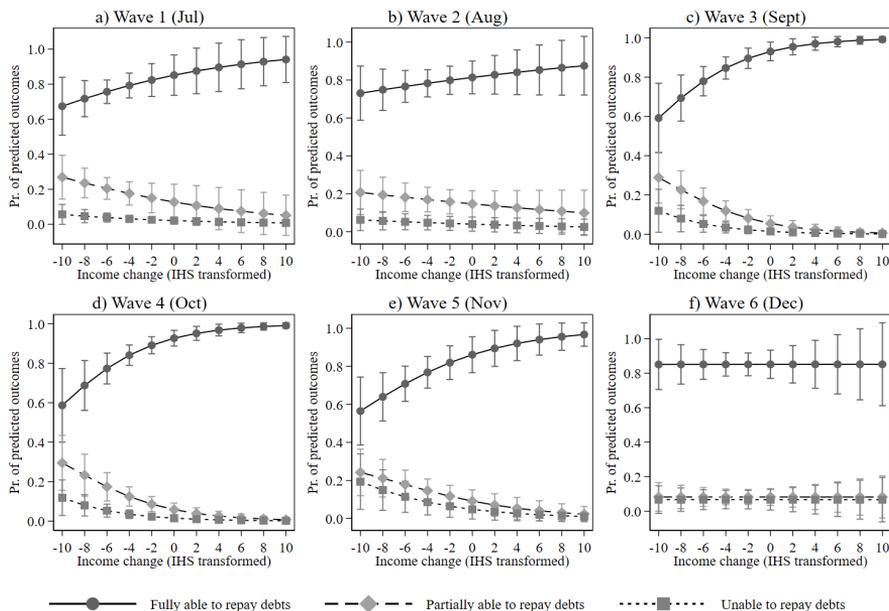
Notes: This figure plots probabilities of predicted outcomes together with 95% confidence intervals across the distribution of income change, fixing other explanatory variables at their means. The estimated ordered logit regression is based on the regressions across 6 waves presented in Appendix through Tables B1 to B6, specification (5).

Source: Survey of Indebted Households, National Bank of Slovakia.

Overall, our results on household expectations are consistent with the findings of the literature on household economic and financial expectations during crises. For example, Hanspal et al. (2020) find that the stronger the decline in income of US households due to the pandemic the more negative were households' expectations about their future debt, the duration of the financial recovery and the labour market prospects. Branten (2022) show, that generally, positive expectations about short-term income development increase the confidence in debt behaviour of Estonian households.

5. Conclusions

In this paper we have presented the results of a survey focusing on the financial situation and expectations of indebted households, with a special focus on households utilizing the debt payment moratorium during the Covid-19 pandemic crisis.

The share of households expecting serious difficulties with resuming payments after moratorium was relatively low across all survey waves. The share was higher in the early summer of 2020, when the future economic development was still highly uncertain, and then slightly increased again towards the last waves, when the second wave of pandemic renewed more stringent government measures.

Income change of indebted households was a key driver of the decision to opt for a deferral. Despite the overall improvement of income situation over the survey waves, average income of households with deferral was still more than 20% below their pre-crisis level, noticeably lower than in case of households not asking for deferral. In addition to income change, another factor affecting the decision to opt for deferral was the pre-crisis level of DSTI. The level of respondent's education and the economic sector turned out to be important factors as well in determining the probability to apply for a loan deferral.

While the share of surveyed households reporting difficulties in starting repaying debts after the end of moratoria was relatively small, it was mostly households/individuals suffering big economic (income) losses because of the crisis or having very risky financial debt positions already before the crisis.

Our results have a number of important takeaways also from a policy perspective. First, the survey confirmed that a significant share of households was strongly hit by the crisis and the lockdown and that the loan deferral helped to improve their liquidity situation. Around 11% of indebted households asked for loan payment deferral. The situation of most of those households normalized over the survey period and the losses foreseen by the survey were manageable for the banking sector. Without the deferral, the default of these households could have significant financial stability implications. Furthermore, it is well documented that a rapid increase of NPLs have serious implications for the loan supply and, consequently, for the real economy (see, e.g., Balgova et al., 2016). On the contrary, because of the support measure, a mere 1% of indebted households did not expect an orderly repayment of their debt, representing also 1% of the retail loan portfolio.

Second, the results confirm the importance of timely and well calibrated macroprudential measures. One of the factors explaining the deferral is high pre-crisis DSTI ratio, as households with high debt payments compared to their income are more sensitive to any income shock than households with sufficient cash buffer. There is already well-documented model-based evidence of the positive impact of the DSTI limit in reducing households' PD (see, e.g., Ampudia et al., 2021). However, the Covid-19 pandemic can serve as empirical evidence of the higher riskiness of households with higher DSTI.

Last but not least, results also underline the importance of financial education. Households with tertiary education, that in Slovakia is strongly correlated with financial education, entered the crisis in a more prepared way.

APPENDIX

Part A

According to the policy tracker provided by the IMF, around two thirds of countries have implemented some form of loan instalments deferral as of September 2020.[27] In 44% of countries the deferral is implemented in national legislation. In an additional 24% of countries, the measures are less comprehensive. Countries where the moratorium applies under some condition, such as only for affected or eligible borrowers, on a case-by-case basis or up to a given limit, for example, are included here. Further, countries with an implicit moratorium (recommendation, but not legally binding) are classified here together with those where the moratorium is valid just for some selected sectors or just for SMEs. For example, in the USA, government-sponsored mortgage companies are providing mortgage forbearance for 12 months. The rest of the world, around one third of countries, has not implemented such a deferral. The share of such countries is the lowest in South America. In Europe, Scandinavia and the Baltic countries, France, Switzerland, North Macedonia and Moldova are included here.

Table A1 Loan Instalment Deferral – Continental Breakdown

	Introduction of debt repayment moratorium					
	Yes		*Partially*		*No*	
Europe	23	53%	8	19%	12	28%
Asia	25	51%	13	27%	11	22%
Africa	15	28%	10	19%	28	53%
North America	1	33%	2	67%	0	0%
South America	14	54%	8	31%	4	15%
Australia and Oceania	4	29%	3	21%	7	50%

Notes: Number of countries and their share in the respective continent is provided in each row.
Source: IMF.

More than half of high-income countries[28] have implemented the deferral and an additional 20% have introduced it with some restrictions. Most upper- and lower-middle-income countries have implemented the moratorium as well, although with a higher share of less comprehensive measures. Almost two thirds of low-income countries have not adopted the deferral yet.

---

[27] https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19.
[28] Country groups based on the World Bank definition:
https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html.

Table 2 Loan Instalment Deferral – Country Income Classification Breakdown

| | Introduction of debt repayment moratorium | | | | | |
	Yes		Partially		No	
High-income countries	34	56%	12	20%	15	25%
Upper-middle-income countries	19	40%	18	38%	11	23%
Lower-middle-income countries	21	43%	11	22%	17	35%
Low-income countries	7	27%	3	12%	16	62%

Notes: Number of countries and their share in the respective income category is provided in each row.
Source: IMF, World Bank.

Part B

Table B1 Variables Used in Empirical Analyses

Variable	Definition
DEFERRAL	Dummy variable: 1 if a household opted for a debt/loan deferral, and 0 otherwise
EXPECTATIONS	Dummy variable: 1 if a household expects that it will not be able to start repaying its liabilities in the future, and 0 otherwise (recoded from original variable using multiple ordered categories 1 "Able to repay loans", 2 "Partially able to repay loans", 3 "Unable to repay loans")
INCOME_CHANGE	Change in household net income since the start of the Covid-19 pandemic
EXPENDITURE_CHANGE	Change in household consumption expenditure since the start of the Covid-19 pandemic
STATUS_CHANGE	Dummy variables set for the following categories: • No household members reported change in economic status • Some but not all household members reported change in economic status • All household members reported change in economic status (including one-person households)
SELF_EMP	Dummy variable: 1 if respondent is self-employed, and 0 otherwise
DSTI	Debt-Service-to-Income (DSTI) is the ratio between household's overall sum of monthly instalments and monthly net income*
DSTI_CHANGE	Change in DSTI after the Covid-19 pandemic
AGE	Respondent's age
SEX	Dummy variable: 1 if male, and 0 if female
EDUCATION	Dummy variables set for the following categories: • No or primary education • Secondary education • Tertiary education
SENSITIVE_SECTOR	Dummy variable: 1 if respondent works in a sensitive sector (Accommodation and food service activities, arts, entertainment and recreation), and 0 otherwise

Notes: Further, there are eight regions in Slovakia and three main banks which are approximately equally present in the data. *Debt service-to-income is calculated, in line with the definition used for borrower-based measures introduced by the National Bank of Slovakia,[29] as

$$DSTI = \frac{Overall\ sum\ of\ monthly\ instalments}{Monthly\ net\ income - Minimum\ subsistence\ amount\ of\ the\ household}.$$

Minimum subsistence amount of household is given by regulation based on the number of adults and children. If net income falls below this minimum, DSTI can be negative.

Source: Own processing based on the survey questions.

---

[29] https://nbs.sk/en/financial-stability/fs-instruments.

Part C

Table C1 Probit Estimates of Determinants of Negative Economic Expectations (Wave 1)

	unweighted				weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
University	-0.007	-0.010	-0.012	-0.012	-0.011	-0.020	-0.017	-0.020
	(0.014)	(0.014)	(0.017)	(0.016)	(0.011)	(0.016)	(0.018)	(0.020)
Age	-0.000	-0.000	-0.000	-0.000	0.001	0.001**	0.002*	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	-0.006	-0.007	-0.007	-0.008	-0.000	-0.001	0.007	0.006
	(0.012)	(0.013)	(0.016)	(0.015)	(0.010)	(0.014)	(0.018)	(0.019)
Income change (IHS transformed)	-0.010***	-0.009***			-0.008***	-0.008***		
	(0.004)	(0.004)			(0.003)	(0.003)		
Self-employed (1st person)	0.032**	0.034**	0.058***	0.054***	0.002	0.002	0.022	0.019
	(0.015)	(0.014)	(0.016)	(0.015)	(0.009)	(0.012)	(0.016)	(0.016)
Self-employed (2nd person)	-0.025	-0.026	-0.028	-0.026	-0.016	-0.023	-0.013	-0.014
	(0.020)	(0.021)	(0.026)	(0.024)	(0.013)	(0.019)	(0.021)	(0.022)
One fam. member experienced change in emp. status			0.007	0.003			0.009	0.004
			(0.026)	(0.025)			(0.027)	(0.027)
Both fam. members experienced change in emp. status			0.007	0.000			-0.017	-0.025
			(0.025)	(0.025)			(0.029)	(0.028)
DSTI change		0.003*		0.004*		0.000		0.000
		(0.002)		(0.002)		(0.001)		(0.002)
Before-crisis DSTI (Arctangent)	0.030		0.020		0.027**		0.018	
	(0.021)		(0.025)		(0.011)		(0.018)	
Pseudo R2	0.10	0.10	0.06	0.07	0.16	0.10	0.07	0.06
N	611	611	611	611	611	611	611	611

Notes: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Table C2 Probit Estimates of Determinants of Negative Economic Expectations (Wave 2)

	unweighted				weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
University	-0.015	-0.016	-0.018	-0.019	-0.047	-0.044	-0.036	-0.034
	(0.017)	(0.016)	(0.017)	(0.017)	(0.030)	(0.029)	(0.023)	(0.024)
Age	0.001*	0.002**	0.002**	0.002**	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	0.006	0.006	0.003	0.003	-0.009	-0.010	-0.009	-0.012
	(0.015)	(0.016)	(0.016)	(0.016)	(0.028)	(0.032)	(0.026)	(0.029)
Income change (IHS transformed)	-0.005***	-0.005***			-0.001	-0.001		
	(0.002)	(0.002)			(0.003)	(0.003)		
Self-employed (1st person)	-0.003	-0.004	0.003	0.000	-0.030	-0.031	-0.029	-0.030
	(0.015)	(0.015)	(0.016)	(0.016)	(0.028)	(0.029)	(0.030)	(0.033)
Self-employed (2nd person)	-0.042	-0.044	-0.036	-0.038	-0.067*	-0.067*	-0.059*	-0.057
	(0.026)	(0.027)	(0.027)	(0.027)	(0.037)	(0.038)	(0.035)	(0.035)
One fam. member experienced change in emp. status			0.042**	0.041**			0.039	0.042
			(0.017)	(0.017)			(0.030)	(0.030)
Both fam. members experienced change in emp. status			0.046**	0.048**			-0.007	-0.003
			(0.019)	(0.020)			(0.024)	(0.026)
DSTI change		0.000		0.001		0.006		0.006
		(0.001)		(0.001)		(0.004)		(0.004)
Before-crisis DSTI (Arctangent)	0.035*		0.036*		-0.053		-0.053	
	(0.020)		(0.021)		(0.039)		(0.039)	
Pseudo R2	0.06	0.06	0.07	0.06	0.08	0.07	0.11	0.10
N	610	610	610	610	610	610	610	610

Notes: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Table C3 Probit Estimates of Determinants of Negative Economic Expectations (Wave 3)

	unweighted				weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
University	-0.012	-0.017	-0.013	-0.018	-0.010	-0.014	-0.025	-0.024
	(0.015)	(0.015)	(0.016)	(0.015)	(0.013)	(0.015)	(0.020)	(0.019)
Age	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	-0.036***	-0.035***	-0.039***	-0.038***	-0.039**	-0.039*	-0.043*	-0.040*
	(0.014)	(0.013)	(0.015)	(0.014)	(0.017)	(0.020)	(0.024)	(0.022)
Income change (IHS transformed)	-0.004**	-0.003			-0.004**	-0.004**		
	(0.002)	(0.002)			(0.002)	(0.002)		
Self-employed (1st person)	-0.005	-0.010	-0.003	-0.007	-0.025	-0.023	-0.027	-0.025
	(0.019)	(0.019)	(0.021)	(0.020)	(0.020)	(0.021)	(0.027)	(0.026)
Self-employed (2nd person)	0.017	0.020	0.023	0.025	0.022	0.023	0.046**	0.044**
	(0.015)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)	(0.019)	(0.019)
One fam. member experienced change in emp. status			0.012	0.006			-0.040	-0.039
			(0.017)	(0.017)			(0.025)	(0.024)
Both fam. members experienced change in emp. status			-0.002	-0.003			-0.003	0.001
			(0.024)	(0.023)			(0.022)	(0.022)
DSTI change		0.005*		0.005**		0.002		0.003
		(0.003)		(0.002)		(0.002)		(0.002)
Before-crisis DSTI (Arctangent)	0.040*		0.038*		0.014		0.003	
	(0.021)		(0.022)		(0.011)		(0.015)	
Pseudo R2	0.10	0.11	0.08	0.08	0.21	0.21	0.17	0.18
N	505	505	505	505	505	505	505	505

Notes: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Table C4 Probit Estimates of Determinants of Negative Economic Expectations (Wave 4)

	unweighted				weighted			
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
University	0.025	0.025	0.025	0.025	0.035[*]	0.035[*]	0.036[*]	0.036[*]
	(0.021)	(0.021)	(0.022)	(0.021)	(0.019)	(0.019)	(0.020)	(0.020)
Age	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	-0.038[*]	-0.038[*]	-0.038[*]	-0.036[*]	0.004	0.004	0.010	0.010
	(0.021)	(0.021)	(0.021)	(0.021)	(0.019)	(0.019)	(0.019)	(0.019)
Income change (IHS transformed)	-0.006[**]	-0.006[**]			-0.006[**]	-0.006[**]		
	(0.003)	(0.003)			(0.003)	(0.003)		
Self-employed (1ˢᵗ person)	0.014	0.014	0.025	0.024	0.014	0.014	0.021	0.021
	(0.027)	(0.027)	(0.027)	(0.026)	(0.024)	(0.024)	(0.024)	(0.024)
Self-employed (2ⁿᵈ person)	-0.026	-0.024	-0.020	-0.018	-0.040	-0.040	-0.040	-0.040
	(0.029)	(0.028)	(0.031)	(0.030)	(0.027)	(0.027)	(0.028)	(0.028)
One fam. member experienced change in emp. status			0.024	0.027			0.032	0.032
			(0.026)	(0.026)			(0.024)	(0.024)
Both fam. members experienced change in emp. status			0.025	0.030			0.037	0.038
			(0.028)	(0.029)			(0.032)	(0.032)
DSTI change		-0.001		-0.002		0.000		-0.000
		(0.002)		(0.002)		(0.001)		(0.001)
Before-crisis DSTI (Arctangent)	0.020		0.023		-0.006		-0.001	
	(0.027)		(0.028)		(0.012)		(0.016)	
Pseudo R2	0.05	0.05	0.04	0.04	0.08	0.08	0.06	0.06
N	410	410	410	410	410	410	410	410

Note: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. [*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Table C5 Probit Estimates of Determinants of Negative Economic Expectations (Wave 5)

	unweighted				weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
University	-0.011	-0.014	-0.009	-0.013	-0.048	-0.055	-0.034	-0.045
	(0.024)	(0.024)	(0.025)	(0.024)	(0.054)	(0.057)	(0.047)	(0.054)
Age	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Male	-0.015	-0.016	-0.021	-0.021	-0.054	-0.056	-0.051	-0.056
	(0.022)	(0.022)	(0.022)	(0.022)	(0.050)	(0.052)	(0.047)	(0.051)
Income change (IHS transformed)	-0.010***	-0.009***			-0.009**	-0.008*		
	(0.003)	(0.003)			(0.005)	(0.005)		
Self-employed (1st person)	-0.006	-0.006	0.015	0.013	0.019	0.020	0.051	0.050
	(0.028)	(0.028)	(0.027)	(0.027)	(0.069)	(0.070)	(0.059)	(0.059)
Self-employed (2nd person)	-0.018	-0.020	-0.018	-0.021	0.017	0.010	0.009	0.000
	(0.031)	(0.032)	(0.031)	(0.031)	(0.060)	(0.061)	(0.053)	(0.056)
One fam. member experienced change in emp. status			0.081***	0.078***			0.113**	0.102**
			(0.025)	(0.025)			(0.048)	(0.048)
Both fam. members experienced change in emp. status			0.055*	0.050*			0.076*	0.062
			(0.030)	(0.029)			(0.042)	(0.046)
DSTI change		0.003		0.005		0.002		0.003
		(0.003)		(0.003)		(0.003)		(0.004)
Before-crisis DSTI (Arctangent)	0.028		0.031		0.033		0.049	
	(0.029)		(0.031)		(0.043)		(0.041)	
Pseudo R2	0.05	0.06	0.06	0.07	0.06	0.06	0.10	0.09
N	388	388	388	388	388	388	388	388

Notes: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

Table C6 Probit Estimates of Determinants of Negative Economic Expectations (Wave 6)

	unweighted				weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
University	-0.003	-0.006	-0.002	-0.005	-0.042	-0.051	-0.032	-0.056
	(0.021)	(0.022)	(0.020)	(0.021)	(0.043)	(0.048)	(0.037)	(0.050)
Age	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Male	-0.018	-0.022	-0.018	-0.021	-0.062	-0.070	-0.046	-0.062
	(0.020)	(0.021)	(0.020)	(0.021)	(0.045)	(0.049)	(0.034)	(0.046)
Income change (IHS transformed)	-0.003	-0.002			0.002	0.003		
	(0.003)	(0.003)			(0.005)	(0.005)		
Self-employed (1st person)	-0.026	-0.028	-0.026	-0.028	-0.075	-0.079	-0.091*	-0.105*
	(0.029)	(0.029)	(0.029)	(0.029)	(0.056)	(0.057)	(0.049)	(0.057)
Self-employed (2nd person)	-0.003	-0.006	-0.001	-0.004	0.051	0.037	0.048	0.032
	(0.032)	(0.033)	(0.032)	(0.033)	(0.054)	(0.056)	(0.050)	(0.057)
One fam. member experienced change in emp. status			0.020	0.020			0.032	0.016
			(0.023)	(0.023)			(0.044)	(0.054)
Both fam. members experienced change in emp. status			0.031	0.029			0.084*	0.062
			(0.024)	(0.023)			(0.044)	(0.048)
DSTI change		-0.001		-0.001		0.003		0.001
		(0.002)		(0.002)		(0.004)		(0.003)
Before-crisis DSTI (Arctangent)	0.039*		0.040*		0.044		0.058*	
	(0.023)		(0.023)		(0.034)		(0.030)	
Pseudo R2	0.04	0.02	0.04	0.03	0.11	0.08	0.16	0.10
N	363	363	363	363	363	363	363	363

Notes: Marginal effects presented are evaluated at the mean of variables. Robust standard errors are presented in parentheses. IHS denotes the inverse hyperbolic sine transformation. We transform DSTI by an arctangent function to scale down some very large values and stack originally negative values next. The transformed values are bounded on $(0, \pi)$ and the most frequent DSTI values up to 60% are mapped almost linearly. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Survey of Indebted Households, National Bank of Slovakia.

REFERENCES

Aller C, Grant Ch (2018): The Effect of the Financial Crisis on Default by Spanish Households. *Journal of Financial Stability*, 36:39-52.

Allinger K, Beckmann E (2021): Use of Loan Moratoria by CESEE Households: Who Are the Users and How Vulnerable Are They?. *Focus on European Economic Integration*, (Q3/21):7-33.

Altavilla C, Barbiero F, Boucinha M, Burlon L (2020): *The Great Lockdown: Pandemic Response Policies and Bank Lending Conditions* (No. 2465): European Central Bank.

Ampudia M, Lo Duca M, Matyas F, Perez-Quiros G, Pirovano M, Runstler G, Tereanu E (2021): On the Effectiveness of Macroprudential Policy. *European Central Bank Working Paper*, 2559.

Aristei D, Gallo M (2016): The Determinants of Households' Repayment Difficulties on Mortgage Loans: Evidence from Italian Microdata. *International Journal of Consumer Studies*, 40(4):453-465.

Baker SR, Farrokhnia RA, Meyer S, Pagel M, Yannelis C (2020): *How Does Household Spending Respond to an Epidemic? Consumption during the 2020 covid-19 Pandemic* (No. w26949): National Bureau of Economic Research.

Balgova M, Nies M, Plekhanov A (2016): *The Economic Impact of Reducing Nonperforming Loans*. EBRD Working Paper No. 193.

Bettocchi A, Giarda E, Moriconi C, Orsini F, Romeo R (2017): Assessing and Predicting Financial Vulnerability of Italian Households: A Micro-Macro Approach. *Empirica*, 45:587-605.

Białowolski P (2019): Economic Sentiment As a Driver for Household Financial Behavior. *Journal of Behavioral and Experimental Economics*, 80:59-66.

Blanco R, Gimeno R (2012): *Determinants of Default Ratios in the Segment of Loans to Households in Spain.* Banco de Espana Working Paper no. 1210.

Blank M, Hanson S, Stein SG, Sunderam JC (2020): *How Should U. S. Bank Regulators Respond to the COVID-19 Crisis?* (No. 63): Hutchins Center.

Branten E (2022): The Role of Risk Attitudes and Expectations in Household Borrowing: Evidence from Estonia. *Baltic Journal of Economics*, 22(2):126-145.

Brewer M, Gardiner L (2020): The Initial Impact of COVID-19 and Policy Responses on Household Incomes. *Oxford Review of Economic Policy*, 36(Supplement_1), S187-S199.

Brown S, Garino G, Taylor K (2008): Mortgages and Financial Expectations: A Household-Level Analysis. *Southern Economic Journal*, 74(3):857-878.

Brown S, Garino G, Taylor K, Price SW (2005): Debt and Financial Expectations: An Individual- and Household-Level Analysis. *Economic Inquiry*, 43(1):100-120.

Bunn P, Rostom M (2014): Household Debt and Spending. *Bank of England Quarterly Bulletin*, Q3.

Cameron AC, Trivedi PK (2005): *Microeconometrics: Methods and Applications*. Cambridge University Press.

Cesnak M, Cupák A, Klacso J, Šuster M (2021): *Fates of Indebted Households during the Corona Crisis: Survey Results from Slovakia.* National Bank of Slovakia Working Paper No. 2/2021.

Cherry SF, Jiang EX, Matvos G, Piskorski T, Seru A (2021): *Government and Private Household Debt Relief during COVID-19* (No. w28357): National Bureau of Economic Research.

Clark RL, Lusardi A, Mitchell OS (2021): Financial Fragility during the COVID-19 Pandemic. *AEA Papers and Proceedings*, 111:292-96.

Coibion O, Gorodnichenko Y, Weber M (2020): *The Cost Of the Covid-19 Crisis: Lockdowns, Macroeconomic Expectations, and Consumer Spending* (No. w27141): National Bureau of Economic Research.

Cupák A, Jurašeková JK, Klacso J, Strachotová A (2023): *Household Finance and Consumption Survey 2021: Results from Slovakia* (No. OP 2/2023): Research Department, National Bank of Slovakia.

Cupák A, Klacso J, Šuster M (2020): *Surveying the Impact of the Covid-19 Recession on the Financial Situation of Indebted Households* (No. OP 6/2020): Research Department, National Bank of Slovakia.

Deaton A (1997): *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy.* The World Bank.

Deville JC, Särndal CE (1992): Calibration Estimators in Survey Sampling. *Journal of the American Statistical* Association, 87(418):376-382.

European Central Bank (2020): *The Household Finance and Consumption Survey, Wave 3. Statistical tables. HFCS Statistical Tables*, European Central Bank.

European Statistical System (2017): *New Web-designed Tool for Calibration of Survey Weights*. Available at: https://ec.europa.eu/eurostat/web/ess/-/slovak-statistcal-office-new-web-designed-tool-for-calibration-of-survey-weights.

Firth D (1993): Bias Reduction of Maximum Likelihood Estimates. *Biometrika*, 80:27-38.

Gerlach-Kristen P, Lyons S (2018): Determinants of Mortgage Arrears in Europe: Evidence from Household Microdata. *International Journal of Housing Policy*, 18:545-567.

Giese J, Haldane A (2020): COVID-19 and the Financial System: A Tale of Two Crises. *Oxford Review of Economic Policy*, 36(Supplement_1):200-2014.

Hanspal T, Weber A, Wohlfart J (2020): *Income and Wealth Shocks and Expectations during the COVID-19 Pandemic* (No. 20-13): University of Copenhagen. Department of Economics. The Center for Economic Behavior and Inequality (CEBI):

Hasan I, Politsidis P, Sharma Z (2020): *Bank Lending during the COVID-19 Pandemic*. MPRA Paper No. 103885

International Monetary Fund (2020): *World Economic Outlook*, *October 2020 update.*

Jurča P, Klacso J, Tereanu E, Forletta M, Gross M (2020): *The Effectiveness of Borrower-Based Macroprudential Measures: A Quantitative Analysis for Slovakia* (No. 20/134): International Monetary Fund.

Keese M (2012): Who Feels Constrained by High Debt Burdens? Subjective vs. Objective Measures of Household Debt. *Journal of Economic Psychology*, 33(1):125-141.

Kelly R, O'Malley T (2016): The Good, the Bad and the Impaired: A Credit Risk Model of the Irish Mortgage Market. *Journal of Financial Stability*, 22:1-9.

Kelly R, O'Toole C (2018): Mortgage Default, Lending Conditions and Macroprudential Policy: Loan-Level Evidence from UK Buy-To-Lets. *Journal of Financial Stability*, 36:322-335.

Kratena K (2020): Supply Constraints in a Heterogenous Agents Household Demand Model: A Method for Assessing the Direct Impact of the COVID Lockdown. *Empirica,* 49:71-97.

Malovaná S, Hodula M, Gric Z, Bajzík J (2023): Macroprudential Policy in Central Banks: Integrated or Separate? Survey among Academics and Central Bankers. *Journal of Financial Stability*, 65:101107.

Mihai I, Popa R, Banu E (2018): *The Probability of Default for Private Individuals Using Microeconomic Data. What Is the Role Played by Macroprudential Measures?* Conference paper, 2nd Annual Workshop of ESCB Research Cluster 3.

National Bank of Slovakia (2019): *Financial Stability Report*, *November 2019.*

National Bank of Slovakia (2020a): *Financial Stability Report May 2020.*

National Bank of Slovakia (2020b): *Financial Stability Report November 2020.*

National Bank of Slovakia (2021a): *Macroprudential Commentary March 2021.*

National Bank of Slovakia (2021b): *Financial Stability Report May 2021.*

Neri A, Zanichelli F (2020): *Principali Risultati Dell'Indagine Straordinaria Sulle Famiglie Italiane NEL 2020*, Banca D'Italia Note.

Statistical Office of the Slovak Republic (2018): *Calif Manual v4.0*. Available at: https://github.com/SO-SR/Calif/blob/master/Calif%20Manual%20v4.0.pdf.