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Contents

What you don't know can't help you: public perception of COVID-19 loan repayment moratoria

Katharina Allinger,[1] Elias Farnleitner

We analyze public perceptions of borrower relief measures, i.e. loan repayment moratoria, implemented during the COVID-19 pandemic, aiming to better understand potential frictions in the transmission of these policies. Using data from an international survey, we document substantial cross-country differences in respondents' awareness and use of borrower relief measures, their attribution of the measures to different institutions and their reasons for not using the measures. We relate these findings to differences in the designs of moratoria across countries, concluding that respondents' awareness and use is positively correlated with how borrower-friendly the measures were. Regarding respondents' socioeconomic characteristics, we find that awareness is correlated with several characteristics, including ownership of financial assets and liabilities or the level of education and financial literacy. In terms of policy conclusions, we are most concerned by respondents' low awareness of borrower relief measures in some countries and by potential implications resulting from high shares of borrowers reporting that they did not use the measure due to ineligibility.

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During the COVID-19 pandemic, loan repayment moratoria for households (subsequently referred to as "moratoria") were one of the relief measures implemented in many countries. These moratoria were largely complementary to other measures aimed at preventing household liquidity crunches and subsequent solvency issues. Studying the effectiveness of the relief measures taken to achieve this aim is central for policymakers and has therefore received most of the attention in the literature.

Our paper has a somewhat different aim, however, which has mostly been neglected in the existing literature: We study how the COVID-19 borrower relief measures implemented in nine Central-, Eastern- and Southeastern European (CESEE) countries[2] were perceived by the public. In this context, we mostly focus on the following variables: awareness of the measures, usage of the measures and reasons for not using them.

All three aspects are important for different reasons and should concern policymakers: Being aware of a measure is clearly a prerequisite for being able to use it. Awareness can even matter for people who are not eligible for the measures, as this might affect their trust, expectations and, subsequently, decision-making. Regarding the usage of measures, we are most interested in the reasons people give for not using them, as this indicates whether people understood the measures correctly and thought they were eligible. In annex C, we also study how people attributed the measures to different institutions, which could be related to take-up. People might be reluctant to use measures offered by institutions they do not trust.

[1] Oesterreichische Nationalbank, Central, Eastern and Southeastern Europe Section, katharina.allinger@oenb.at. Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the OeNB or the Eurosystem. The authors would like to thank Julia Wörz and Fabio Rumler (both OeNB) and an anonymous referee for helpful comments.

[2] Six CESEE EU countries (Bulgaria, Croatia, Czechia, Hungary, Poland, Romania) and three CESEE EU candidate countries (Bosnia and Herzegovina, North Macedonia and Serbia).

We analyze these topics along two dimensions: First, we study how different designs of moratoria are related to people's perceptions and use of moratoria. We exploit the fact that while the objectives of the moratoria were largely the same in the countries covered, they were implemented very differently. Second, we analyze which observable characteristics of individuals help explain the variation in perceptions and take-up.

For our analyses, we use survey data collected in fall 2021. Based on these data, we can shed light on what individuals thought about the different aspects of the moratoria.

In our cross-country comparisons, we find marked differences in our variables of interest. Regarding people's awareness of moratoria, we find that awareness is relatively low in some countries, even among the target group of borrowers. When put in the context of different moratorium designs, we conclude that, above all, awareness and use of moratoria are strongly related to design features. Moreover, the reasons given for not using moratoria vary across countries and show no clear pattern when analyzed against moratorium designs. In most countries, having "no need" for taking up moratoria was the answer given most frequently. In three countries, "not being eligible" was mentioned by even more respondents.

Finally, we study the correlation of our variables of interest with socioeconomic characteristics for the pooled sample and for each country separately. We find that despite some heterogeneity across countries, the patterns of correlations are relatively similar. Awareness increases with several characteristics, mostly related to respondents' ownership of financial assets and liabilities as well as their level of education and financial knowledge. In some countries, there is a high degree of variation in awareness across regions, while in others, the shares are relatively similar across regions. For moratorium use, the most important factor was whether respondents were financially affected by the COVID-19 pandemic.

Our study belongs to the literature assessing borrower relief programs, which largely consists of studies on the effects of borrower relief on debt distress, debt taking, consumption and employment on a household or regional level (Agarwal et al., 2017, 2023; Cherry et al., 2021; Dobbie and Song, 2020; Dinerstein et al., 2023; Piskorski and Seru, 2021; Giné and Kanz, 2018; Kanz, 2016; Mukherjee et al., 2018; Fiorin et al., 2023). Recent studies related to the COVID-19 pandemic and CESEE include, e.g., the study by Aczél et al. (2023) who show that participation in moratoria in Hungary is correlated with subsequent defaults. Cesnak et al. (2023) use survey data for indebted households in Slovakia to study which households used the moratorium and how it impacted their finances. An earlier paper using data from the OeNB Euro Survey by Allinger and Beckmann (2021) finds that individuals who had exited moratorium programs by fall 2020 were not more likely to be in arrears with loan repayments than individuals who had not used these programs.

While these papers provide crucial evidence on the effectiveness of borrower relief measures, there are few papers on potential frictions in the transmission of such measures on the borrower side, such as low awareness, difficulties in understanding the measures and non-monetary costs. Johnson et al. (2019) combine administrative and survey data to study motives for not accepting refinancing offers of a US borrower relief program. They find that suspicion toward refinancing offers is significantly related to take-up, as is awareness of the offer and perceived eligibility. Allen et al. (2022) investigate two COVID-19 debt relief programs in Canada and find that take-up was low. They report that this is partially due to people's low awareness of the programs. Jacob et al. (2023) complement their study on debt relief for US teachers with evidence from focus groups which suggests that administrative barriers and program complexity hindered take-up.

We are not aware of any papers that present evidence on public perceptions of COVID-19 loan moratoria in the CESEE region or borrower relief programs in a cross-country setting, linking public perceptions to the design of the policies. Thus, our study fills a gap in the literature. Moreover, it is very topical in the context of high inflation and interest rates, as some household finances are under pressure and a renewal of loan repayment moratoria has been discussed.

The study is structured as follows: In section 1, we provide a review of the designs of moratoria implemented in the CESEE countries and of the guidelines issued by the European Banking Authority (EBA) on moratoria. In section 2, we briefly discuss the data and methodology we use. In section 3, we present our data analysis, shedding light on people's awareness and use of moratoria from a cross-country perspective. Section 4 focuses on a within-country perspective, using socioeconomic characteristics and geographic data. Section 5 summarizes and provides some policy conclusions.

1 Implementation of moratoria

This section first outlines what is meant by EBA-compliant moratoria and then proceeds to compare the designs of moratoria implemented in nine CESEE countries during the COVID-19 pandemic. We mostly use national sources, complemented with information collected by the EBA (2020d). Our task is complicated by the fact that the characteristics of moratoria changed in most countries over the course of the pandemic. Moreover, in some countries, several moratorium schemes existed in parallel, applying different conditions. On top of that, banks could always negotiate with clients bilaterally. Thus, the characteristics of moratoria could differ drastically even within a given country.[3]

1.1 EBA guidelines on legislative and non-legislative moratoria

On April 2, 2020, the EBA published its guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis (subsequently referred to as "EBA GL"; European Banking Authority, 2020a). The EBA GL set out the conditions for legislative and non-legislative general payment moratoria, which did not automatically trigger a reclassification of the exposure as forborne (in accordance with Article 47b of the Capital Requirements Regulation (CRR)) or defaulted (Article 178 of the CRR). These general payment moratoria stood in contrast to the usual regulatory forbearance approach, asking banks to carefully assess each borrower's situation and tailor forbearance measures to the borrower. In fact, the COVID-19 moratoria had to be sufficiently broad in terms of both the participating creditors and the borrowers. The EBA GL thus excluded initiatives designed and implemented by a single bank, as well as solutions tailored to individual clients. The conditions offered by EBA-compliant moratoria needed to be the same for the same type of borrower or exposure. Thus, different conditions could only be specified for groups of borrowers or products, e.g. for mortgage loans. Only the payment schedule should be affected by the moratorium, while other terms (e.g. the contractually agreed interest rate) should remain unaffected. Contracts concluded after the start of the COVID-19 pandemic were not eligible.

The application deadline for moratoria under the EBA GL was extended twice. After the deadline had first been extended from June to September 30, 2020, the EBA decided in September 2020 to suspend its GL. However, due to the second COVID-19 wave, the GL were re-activated in early December 2020 and the application deadline was set to the end of March 2021. An

[3] Given these difficulties, information on moratoria had to be collected on a best-effort basis.

additional condition was introduced, specifying that loan repayments could be deferred for a maximum of 9 months for the moratorium to remain compliant with the GL (European Banking Authority, 2020b, 2020c).

1.2 Moratoria in CESEE

Most CESEE EU countries modeled their moratoria at least partially on the EBA GL. However, compliance varied across countries and over time. Moreover, even while adhering to the EBA GL, there was substantial room for variation in the design of moratoria. We summarized some of the most important characteristics of, and differences between, moratoria in table B4 in annex B. In the subsequent paragraphs, we discuss some of the more distinctive features of the moratoria across countries.

Certainly, two of the more important distinctions were, first, whether respondents had to apply for, i.e., opt in to the moratorium or, second, whether the moratorium applied automatically unless clients actively opted out (or simply continued to make their loan repayments). Besides being more convenient for borrowers, opt-out moratoria were available to all borrowers. Opt-in moratoria in CESEE were mostly tied, directly or indirectly, to whether borrowers' finances were affected by the COVID-19 pandemic.

Another distinction was whether moratoria were based on legal documents issued by governments, central banks or regulatory authorities, thus constituting public moratoria (see column 3 in table B4 in annex B), or whether they were based on private agreements, e.g., between members of banking associations. Public moratoria usually implied that participation was compulsory for banks and that any conditions of the moratorium outlined in legal texts or guidelines were followed closely, as they were legally binding. The latter is difficult to verify in retrospect and without insights into banks' practices. However, the Polish central bank noted that "banks in Poland have not developed a uniform standard of loan moratoria. As a result, borrowers face various conditions on the suspension of loan repayment depending on the lending bank" (Narodowy Bank Polski, 2020, box 4.1.). This seems to support the theory that in the case of private moratoria, as in Poland, banks had more leeway when implementing the measures.

Along these two dimensions, the CESEE countries were split almost evenly. Three countries – Hungary, North Macedonia and Serbia – had public and, at least partially, opt-out moratoria. Another three countries – Czechia, Romania and Bosnia and Herzegovina – implemented public opt-in borrower relief programs. Finally, the policies in Bulgaria, Croatia and Poland can best be characterized as private and opt-in policies.[4]

Of all the moratoria, the one in Hungary had the most generous terms, as it applied for a very long time and was changed from an opt-out to an opt-in moratorium relatively late. The Hungarian central bank was quite critical of the many blanket extensions of the moratorium granted by the government. Only from November 1, 2021, onward were the conditions of the moratorium tightened so that only specific groups (e.g. retirees, families with children) remained eligible. Overall, the moratorium applied until end-2022 (Ministry of Justice, 2020a, 2020b; Magyar Nemzeti Bank, 2021, 2022a, 2022b).

In Czechia, on the other hand, the government applied some of the tightest conditions among the CESEE EU countries by explicitly excluding revolving products and setting a comparatively early end-date for moratorium use, namely on October 31, 2020 (Act No. 177/2020, 2020).

[4] However, there are some cases that are not entirely clear-cut, again speaking to the complexity of characterizing the moratoria. For instance, Poland briefly had a short legislative moratorium, and Serbia switched to an opt-in moratorium already in December 2020.

Regarding private moratoria in Bulgaria, Croatia and Poland, these were largely established with strong involvement of the respective banking associations. Given their non-legislative nature, these moratoria were largely voluntary for banks, but information by the EBA suggests that in all three countries (almost) all banks participated. Bulgaria and Croatia definitely saw active involvement of their central banks. The Bulgarian central bank outlined the conditions of the moratorium on April 10, 2020 (Bulgarian National Bank, 2020), and these were then adopted by the Bulgarian banking association. In Croatia, the central bank sent several Circular Letters to the banks regarding the application of the EBA GL (Hrvatska narodna banka, 2020a, 2020b, 2020c, 2020d). According to the Polish banking association, the latter agreed on the moratorium with the Polish government (ZBP, 2020).[5]

In the CESEE EU candidate countries, a special feature was that borrower relief was defined more broadly than just loan moratoria. In Serbia, for instance, the second part of the borrower relief program from mid-December 2020 onward required clients to opt in and was tied to eligibility criteria, i.e., to whether clients were negatively financially affected by the COVID-19 pandemic. Moreover, banks could choose from several options how to help borrowers in need (Narodna banka Srbije, 2020a, 2020b, 2020c). In North Macedonia, borrower relief generally included two offers made to clients (one in March and one in September 2020), providing for favorable changes in loan terms. The conditions of these changes were determined by the banks (National Bank of the Republic of North Macedonia, 2020a, 2020b). In Bosnia and Herzegovina, the banking agencies of the two entities adopted decisions in March 2020, establishing a temporary moratorium. The latter was intended to apply only until the end of the state of emergency (i.e. until May 2020) and mostly served to give banks and clients time to work out the right medium-term modalities for repayment. The decisions also detailed all modalities available, including the option to defer repayments for a maximum of six months. In August/September 2020, the banking agencies extended the application deadline for moratoria and other relief measures outlined in the decisions until end-2020, effectively allowing loan postponements until mid-2021 at the latest (ABRS, 2020a, 2020b; FBA, 2020a, 2020b; UBBIH, 2020).

2 Data and methodology

This section discusses the data and methodology used. It describes the construction of a design index for moratoria as well as key features of the data.

2.1 Constructing a design index for moratoria

The information contained in table B4 in annex B simplifies the complexity of COVID-19 moratoria. However, the information is still too detailed for further use in the paper, which is why we select three key characteristics from table B4 to construct a simple numeric index that captures certain design features of the moratoria discussed: i) the scope of eligible borrowers (opt-in/opt-out moratoria); ii) the binding nature of the moratoria (public/private); and iii) the duration of the moratoria. We chose these characteristics, as they seem to be good proxies for how generous the moratoria were for borrowers. The calculation of the index is shown in table 1. The results are displayed in the first panel of chart 1.

All other characteristics that we could have used to create more differentiation in the index across countries presented us with the following issues: The information available was incomplete across countries; the criteria were too unique and/or minor (e.g. only one country would get a

[5] From June 24, 2020, onward, there was also a brief legislative moratorium based on Articles 31fa-fc of the Act of 19 June 2020 on interest rate subsidies. The articles set out that borrowers could apply for moratoria of a maximum of 3 months.

score of 1 versus 0 for all other countries based on a minor aspect); or the criteria were collinear with characteristics already contained in the index. For instance, the latter would apply for eligibility criteria related to COVID-19, as these criteria existed in all opt-in countries, but not in the opt-out countries. In our opinion, information gathered through expert interviews with policymakers and bankers in the region would be needed to markedly improve the index.

Table 1

Design index for moratoria in CESEE

	BG	HR	CZ	HU	PL	RO	BA	MK	RS
Opt-out (1)/opt-in (0)	0	0	0	1	0	0	0	1	0.5
Public (1)/private (0)	0	0	1	1	0.5	1	1	1	1
Maximum duration	0.5	0.5	0	1	0	0.5	0	0	0
Sum	0.5	0.5	1	3	0.5	1.5	1	2	1.5

Source: Authors' compilation based on information provided by the EBA as well as various national competent authorities and banking associations.
Note: Opt-in moratoria refer to moratoria for which borrowers needed to apply. Opt-out moratoria applied automatically unless borrowers opted out. Serbia has a score of 0.5, as borrowers had to opt out of the initial moratorium and opt in to its extension in 2020. Public moratoria refer to moratoria established by law, ordinances or decisions issued by governments, central banks or other financial authorities. Poland has a score of 0.5, as it had rather limited public and much broader private moratoria. The maximum duration refers to the date when the last moratoria expired and is judged relative to the EBA GL (maximum duration until December 31, 2021). Moratoria that were in place longer get 1 point, those in place shorter get 0 points. Moratoria in place for as long as indicated in the EBA GL receive 0.5 points.

Thus, the design index clearly contains many assumptions that have implications for our conclusions. However, instead of viewing the index as a perfect representation of how generous moratoria were in the countries, we consider it a necessary and helpful tool for subsequent analyses using publicly available information on moratorium designs. We provide some robustness checks in annex B.

2.2 The OeNB Euro Survey and module on borrower relief measures

The remainder of the paper uses data from the 2021 wave of the OeNB Euro Survey.[6] The OeNB Euro Survey is an annual survey among individuals in ten CESEE economies that has been conducted since 2007. The countries included in the survey are 6 EU member states, namely Bulgaria (BG), Czechia (CZ), Croatia (HR), Hungary (HU), Poland (PL) and Romania (RO) as well as four EU candidate countries, namely Albania (AL), Bosnia and Herzegovina (BA), North Macedonia (MK) and Serbia (RS). The sample for each OeNB Euro Survey wave consists of 1,000 randomly selected individuals per country and is designed to represent the adult population with respect to gender, age and regional distribution. Due to issues with data quality in Albania, the country is excluded from this study (Olbrich et al., 2024).

The OeNB Euro Survey wave conducted in October 2021 included a module on borrower relief during the COVID-19 pandemic. In this study, we present results for a couple of questions from the module (for more details, see table A1 in annex A):

[6] For details, see the OeNB Euro Survey website.

- **Awareness:** *"Are you aware of any measures your government or banks in [YOUR COUNTRY] adopted because of the pandemic to support borrowers (for example enabling borrowers to postpone repayments without penalties, offering borrowers favorable changes in loan terms)?"*
- **Usage:** *"Since the beginning of the COVID-19 pandemic, have you taken advantage of any measures that were adopted to support borrowers?"*
- **Reasons for non-usage:** *"Could you tell us why you didn't make use of the measures? Please mention all reasons that apply." Answer options: see table A1 in annex A.*

Except for usage, the aspects listed above cannot be studied without survey data. However, survey data have some caveats: Given the international dimension of the survey, we needed to find a term suitable for all countries covered. As discussed in section 1, the EU candidate countries in our sample allowed for borrower support to take different forms. We therefore settled on the term "borrower relief" rather than "moratoria" for the survey module. Thus, using the terms "moratoria" and "borrower relief" interchangeably throughout the paper is not entirely precise in the case of the candidate countries. Moreover, while the OeNB Euro Survey is designed to represent the adult population in the surveyed countries, missing data and the fact that we occasionally work with quite small subsamples mean that we need to be careful when trying to interpret our findings for the entire population of a given country or subsamples of that population. For instance, given the lack of statistics on debtor characteristics for the respective countries, we cannot check the representativeness of our debtor sample or correct for imbalances ex post.[7] This is why we focus on the entire population of a given country rather than on subsamples of that population, wherever possible.

2.3 Methodology for cross-country and within-country analyses

In section 3, we present descriptive results for our questions on awareness, usage and non-usage of moratoria and discuss differences across countries.[8] While the cross-country heterogeneity is already interesting in itself, we hypothesize that policy design matters. We expect a positive correlation, meaning that the more borrower-friendly a measure, the higher people's awareness and usage of the measure and the lower the share of people who did not use the measure because they were not eligible.

In section 4, we use a large set of available variables on respondents' socioeconomic characteristics, preferences and beliefs to shed some light on within-country differences. We define binary dependent variables for each of our main questions of interest and estimate the following model(s) with probit regressions:

$$P(y_i = 1) = \Phi(\beta X_i + \varepsilon_i) \quad (1)$$

where, depending on the model, $P(y_i = 1)$ stands for the probability that the respondent i is aware of borrower relief programs, or used the programs. X is a vector of explanatory variables and ε is an error term. Standard errors are clustered at the level of the primary sampling unit (PSU), which refers to a selected starting point for the random route of the interviewer. This level

[7] See annex A for a description of all variables used in this study (including the corresponding questions) as well as summary statistics.

[8] For these analyses, we use the post-stratification weights of the OeNB Euro Survey calculated based on age, sex, education and region and additional variables in a few countries.

is chosen given the sampling design of the survey (Abadie et al., 2023; Cameron and Miller, 2015). Moreover, within-PSU correlation is likely, given potential interviewer and network effects.[9]

Given the different dependent variables, we have different samples for each regression: for awareness, all respondents that answered "yes" or "no" to the corresponding question; for usage, all respondents with bank or nonbank loans or revolving debt, such as overdraft or credit card debt (subsequently referred to as "borrowers").

With the exception of "having debt," we use the same explanatory variables in the probit estimations for awareness, attribution and usage to facilitate comparisons. We use theoretical considerations and statistical methods and choose the following variables: having debt/loans, planning to take out a loan in the next 12 months, having no savings, owning investment products, having been negatively financially affected by the COVID-19 pandemic, living in the capital city, trust in banks and trust in the government, education, financial literacy, income[10] and employment status. Moreover, we also add further socioeconomic control variables that are not shown in the coefficient plots in section 4, namely age, gender, being married and household size. All pooled regressions contain country dummies. Correlations between the explanatory variables are rather low (see table A3 in annex A), as are variance inflation factors for the regressions shown in this study.

The main aim of the simple regressions is to provide some sense of the correlations between socioeconomic characteristics and awareness and usage of moratoria, respectively. The variables are selected to test different hypothesis for each dependent variable. We outline these hypotheses before presenting the results in section 4. We do not claim causality in the results we report, given the shortcomings of our design index as well as the fact that we cannot control for all relevant variables, e.g. different media landscapes/coverage or political factors.

3 Cross-country variation by moratorium design

In this section, we focus on cross-country variations in respondents' average awareness and use of moratoria as well as their reasons for not using them, considering the different design features of moratoria.

The upper panel of chart 1 shows the results of our simple design index listed from highest to lowest value. Hungary stands out with the maximum value, followed by North Macedonia, which also had a public, opt-out moratorium. Serbia is on a par with Romania according to our index. So are Czechia and Bosnia and Herzegovina, both with a score of 1, while Bulgaria, Croatia and Poland come in last with a low average score of 0.5. This ranking of the countries is maintained in the middle and lower panels of chart 1, enabling us to see at first glance that while there is strong variation across countries, there seems to be at least some correlation between the design features of moratoria and respondents' awareness and use of the latter. The Pearson correlation coefficients between the design index and the means of awareness and usage are 0.87 and 0.90, while the Spearman rank correlation coefficients are similar but slightly smaller.

[9] For robustness, we cluster pooled regressions at a higher level, namely at the level of regions (74 clusters). While the standard errors are higher in this case (see table D2 in annex D), the change is not large enough to affect the graphic results in the main text.

[10] Income is included as dummies for income terciles and a dummy variable if the answer was "Don't know" or "No answer," given high income nonresponse. The results of the pooled regressions barely change when we exclude respondents with missing income information as a robustness check (results available upon request).

3.1 Awareness of moratoria

At roughly 70%, the share of respondents aware of borrower relief measures is by far the highest in Hungary. Hungary is followed by the other two opt-out countries, namely North Macedonia and Serbia, both with shares of over 50%. In Czechia and Romania, the shares come to around 40%. In the remaining countries, the shares are close to or below 35%, with a low of 20% in Bosnia and Herzegovina.[11] Since the relief measures are targeted at borrowers, we also plot the shares of borrowers aware of the measures in red. While these shares are higher in all countries and reach almost 100% in Hungary, they remain rather low in the last four countries displayed, i.e. in Bosnia and Herzegovina, Bulgaria, Croatia and Poland. If we consider an even smaller subgroup, namely borrowers affected by the COVID-19 pandemic, the results differ markedly across countries. Awareness is actually lower among borrowers affected by the pandemic than among those unaffected in six out of nine countries. Only in Czechia, Bosnia and Herzegovina and North Macedonia, affected debtors are more aware of the measures than unaffected ones (see table A4 in annex A).

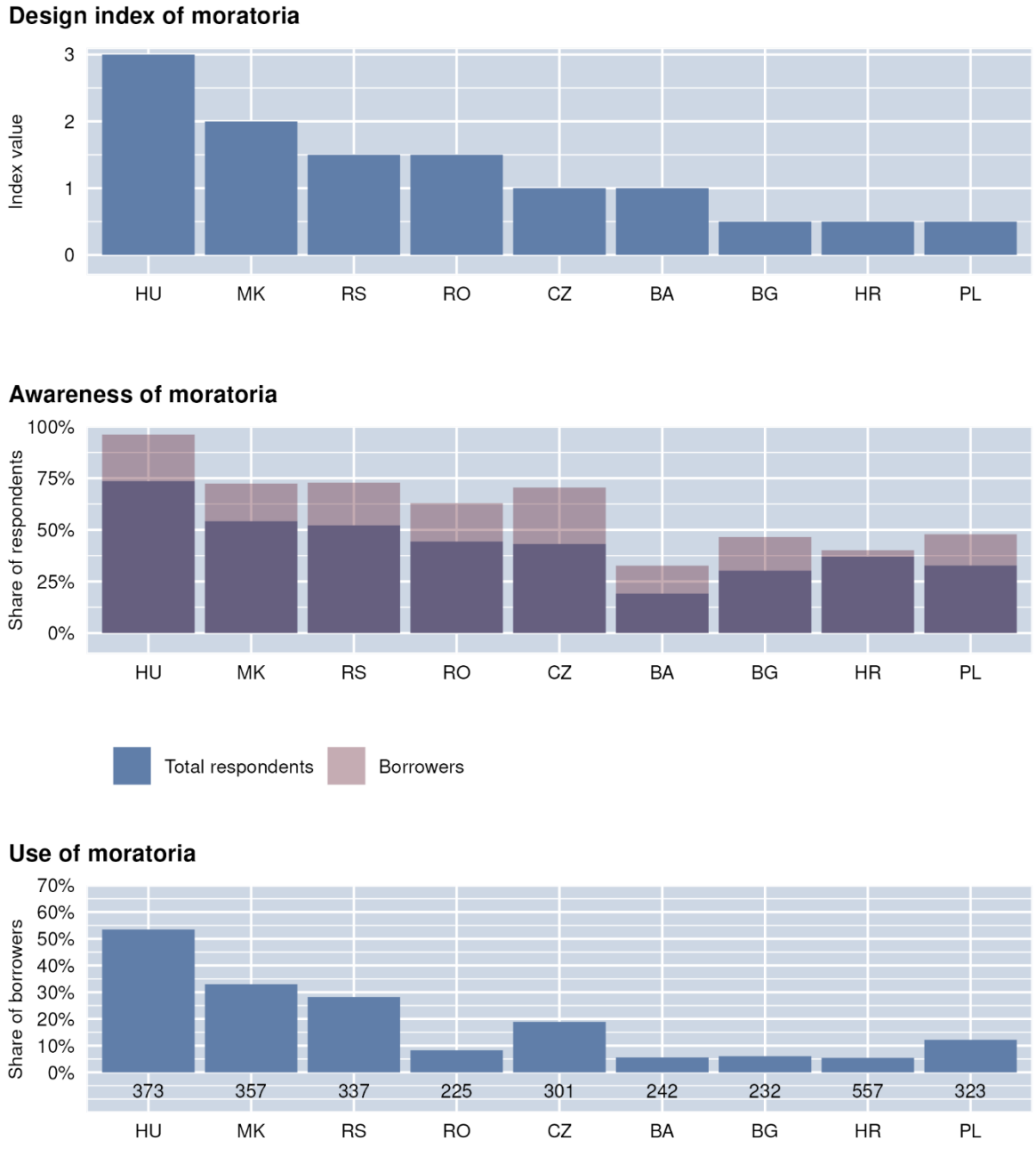
In terms of design features, the ranking for awareness comes close to the results obtained for the design index. This suggests that more generous moratorium designs were related to higher awareness in the population. Intuitively, this makes sense, as more generous support measures were probably more present in the media. Also, opt-out moratoria certainly created more awareness among debtors, as most banks likely informed their debtors about the changes in their loan terms. Despite the intuitiveness of the correlation, it seems striking how large the variation between the countries is and how few people in some countries claimed to be aware of the measures taken.

The lack of awareness is potentially concerning from a policy perspective. While there may be good reasons to have tight eligibility criteria for a borrower support program, every borrower should at least be aware of the existence of the program to assess whether they are eligible and want to use it. If awareness is very low, potentially interested borrowers might not have been able to benefit from the measure, as they were simply not aware of it. A complementary explanation might be that since very low awareness mostly concerns private moratoria, the communication of such measures might have been different: They might have been communicated less through official channels and the media, or they might have simply not been communicated and noticed as broad-based policy measures related to COVID-19. After all, borrowers in difficulty can always discuss restructuring their loan with their banks.

[11] Respondents who stated "Don't know" or "No answer" are excluded from the total. Poland has by far the highest share of respondents stating "Don't know" (20%). Higher shares were also reported for Bulgaria and Czechia (12%–14%). When including these respondents as not being aware of borrower relief measures, the shares of respondents aware of these measures would be lower in Poland (26%), Bulgaria (25%) and Czechia (36%).

Chart 1

Design index, awareness and use of moratoria in CESEE



Source: 2021 OeNB Euro Survey wave.
Note: Means are calculated with post-stratification weights. In the lower panel, the number of observations for the borrower subsample is indicated below the bars. The question on awareness was posed to all respondents.

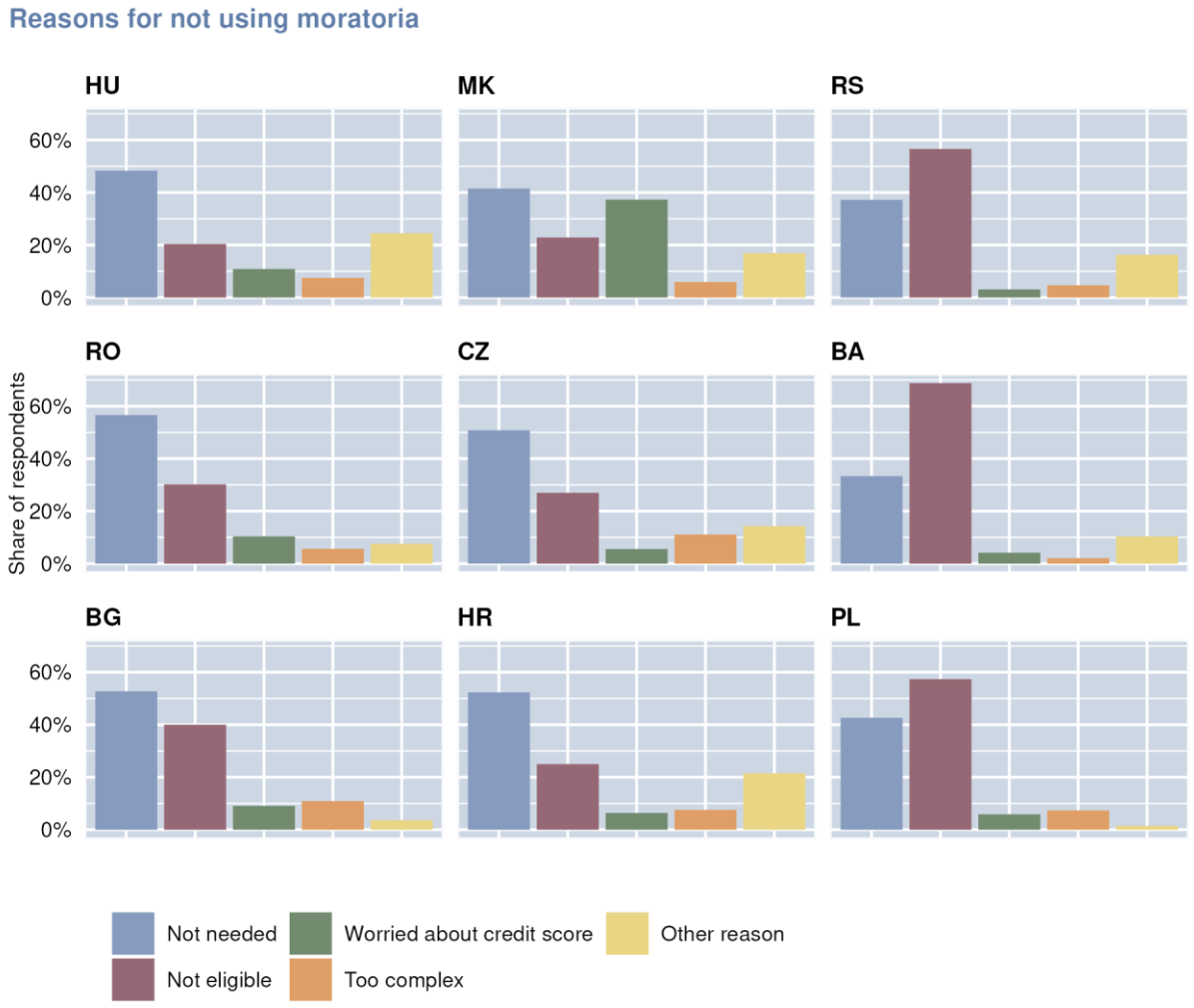
3.2 Use of moratoria

The lower panel in chart 1 shows the use of borrower relief measures among borrowers in CESEE. Given the low absolute number of moratorium users in some countries, the means are subject to considerable uncertainty.

We see similar patterns as for awareness and an even higher correlation with the design index. Reported use of borrower relief measures was by far the highest in the opt-out countries, starting with around 55% of debtors in Hungary and around 30% in North Macedonia and Serbia. In Czechia, almost 20% of debtors reported using the relief programs, followed by around 10% in Poland. In the remaining countries, less than 10% of debtors in our sample used the moratoria.[12]

We asked respondents who did not use the relief programs for the reasons behind not using them. Since we only asked debtors who were aware of the programs, we are left with few observations, ranging from 57 in Bosnia and Herzegovina to 188 in Croatia. Moreover, respondents could give more than one answer, even though the vast majority of respondents chose just one option. Keeping these caveats in mind, we nonetheless found some interesting cross-country similarities and dissimilarities evident from chart 2.

Chart 2



Source: 2021 OeNB Euro Survey wave.
Note: Countries are plotted in descending order based on the design index. The number of observations for each country are as follows: Hungary (N = 154), North Macedonia (N = 132), Serbia (N = 142), Romania (N = 118), Bosnia and Herzegovina (N = 57), Czechia (N = 137), Bulgaria (N = 71), Croatia (N = 188), Poland (N = 79).

[12] Regarding the question on how OeNB Euro Survey data on the use of borrower relief measures compares to data from other sources, we refer to Allinger and Beckmann (2021). In this paper, the authors discuss the difficulty of comparing OeNB Euro Survey usage data with the few other statistics available and provide a table comparing usage data from a variety of sources (see table A3 in annex A).

In most countries, respondents not using the moratoria most often stated that they had no financial need to do so. In Bulgaria, Croatia, Czechia, Hungary and Romania, 50% or more of non-users gave this answer. In the remaining countries, around 35%–40% mentioned this reason. Moreover, non-users frequently stated that they were not eligible for the moratoria. In most countries, the shares of non-users mentioning eligibility ranged between 20% and 30%. However, in three countries, this answer was chosen most often, namely in Poland, Bosnia and Herzegovina and Serbia. It is interesting to note that Serbia is among these countries, given that Serbia initially had an opt-out moratorium. We can break down eligibility further to differentiate between debt type, criteria related to the COVID-19 pandemic and other eligibility criteria. In the case of Poland, Bosnia and Herzegovina and Serbia, the high shares of ineligible borrowers are largely due to respondents stating that the types of debt they held were not eligible for a moratorium. This is somewhat puzzling, as our reading of the design features of moratoria suggests that their debt types would have been eligible.

However, respondents might indeed not have been eligible if, e.g., they were in arrears on their loan in March 2020 or had taken out their loan after March 2020. We can also not exclude that respondents accidentally or deliberately gave false answers, not wanting to state the true reasons. The most worrying possible interpretation from a policy perspective is that respondents might have erroneously thought that they were not eligible. This could point to suboptimal communication by policymakers or banks. The data suggest that other borrowers potentially wanted to use the moratoria but were prevented from doing so due to the eligibility criteria defined or their interpretation of these criteria.

Having sorted the countries in chart 2 in descending order based on the design index, we find that there is no clear visual pattern based on moratorium design features for either "not eligible" or "not needed." The computed correlation coefficients for eligibility are –0.44 (Pearson) and –0.54 (Spearman), indicating that a higher design index is associated with lower shares of respondents concerned about eligibility. However, the correlation is not significant. For "not needed," the computed correlation coefficients are both around –0.1 and highly insignificant.

Finally, in most countries, around 5%–10% of respondents who knew about the moratoria but did not use them mentioned the complexity of the related application process. Particularly in North Macedonia, people also seemed to worry about their credit score, which deterred them from using the moratoria. In Croatia, Hungary, North Macedonia and Serbia, almost 20% of respondents also listed other (not specified) reasons.

4 Within-country variation by region and socioeconomic variables

In this section, we discuss the within-country variation in respondents' awareness and use of borrower relief measures both with regressions using socioeconomic variables and, in the case of awareness, regional variation. Results for respondents' attribution of the measures are reported in annex C.

4.1 Awareness of moratoria

With respect to awareness, we formulate several hypotheses about some of the variables we selected for our probit model, while other variables are primarily included as control variables and will therefore not be discussed in detail. We study the awareness of the entire population instead of just debtors for two main reasons: First, awareness of policy measures may have effects on debtors' and non-debtors' overall financial behavior. Those aware are potentially more likely to expect future bailouts by the government, which might alter their risk-taking behavior. Second,

this allows us to exploit the full, representative population sample, which gives our statistical analyses more power. This is particularly relevant for the country regressions.

We assume that the following variables have a positive correlation with respondents' awareness: i) having or planning to take out loans, as it is likely that debtors pay more attention to, and have a different stake in, borrower relief programs than non-debtors. Moreover, they may even have received personalized information from their banks, particularly in opt-out countries; ii) higher level of education and financial literacy, as both likely make it easier for respondents to understand financial policy measures and assess their usefulness and implications; iii) being negatively affected by the COVID-19 pandemic, as this may give respondents an incentive to be more aware of available support measures; and iv) living in the capital city, as this is usually where policies are decided in the CESEE countries and may therefore lead to increased awareness.

We believe that other variables of financial inclusion and sophistication, such has having no savings or owning investment products, are likely also important. However, we are uncertain about the expected direction of the effects. Both savings and investment products may, on the one hand, be an indicator of wealth and thus of the need for support measures. On the other hand, these variables may also be an indicator of financial inclusion and thus of being aware of developments in finance and banking in general.

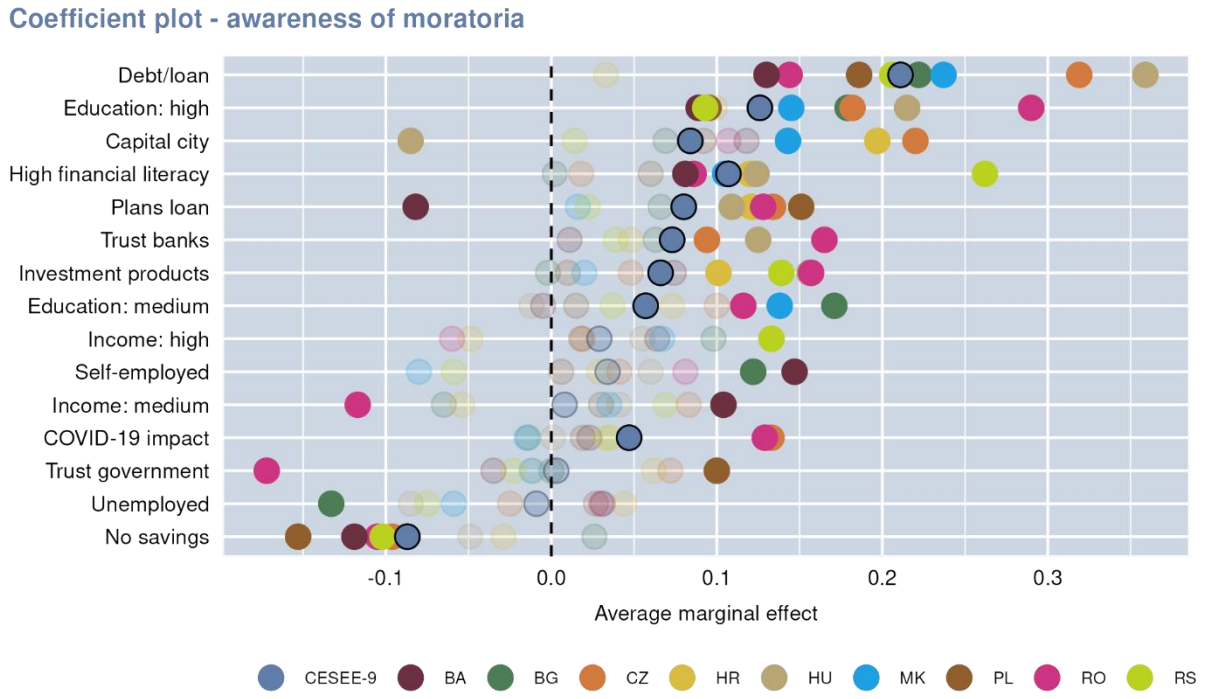
Chart 3 shows the average marginal effects of several probit regressions.[13] The results of a pooled regression are shown in dark blue in addition to the results of country-specific regressions. We can clearly see that the magnitude and significance of the estimates varies across countries. Despite this heterogeneity, some common patterns can be identified.

For the variables that capture having loans, planning to take out loans and having higher levels of education and financial literacy, we find that they are strongly, positively and significantly related to awareness in almost all regressions. With respect to owning investment products or having no savings, the financial inclusion effect seems to dominate the wealth effect. Having no savings is associated with lower awareness of borrower relief measures, and owning investment products with higher awareness – again, this holds for most countries.

Interestingly, if respondents' personal finances were negatively impacted by the COVID-19 pandemic, awareness levels were higher in the pooled regressions. However, the marginal effects appear relatively modest. Moreover, in country-specific regressions, these effects are mostly insignificant. Thus, the results for our initial hypothesis that COVID-19 affectedness correlates with awareness are mixed.

[13] For reasons of scope, not all coefficients are shown in the plot, but they are included in table D3 in annex D.

Chart 3



Source: 2021 OeNB Euro Survey wave.
Note: Dependent variable = 1 if respondent is aware of borrower relief measures. Average marginal effects from a probit model estimated by maximum likelihood. Standard errors are clustered at the PSU level. Full opacity means p-value of t-test < 0.1. Variables not shown include log(Age), Female (0/1), Married (0/1), Income: NA, Size of household.

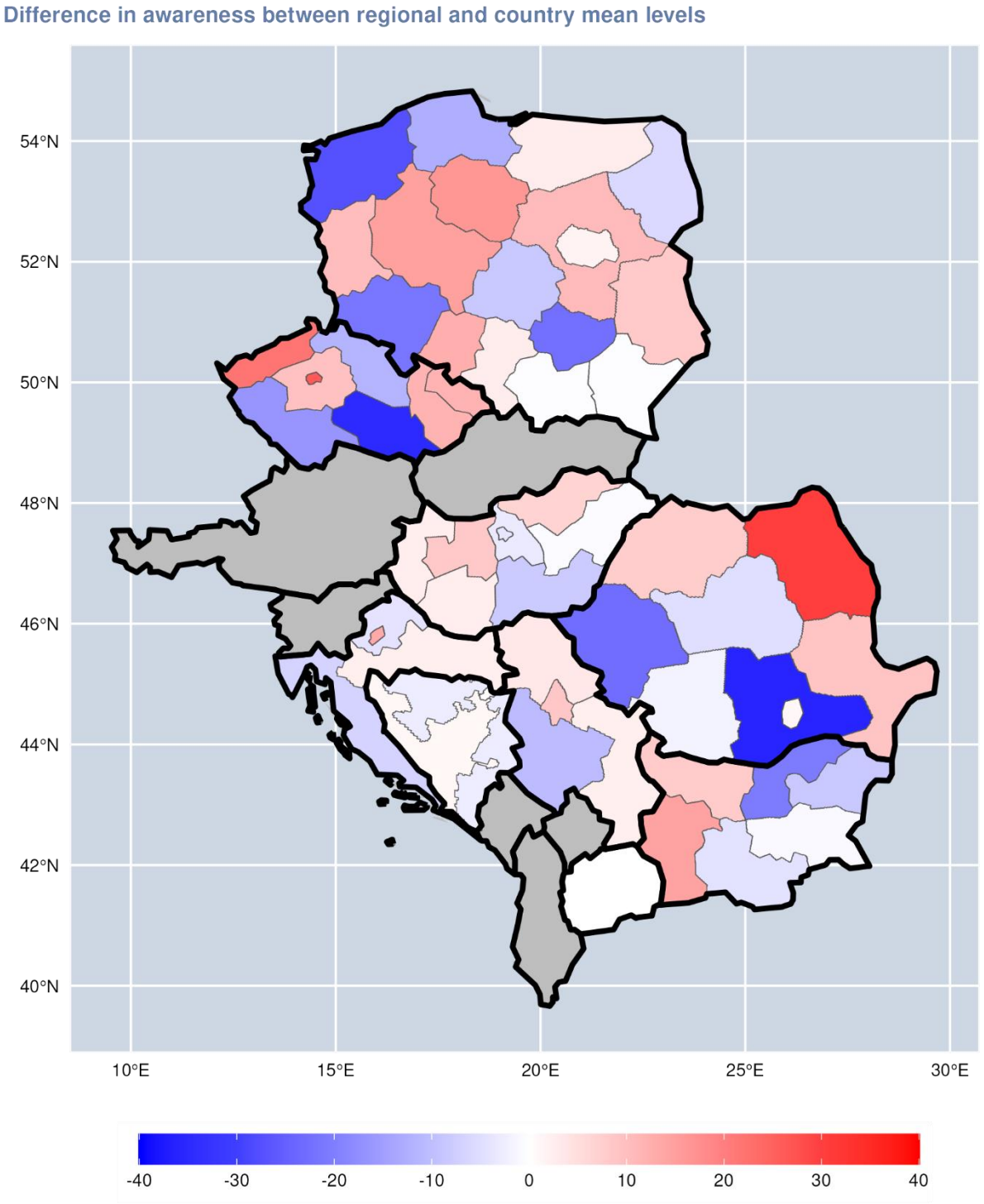
Finally, we find evidence that respondents' awareness is indeed significantly higher in a few country capitals and in the pooled sample, with the exception of Hungary, where awareness is lower in the capital. We cannot say, however, whether this is truly because of the proximity to policymakers, as we hypothesized, or some other, unobserved characteristic of respondents living in the capital city.[14]

Related to this, we also show the geographic distribution of respondents' awareness by country. In figure 1, we present the percentage points difference between the mean of a given NUTS 2 region and the mean of the corresponding country. The scale ranges from –40 to +40 percentage points, indicating considerable within-country fluctuations in awareness in some countries. Countries with an overall lighter, more transparent shade (e.g. Bosnia and Herzegovina, Hungary or Serbia) show less pronounced differentiation around their country mean than those with darker shades (e.g. Czechia, Romania or Poland). Figure E1 in annex E shows respondents' awareness as predicted by our pooled probit model. Looking at both figures helps us better understand whether regional differences in awareness are due to observed or unobserved factors. In some countries (e.g. Bulgaria, Croatia), the figures point to similarities, suggesting that the observed socioeconomic characteristics can explain a large portion of the variation. In other countries (e.g. Poland, especially its eastern parts), the difference between the two figures is

[14] As a small robustness check whether this is indeed a capital or large-city effect, we additionally add a dummy for large cities (we try cut-offs at 50,000, 75,000 and 100,000 inhabitants, respectively). Each dummy is insignificant in all regressions, while the capital city dummies remain significant (results available upon request).

striking. Theoretically, there are many potential confounding factors, including media coverage or social networks, for which we cannot control and which might vary in importance across regions.

Figure 1



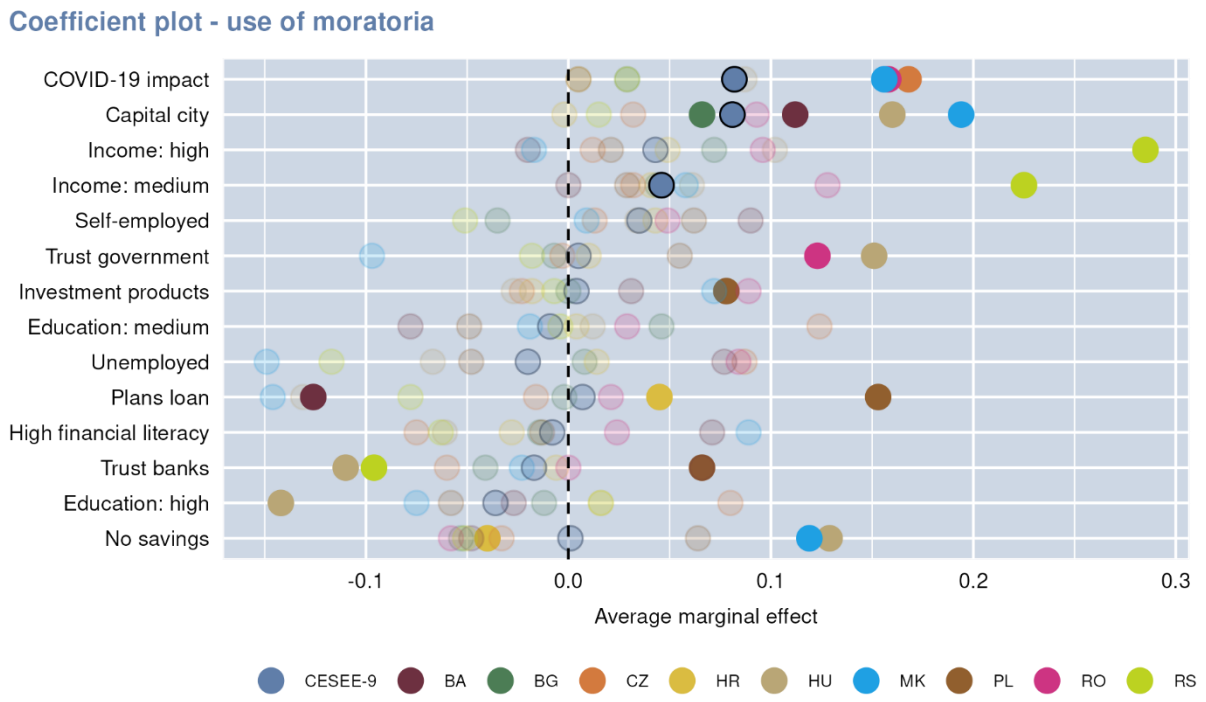
Source: 2021 OeNB Euro Survey wave.
Note: NUTS 2, except for Bosnia and Herzegovina, where regions are defined according to Hijmans (2015). Please refer to table E1 for the numeric values and see also figure E1 in annex E.

4.2 Use of moratoria

Regarding usage, our main hypothesis is that we expect to find broadly similar results to those found by Allinger and Beckmann (2021). In this study, the authors used a different question on moratoria included in the 2020 OeNB Euro Survey wave to assess socioeconomic determinants of moratorium use and the prevalence of arrears. Most socioeconomic control variables used by Allinger and Beckmann (2021) were insignificant in a pooled regression on moratorium use, pointing to the fact that usage was relatively broadly distributed among loan holders. However, several variables associated with the negative financial impact of the COVID-19 pandemic and with having no savings were significant. This makes sense given the larger need for support measures and the conditionality of moratorium programs in many countries.

Despite relying on a different survey wave and question, we find similar results in our current study compared to Allinger and Beckmann (2021). In chart 4 in the pooled regression, very few coefficients are significant. Being negatively financially affected by the COVID-19 pandemic increased the use of moratoria, which is not surprising. The coefficient on the capital city is also significant. Both variables have significant and positive coefficients in three country regressions.

Chart 4



Source: 2021 OeNB Euro Survey wave.
Note: Dependent variable = 1 if respondent took advantage of borrower relief measures. Average marginal effects from a probit model estimated by maximum likelihood. Standard errors are clustered at the PSU level. Full opacity means p-value of t-test < 0.1. Variables not shown include log(Age), Female (0/1), Married (0/1), Income: NA, Size of household.

5 Conclusions

This study compares moratorium designs across nine CESEE countries and uses survey data to analyze how certain aspects of borrower relief programs were perceived by the public. For this purpose, survey data are an excellent source, as they can shed light on individuals' decision-making processes – something that loan-level data available to banks and financial authorities cannot do.

We find large heterogeneity across countries in respondents' awareness of borrower relief measures, their attribution of the measures to different institutions, their use of the measures and their reasons for not using them. Regarding awareness, we find that in some countries, large shares of the overall population and almost all borrowers were aware of the relief measures put in place. In several other countries, however, less than 50% of respondents knew about the relief measures – even when considering the subsample of borrowers only. This could be a cause for concern, as awareness of a policy measure is a requirement for being able to decide whether or not to use it (e.g. Allen et al., 2022). Our findings suggest that awareness was higher in countries with a higher calculated design index for moratoria, which is our gross proxy for how borrower-friendly the implemented measures were. Particularly in countries with very low awareness, the public might not have perceived the implemented moratoria as different to the status quo (of bilaterally negotiating loan restructurings with banks), or banks and authorities may have provided (too) little information regarding the policy measures.

When looking at within-country variation in respondents' awareness, we find relatively similar patterns across countries. Socioeconomic characteristics that proxy financial inclusion and sophistication (e.g. owning investment products) as well as general education and financial knowledge are strongly positively correlated with awareness. Thus, low financial inclusion or limited knowledge could also have contributed to lower aggregate awareness. Awareness also differed quite strongly across the NUTS 2 regions within some countries.

Regarding usage, we find a large dispersion across countries that is highly correlated with the moratorium design index. The more borrower-friendly the design of moratoria, the higher their usage. When looking at the correlations with socioeconomic characteristics, having been negatively financially affected by the COVID-19 pandemic seems to be the most important correlation. This makes sense given that this was one of the conditions tied to moratoria in many countries. When asking borrowers about why they did not use relief measures, they most often stated that they did not have a financial need to do so or that they were not eligible. There is some differentiation between countries regarding which of the two reasons was mentioned more often. However, these cross-country differences do not correlate with the moratorium design index. The fact that in several countries, the shares of non-users mentioning eligibility as an issue were quite high (above 50%), raises some concerns as to whether borrowers might have misunderstood the eligibility criteria defined by authorities and banks.

Overall, our study provides novel insights into differences in moratorium designs coupled with public perceptions of these moratoria. The findings should be evaluated jointly with studies on other aspects of moratoria, most importantly their effectiveness in preventing unnecessary defaults due to liquidity crunches. For the country sample covered in this study, evidence on loan arrears can be found in Allinger and Beckmann (2021). More work on the effectiveness and potential moral hazard implications of moratoria is envisaged based on the OeNB Euro Survey module used in this paper.

References

Abadie, A., Athey, S., Imbens, G. W. and Wooldridge, J. M. 2023. When should you adjust standard errors for clustering? The Quarterly Journal of Economics, 138(1):1–35.

ABRS. 2020a. Odluka o privremenim mjerama bankama za ublažavanje negativnih ekonomskih posljedica uzrokovanih virusnim oboljenjem "COVID-19." Official Gazette of the Republika Srpska, 27.

ABRS. 2020b. Odluka o privremenim mjerama bankama za ublažavanje negativnih ekonomskih posljedica uzrokovanih virusnim oboljenjem "COVID-19." Official Gazette of the Republika Srpska, 89.

Act No. 177/2020. 2020. Col. on some measures in the area of loan repayment in connection with the COVID-19 pandemic.

Aczél, Á., El-Meouch, N. M., Lakos, G. and Spéder, B. 2023. Household loan repayment difficulties after the payment moratorium: Hungarian experience from the COVID-19 pandemic. Financial and Economic Review, 22(1):21–56.

Agarwal, S., Amromin, G., Ben-David, I., Chomsisengphet, S., Piskorski, T. and Seru, A. 2017. Policy intervention in debt renegotiation: Evidence from the home affordable modification program. Journal of Political Economy, 125(3):654–712.

Agarwal, S., Amromin, G., Chomsisengphet, S., Landvoigt, T., Piskorski, T., Seru, A. and Yao, V. 2023. Mortgage refinancing, consumer spending, and competition: Evidence from the home affordable refinance program. The Review of Economic Studies, 90(2):499–537.

Allen, J., Clark, R., Li, S. and Vincent, N. 2022. Debt-relief programs and money left on the table: Evidence from Canada's response to COVID-19. Canadian Journal of Economics, 55:9–53.

Allinger, K. and 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.

Blinder, A. S., Ehrmann, M., De Haan, J. and Jansen, D.-J. 2022. Central bank communication with the general public: Promise or false hope?

Bulgarian National Bank. 2020. Procedure for deferral and settlement of liabilities payable to banks and their subsidiaries – financial institutions in relation to the state of emergency enforced by the national assembly on 13 March 2020 as a result of the COVID-19 pandemic. BNB Press Release.

Cameron, A. C. and Miller, D. L. 2015. A practitioner's guide to cluster-robust inference. Journal of Human Resources, 50(2):317–372.

Cesnak, M., Cupak, A., Klacso, J. and Šuster, M. 2023. The impact of loan payment deferral on indebted households and financial stability during the COVID-19 pandemic: Survey results from Slovakia. Finance a Uver: Czech Journal of Economics & Finance, 73(3):220 –250.

Cherry, S. F., Jiang, E. X., Matvos, G., Piskorski, T. and Seru, A. 2021. Government and private household debt relief during COVID-19. Working Paper 28357, National Bureau of Economic Research.

Dinerstein, M., Yannelis, C. and Chen, C.-T. 2023. Debt moratoria: Evidence from student loan forbearance. American Economic Review: Insights (forthcoming).

Dobbie, W. and Song, J. 2020. Targeted debt relief and the origins of financial distress: Experimental evidence from distressed credit card borrowers. The American Economic Review, 110(4):984–1018.

European Banking Authority. 2020a. EBA/GL/2020/02 – Guidelines on legislative and non-legislative payment moratoria on loan repayments applied in the light of the COVID-19 crisis. Technical report, European Banking Authority.

European Banking Authority. 2020b. EBA/GL/2020/08 – Guidelines amending guidelines EBA/GL/2020/02. Technical report, European Banking Authority.

European Banking Authority. 2020c. EBA/GL/2020/15 – Guidelines amending guidelines EBA/GL/2020/02. Technical report, European Banking Authority.

European Banking Authority. 2020d. Notifications on general payment moratoria.

FBA. 2020a. Odluka o privremenim mjerama koje banka primjenjuje za oporavak od negativnih ekonomskih posljedica uzrokovanih virusnim oboljenijem "COVID-19." Official Gazette of the Federation of Bosnia and Herzegovina, 22.

FBA. 2020b. Odluka o privremenim mjerama koje banka primjenjuje za oporavak od negativnih ekonomskih posljedica uzrokovanih virusnim oboljenijem "COVID-19." Official Gazette of the Federation of Bosnia and Herzegovina, 60.

Fiorin, S., Hall, J. and Kanz, M. 2023. How do borrowers respond to a debt moratorium? Experimental evidence from consumer loans in India. Policy Research Working Paper 10358.

Giné, X. and Kanz, M. 2018. The economic effects of a borrower bailout: evidence from an emerging market. The Review of Financial Studies, 31(5):1752–1783.

Hijmans, R. J. 2015. First-level administrative divisions, Bosnia and Herzegovina, 2015. [shapefile]. Retrieved from: https://earthworks.stanford.edu/catalog/stanford-nj241sn6981.

Hrvatska narodna banka. 2020a. Addendum to the circular of the Croatian national bank (reg. no. 180-020/19-03-20/bv) dated 19 March 2020. HNB Circular Letter. Reg. No: 348/020/20-7/BV.

Hrvatska narodna banka. 2020b. Adjustments of certain supervisory activities, extension of deadlines for the implementation of supervisory measures and supervisory expectations regarding the classification of exposures in response to coronavirus pandemic. HNB Circular Letter. Reg. No: 180-020/19-03-20/BV.

Hrvatska narodna banka. 2020c. Implementation of EBA guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis. HNB Circular Letter. Reg. No: 348/020/20-8/MD.

Hrvatska narodna banka. 2020d. Implementation of EBA guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis. HNB Circular Letter. Reg. No: 348/020/20-10/MD.

Jacob, B., Jones, D. and Keys, B. J. 2023. The value of student debt relief and the role of administrative barriers: Evidence from the teacher loan forgiveness program. Working Paper 31359, National Bureau of Economic Research.

Johnson, E. J., Meier, S. and Toubia, O. 2019. What's the catch? Suspicion of bank motives and sluggish refinancing. The Review of Financial Studies, 32(2):467–495.

Kanz, M. 2016. What does debt relief do for development? Evidence from India's bailout for rural households. American Economic Journal: Applied Economics, 8(4):66–99.

Magyar Nemzeti Bank. 2021. Financial stability report June 2021. Financial Stability Reports.

Magyar Nemzeti Bank. 2022a. Financial stability report May 2022. Financial Stability Reports.

Magyar Nemzeti Bank. 2022b. Financial stability report November 2022. Financial Stability Reports.

Ministry of Justice. 2020a. Government decree 47/2020 (18 March) on immediate measures necessary for alleviating the effects of the coronavirus pandemic on the national economy.

Ministry of Justice. 2020b. Government decree 62/2020 (24 March) on the detailed rules for the payment moratorium.

Mukherjee, S., Subramanian, K. and Tantri, P. 2018. Borrowers distress and debt relief: Evidence from a natural experiment. The Journal of Law and Economics, 61(4):607–635.

Narodna banka Srbije. 2020a. Moratorium on debt payments. Press Release.

Narodna banka Srbije. 2020b. The national bank of Serbia enabled an additional delay in the repayment of debtors' obligations – a new moratorium (Serbian only). Press Release.

Narodna banka Srbije. 2020c. NBS passes new measures to facilitate repayment to debtors hit by the COVID-19 pandemic. Press Release.

Narodowy Bank Polski. 2020. Financial stability report June 2020. Financial Stability Reports.

National Bank of the Republic of North Macedonia. 2020a. Banks can allow a second period of deferred payment of loan liabilities. National Bank of the Republic of North Macedonia Press Release.

National Bank of the Republic of North Macedonia. 2020b. Decree adopted: Faster and more straightforward implementation of changes to the loan agreement terms for citizens and businesses concerned. National Bank of the Republic of North Macedonia Press Release.

Olbrich, L., Beckman, E. and Sakshaug, J. W. 2024. Multivariate assessment of interviewer effects in a cross-national survey. OeNB Working Paper No. 253.

Piskorski, T. and Seru, A. 2021. Debt relief and slow recovery: A decade after Lehman. Journal of Financial Economics, 141(3):1036–1059.

UBBIH. 2020. Odgovori na najea pitanja klijenata vezana za moratorij na otplatu kredita COVID-19. Udruga Banaka Bosne i Hercegovine (UBBIH) Press Release.

Van der Cruijsen, C., de Haan, J. and van Rooij, M. 2023. The impact of high inflation on trust in national politics and central banks. Working Paper No. 762, De Nederlandsche Bank.

ZBP. 2020. Communique of the Polish Bank Association on aid measures taken by banks in connection with the coronavirus disease (COVID-19) pandemic. ZBP Announcement.

Annex A

Variable list and descriptive statistics

Table A1

Variable definitions

Variable	Definition
Borrower relief variables	
Aware of moratorium	Dummy variable is 1 if respondent answered question "Are you aware of any measures your government or banks in [YOUR COUNTRY] adopted because of the pandemic to support borrowers (for example enabling borrowers to postpone repayments without penalties, offering borrowers favorable changes in loan terms, …)?" with "Yes" and 0 if answer was "No."
Attribution to government	Dummy variable is 1 if respondent answered "Government" to question: "Who, do you think, was the driving force behind the measures that were adopted to support borrowers?" Dummy variable is 0 if one of the following answers was given: commercial banks; both government and commercial banks; some other organization.
Used moratorium	Dummy variable is 1 if borrower answered question "Since the beginning of the COVID-19 pandemic, have you taken advantage of any measures that were adopted to support borrowers?" with "Yes" and 0 otherwise.
Reasons for non-usage: no need	Dummy variable is 1 if respondent answered "I had no financial need to participate" to question: "Could you tell us why you didn't make use of the measures? Please mention all reasons that apply."
Reasons for non-usage: eligibility	Same as above, if answer was either "My types of debt were not eligible" or "I did not fulfill eligibility criteria related to the pandemic (e.g. affectedness)" or "I did not fulfill some other eligibility criteria."
Reasons for non-usage: complexity	Same as above, if answer was "I thought the application process was too complex."
Reasons for non-usage: credit score	Same as above, if answer was "I was worried that it would hurt my credit score."
Reasons for non-usage: other reason	Same as above, if answer was "Some other reason."
Sociodemographic variables	
Log(Age)	Logarithm of age of respondent in years.
Female	Dummy variable is 1 for female respondents and 0 for male respondents.
Household size	Number of household members permanently living in household.
Income (low, medium, high, no answer)	Dummy variable is 1 for each net household income tercile (low, medium, high) by country. Sample values are used to construct terciles. For respondents who did not answer, an additional dummy variable is defined (income − no answer).
Education (low, medium, high)	Three dummy variables that are 1 if respondent has low/medium/high education, respectively. Low education is primary and lower secondary education or less, medium is upper and post-secondary education and high is tertiary education or more. Classification controls for different national education systems and is harmonized across countries.
High financial literacy	Dummy variable is 1 if respondent correctly answered all three financial literacy questions concerning 1) interest rates, 2) inflation, 3) exchange rate depreciation. Dummy variable is 0 if one or more questions were answered incorrectly or with "Don't know." "No answer" responses missing.
Employment status	Two dummy variables included: Unemployed is 1 if respondent is unemployed. Self-employed is 1 if respondent is self-employed. Base category: employed, retired, students.

Other variables	
Capital city	Dummy variable is 1 if respondent lives in the capital city according to the geolocation of the interview.
Debt/loan	Dummy variable is 1 if respondent has either of these financial liabilities: "a bank using a bank loan" and/or "a bank using the overdraft facility of my bank account" and/or "a credit card debt" and/or "a store or company using installment credit, buying on credit" and/or "a leasing contract" and/or "an internet loan provider" and/or "a pay day lender" and/or "another private lender" and 0 otherwise.
Plans loan	Dummy variable is 1 if respondent answered question "If you think about loans in general, both from a bank or from other sources: Do you, either personally or together with your partner, plan to take out a loan within the next 12 months?" with "Yes" and 0 if answer was "No."
No savings	Dummy variable is 1 if respondent answered question "[...] Do you currently have any savings?" with "No" and 0 if answer was "Yes."
Investment products	Dummy variable is 1 if respondent owns any of these financial assets: "life insurance" and/or "mutual funds" and/or "stocks" and/or "pension funds (voluntary)" and/or "bonds" and 0 otherwise.
COVID-19 financial affectedness	Dummy variable is 1 if respondent answered question "How much, if at all, has the financial situation of your household been negatively affected by the COVID-19 pandemic?" with "A great deal" or "A fair amount" or "Just a little" and 0 if answer was "Not at all."
Trust in government	Dummy variable based on the following question: "I would like to ask you a question about how much trust you have in other people and in certain institutions. Please tell me whether you trust or distrust on a scale from 1 (trust completely) to 5 (do not trust at all). The Government?" Answers 1 "I trust completely" and 2 "I somewhat trust" are coded as 1, answers 3 to 5 as 0.
Trust in banks	As above, applied to (domestic and foreign) commercial banks.

Table A2

Summary statistics

	Full sample			Respondents with debt			
	Mean	SD	N	Mean	SD	N	p-value
Awareness (0/1)	0.43	0.49	8,268	0.61	0.49	2,749	0.000
Usage (0/1)	0.20	0.40	2,947	0.20	0.40	2,947	1.000
Attribution to government (0/1)	0.46	0.50	3,357	0.44	0.50	1,601	0.180
Age (in years)	47.28	16.33	9,077	45.21	13.17	2,947	0.000
Female (0/1)	0.54	0.50	9,077	0.55	0.50	2,947	0.350
Married (0/1)	0.65	0.48	9,077	0.74	0.44	2,947	0.000
Size of household (in persons)	2.78	1.34	9,071	2.97	1.29	2,945	0.000
High financially literacy (0/1)	0.32	0.47	8,907	0.36	0.48	2,896	0.000
Unemployed (0/1)	0.12	0.32	9,008	0.08	0.28	2,921	0.000
Self-employed (0/1)	0.08	0.27	9,008	0.09	0.29	2,921	0.010
No savings (0/1)	0.57	0.50	8,794	0.50	0.50	2,878	0.000
Investment products (0/1)	0.15	0.35	9,077	0.21	0.40	2,947	0.000
Trust government (0/1)	0.25	0.43	8,887	0.25	0.44	2,901	0.430
Trust banks (0/1)	0.32	0.47	9,077	0.34	0.47	2,947	0.100
Capital city (0/1)	0.14	0.34	9,077	0.17	0.38	2,947	0.000
COVID-19 impact (0/1)	0.72	0.45	8,781	0.77	0.42	2,894	0.000
Debt/loan (0/1)	0.32	0.47	9,077				
Plans loan (0/1)	0.08	0.26	8,633	0.14	0.35	2,760	0.000
Education: low (0/1)	0.19	0.39	9,058	0.13	0.34	2,943	0.000
Education: medium (0/1)	0.60	0.49	9,058	0.61	0.49	2,943	0.370
Education: high (0/1)	0.21	0.41	9,058	0.26	0.44	2,943	0.000
Income: low (0/1)	0.24	0.43	9,077	0.17	0.37	2,947	0.000
Income: medium (0/1)	0.27	0.44	9,077	0.30	0.46	2,947	0.000
Income: high (0/1)	0.24	0.43	9,077	0.33	0.47	2,947	0.000
Income: NA (0/1)	0.25	0.43	9,077	0.20	0.40	2,947	0.000
Income (in euro)	1,224	1,151	9,077	1,495	1,221	2,947	0.000

Source: 2021 OeNB Euro Survey wave.
Note: The last column shows the results of a Welch 2-sample t-test, i.e. H0: True difference in means is equal to 0.

Table A3

Pairwise correlation table

	Age (in years)	Female (0/1)	Size of house-hold (in persons)	Income: low (0/1)	Income: medium (0/1)	Income: high (0/1)	Education: low (0/1)	Education: medium (0/1)	Education: high (0/1)
Age (in years)									
Female (0/1)	−0.0290*	1.0							
Size of household (in persons)	−0.3284*	0.0016*	1.0						
Income: low (0/1)	0.2488*	0.0317*	−0.3248*	1.0					
Income: medium (0/1)	−0.0184*	0.0022*	−0.0165*	−0.3419*	1.0				
Income: high (0/1)	−0.1323*	−0.0222*	0.2412*	−0.3206*	−0.3441*	1.0			
Education: low (0/1)	0.1471*	−0.0	−0.0455*	0.2135*	−0.0513*	−0.1510*	1.0		
Education: medium (0/1)	−0.0281*	−0.0392*	0.0080*	−0.0481*	0.0969*	−0.0113*	−0.5970*	1.0	
Education: high (0/1)	−0.1087*	0.0478*	0.0345*	−0.1491*	−0.0671*	0.1602*	−0.2495*	−0.6279*	1.0
High financial literacy (0/1)	−0.0020*	−0.0374*	0.0120*	−0.0838*	0.0198*	0.0874*	−0.0949*	−0.0080*	0.1016*
Unemployed (0/1)	−0.1156*	0.1269*	0.1255*	0.1173*	−0.0229*	−0.1233*	0.1087*	−0.0212*	−0.0797*
Self-employed (0/1)	−0.0273*	−0.1049*	0.0674*	−0.0842*	−0.0234*	0.0843*	−0.0708*	−0.0	0.0692*
Debt/loan (0/1)	−0.0411*	0.0136*	0.0994*	−0.1220*	0.0556*	0.1310*	−0.1104*	0.0131*	0.0913*
Plans loan (0/1)	−0.0900*	0.0112*	0.0944*	−0.0458*	0.0025*	0.0831*	−0.0535*	−0.0110*	0.0659*
No savings (0/1)	−0.0497*	0.0236*	−0.0154*	0.1266*	−0.0019*	−0.1779*	0.1560*	−0.0023*	−0.1494*
Investment products (0/1)	0.0230*	−0.0217*	0.0119*	−0.0922*	−0.0105*	0.1349*	−0.1223*	−0.0174*	0.1397*
Trust government (0/1)	0.0416*	0.0134*	0.0169*	−0.0063*	0.0033*	0.0277*	0.0755*	−0.0708*	0.0123*
Trust banks (0/1)	−0.0281*	0.0138*	0.0462*	−0.0556*	−0.0125*	0.0776*	−0.0328*	−0.0233*	0.0600*

	High financial literacy (0/1)	Unemployed (0/1)	Self-employed (0/1)	Debt/loan (0/1)	Plans loan (0/1)	No savings (0/1)	Investment products (0/1)	Trust government (0/1)	Trust banks (0/1)
High financial literacy (0/1)	1.0								
Unemployed (0/1)	−0.0856*	1.0							
Self-employed (0/1)	0.0372*	−0.1056*	1.0						
Debt/loan (0/1)	0.0591*	−0.0763*	0.0428*	1.0					
Plans loan (0/1)	0.0204*	−0.0099*	0.0421*	0.1774*	1.0				
No savings (0/1)	−0.1594*	0.1344*	−0.1133*	−0.0940*	−0.0654*	1.0			
Investment products (0/1)	0.0963*	−0.0882*	0.1244*	0.1186*	0.0821*	−0.3175*	1.0		
Trust government (0/1)	0.0387*	−0.0505*	−0.0361*	0.0118*	0.0028*	−0.0480*	0.0051*	1.0	
Trust banks (0/1)	0.1148*	−0.0321*	0.0210*	0.0242*	0.0328*	−0.1328*	0.0547*	0.3638*	1.0

Source: 2021 OeNB Euro Survey wave.
Note: Pairwise correlations. Stars indicate significance at 0.95 confidence level. Some variables with low correlations omitted for readability.

Table A4

Share of borrowers aware of relief measures by COVID-19 affectedness

Country	COVID-19 financial affectedness	Share	N
HU	A great deal	0.91	32
HU	A fair amount	0.95	91
HU	Just a little	0.96	146
HU	Not at all	0.99	101
MK	A great deal	0.66	62
MK	A fair amount	0.74	92
MK	Just a little	0.75	130
MK	Not at all	0.72	68
RS	A great deal	0.64	42
RS	A fair amount	0.77	117
RS	Just a little	0.70	112
RS	Not at all	0.79	65
RO	A great deal	0.76	33
RO	A fair amount	0.65	65
RO	Just a little	0.56	59
RO	Not at all	0.58	63
CZ	A great deal	0.67	30
CZ	A fair amount	0.79	66
CZ	Just a little	0.79	88
CZ	Not at all	0.61	106
BA	A great deal	0.43	30
BA	A fair amount	0.31	105
BA	Just a little	0.34	63
BA	Not at all	0.24	42
BG	A great deal	0.40	28
BG	A fair amount	0.32	79
BG	Just a little	0.51	90
BG	Not at all	0.65	22
HR	A great deal	0.41	85
HR	A fair amount	0.33	202
HR	Just a little	0.52	150
HR	Not at all	0.37	119
PL	A great deal	0.54	45
PL	A fair amount	0.43	99
PL	Just a little	0.49	91
PL	Not at all	0.53	7

Source: 2021 OeNB Euro Survey wave.

Annex B

Moratorium characteristics in CESEE countries

This section contains table B4 outlining characteristics of moratoria across countries. Moreover, it discusses some robustness checks regarding the moratorium design index that we constructed from the information underlying this table.

As pointed out in the main text, it is very difficult to find additional criteria to add to the index to increase differentiation. However, we can nonetheless test to what extent changes in the classifications would change the correlations. For this purpose, we draw up table B1, which shows the correlation coefficients and p-values for our main variables of interest and five alternative design indices. The first index is the one we use in the main text. The second index does not allow for the intermediate value 0.5 in the first two categories, and thus classifies Serbia as having a fully opt-out moratorium and Poland as having a fully private moratorium. The third index assigns opt-out moratoria a numeric value of two instead of one, putting more weight on the importance of this criterion. The final index adds an additional dimension, namely whether the maximum number of months during which individuals could have used the moratoria came to more than 6 months or ≤ 6 months. As can be seen in table 1, the numbers are basically equivalent to the values for the application period that we used in the original index. Finally, we use the original index, but remove a country from the top and from the bottom – Hungary and Poland – from the sample.

Table B1 shows that the Pearson correlation coefficients and their p-values barely vary across the indices. Only in the last column, we can see that omitting Hungary and Poland from the sample decreases the correlation and increases the p-value – this is particularly the case for attribution, where the correlation was insignificant to begin with. Regarding the Spearman rank correlations, there is also little variation between the first three indices. However, for the fourth index containing the additional dimension, we see lower correlation coefficients and higher p-values. Moreover, excluding Hungary and Poland again drops the correlation and increases the p-value for attribution. We thus conclude that our index is relatively robust to minor changes, but adding additional criteria could affect the correlations and, in particular, their significance. However, as pointed out in the main text, we have carefully considered possible sensible extensions of our index and have not found any.

Returning to the original design index, we construct binary design features[15] and use them to run two additional checks. First, with t-tests, we can test for the significance of differences in means for each design feature separately – contrary to adding them all together as we do in the main text. The tests show that for opt-out versus opt-in moratoria (for country classifications, see table B4 in annex B or table 1), all means between the groups are significantly different for awareness, attribution and usage. For private versus public, public moratoria have higher means and the test for differences is significant for awareness and usage, but not for attribution. When comparing means between countries by duration, only the difference in awareness is significant. For usage and attribution, the means are very similar.

[15] Thus, in this case, we do not allow for intermediate values. Serbia is classified as "opt-out," Poland as "private" and the application duration is split into countries with a duration equal to or longer than the one outlined in the EBA GL and countries with a shorter application period.

Table B1

Correlation with design index

Index	Awareness		Attribution		Usage	
	Correlation	p-value	Correlation	p-value	Correlation	p-value
Pearson test						
Original	0.87	0.00	0.37	0.33	0.90	0.00
No intermediate values	0.85	0.00	0.33	0.39	0.87	0.00
Double opt-out	0.87	0.00	0.37	0.33	0.91	0.00
Incl. maximum usage	0.80	0.01	0.36	0.34	0.71	0.03
Excl. HU+PL	0.70	0.08	−0.05	0.92	0.78	0.04
Spearman test						
Original	0.85	0.00	0.26	0.50	0.78	0.01
No intermediate values	0.84	0.01	0.29	0.45	0.73	0.02
Double opt-out	0.84	0.00	0.26	0.50	0.74	0.02
Incl. maximum usage	0.73	0.02	0.06	0.88	0.41	0.27
Excl. HU+PL	0.83	0.02	0.00	1.00	0.83	0.02

Source: 2021 OeNB Euro Survey wave. Information provided by the EBA as well as various national competent authorities and banking associations. Authors' calculations.

We also add the design index to our pooled regressions displayed in annex D to test if controlling for socioeconomic variables changes the impact of the design features and whether the design characteristics are significant when included jointly in a regression. Table B3 shows average marginal effects. For each dependent variable, the first column displays the results for the country dummies from the baseline regression with Hungary as the base country. In the second column for each variable, we see the results of a regression excluding the country dummies and instead using dummies for opt-in moratoria, private moratoria and short-duration moratoria. Despite the fact that we control for all design features jointly, the regression results are very similar to the results displayed in table B2. All average marginal effects are negative and significant, except for the private dummy in the attribution regression and the short-duration dummy in the usage regression. The design feature with the highest coefficient is opt-in, even though in the attribution regression the coefficient is roughly the same size as the one for short duration.

Table B2

Results of Welch 2-sample t-test

Test	Mean Group 0	Mean Group 1	Difference	p-value
Awareness, opt_in = 1	0.59	0.34	0.25	0.000
Awareness, private = 1	0.48	0.33	0.15	0.000
Awareness, short application = 1	0.46	0.40	0.06	0.000
Attribution, opt_in = 1	0.51	0.42	0.09	0.000
Attribution, private = 1	0.47	0.44	0.03	**0.107**
Attribution, short application = 1	0.48	0.45	0.04	**0.028**
Usage, opt_in = 1	0.38	0.10	0.29	0.000
Usage, private = 1	0.27	0.08	0.19	0.000
Usage, short application = 1	0.19	0.21	−0.02	**0.157**

Source: 2021 OeNB Euro Survey wave.

Table B3

Average marginal effects of probit regressions for country and design dummies

	Awareness		Attribution		Usage	
	Base	Design	Base	Design	Base	Design
BG	−0.43***		−0.20***		−0.34***	
	(0.03)		(0.05)		(0.04)	
HR	−0.44***		−0.15***		−0.40***	
	(0.03)		(0.04)		(0.03)	
CZ	−0.37***		0.0		−0.23***	
	(0.04)		(0.05)		(0.04)	
HU						
(Base category)						
PL	−0.40***		−0.22***		−0.25***	
	(0.03)		(0.05)		(0.03)	
RO	−0.24***		−0.26***		−0.34***	
	(0.03)		(0.04)		(0.04)	
BA	−0.49***		−0.46***		−0.36***	
	(0.03)		(0.04)		(0.04)	
MK	−0.20***		−0.23***		−0.14***	
	(0.03)		(0.05)		(0.03)	
RS	−0.23***		−0.18***		−0.17***	
	(0.04)		(0.04)		(0.03)	
Opt-in moratoria		−0.22***		−0.07**		−0.20***
		(0.02)		(0.03)		(0.02)
Private moratoria		−0.12***		−0.0		−0.06**
		(0.02)		(0.03)		(0.03)
Short-duration moratoria		−0.13***		−0.07***		−0.0
		(0.02)		(0.03)		(0.02)
Socioeconomic variables	Yes	Yes	Yes	Yes	Yes	Yes
N	7,273	7,273	3,169	3,169	2,554	2,554
Pseudo-R2	0.17	0.16	0.07	0.04	0.17	0.14
Clusters	1,324	1,324	966	966	1,024	1,024
Log-L	−4,140.5	−4,196.0	−2,023.6	−2,091.9	−1,054.8	−1,098.1

Source: 2021 OeNB Euro Survey wave.
Note: Average marginal effects of probit regressions. Standard errors clustered at the PSU level. The dependent variables are binary. All control variables from regressions in main text included.
** p<0.10, ** p<0.05, *** p<0.01*

Table B4

Design features of moratoria in CESEE countries

Country	Legislation	Institutions	Start date	Maximum duration/latest application	Opt-in/opt-out	COVID-19 eligibility criteria	Other characteristics/conditions
BG	Private	National bank, banking association	From March 2020	Up to 9 months, not later than December 31, 2021	Opt-in	Explicitly intended for borrowers directly or indirectly negatively affected	
CZ	Public	Government	From May 2020	Up to 6 months, not later than October 31, 2020	Opt-in	Application required statement that borrower was negatively affected	No leasing products or revolving products
HR	Private	National bank, banking association	From March 2020	Up to 9 months, not later than December 31, 2021	Opt-in	Modalities referred to EBA GL	
HU I	Public	Government	From March 2020	Not later than December 31, 2020	Opt-out	No criteria	
HU II	Public	Government	From January 2021	Until December 31, 2022, for certain groups, otherwise until October 31, 2021	Opt-in for new users	Restricted to specific groups from November 1, 2021 (incl. negatively affected borrowers)	
PL I	Public	Government	From June 2020	Up to 3 months	Opt-in	Loss of job or other main source of income after March 13, 2020	Use of moratorium only possible for one credit agreement
PL II	Private	National bank, banking association	From March 2020	Up to 6 months, not later than March 31, 2021	Opt-in	Explicitly intended for borrowers directly or indirectly affected by COVID-19 pandemic	
RO	Public	Government	From March 2020	Up to 9 months, not later than December 31, 2021	Opt-in	Application required affidavit that borrower was directly or indirectly negatively affected	
BA	Public	Banking agencies	From March 2020	Up to 6 months, not later than June 30, 2021	Opt-in	Explicitly intended for borrowers directly or indirectly affected by COVID-19 pandemic	More options for borrower relief than just moratorium
MK	Public	National bank, government, banking association	Two offers: March and September 2020	Up to 6 months, not later than March 31, 2021	Opt-out	For second offer: banks asked to set out affectedness criteria	More options for borrower relief than just moratorium, not compulsory for banks
RS I	Public	National bank	From March 2020	Up to 6 months or not later than September 30, 2020	Opt-out	No criteria	
RS II	Public	National bank	From December 2020	Up to 6 months, not later than October 31, 2021	Opt-in	Specific criteria for debt relief; banks could voluntarily grant relief to other borrowers	More options for borrower relief than just moratorium

Annex C

Attribution of measures

In this annex, we show some results regarding the attribution of borrower relief measures to different institutions, using the following question from the OeNB Euro Survey:

- **Attribution:** "*Who, do you think, was the driving force behind the measures that were adopted to support borrowers?" Answer options: 1) Government, 2) Commercial banks, 3) Both government and commercial banks, 4) Some other organization.*

We study this variable, as it is interesting per se to know who respondents thought was responsible for the measures. Moreover, attribution could hinder take-up if individuals do not trust the institution deemed responsible for the debt relief offer. The annex shows differences in attribution at the country level, correlations between attribution and trust in institutions at the regional level and correlations between attribution and socioeconomic characteristics and trust at the individual level.

Cross-country variation

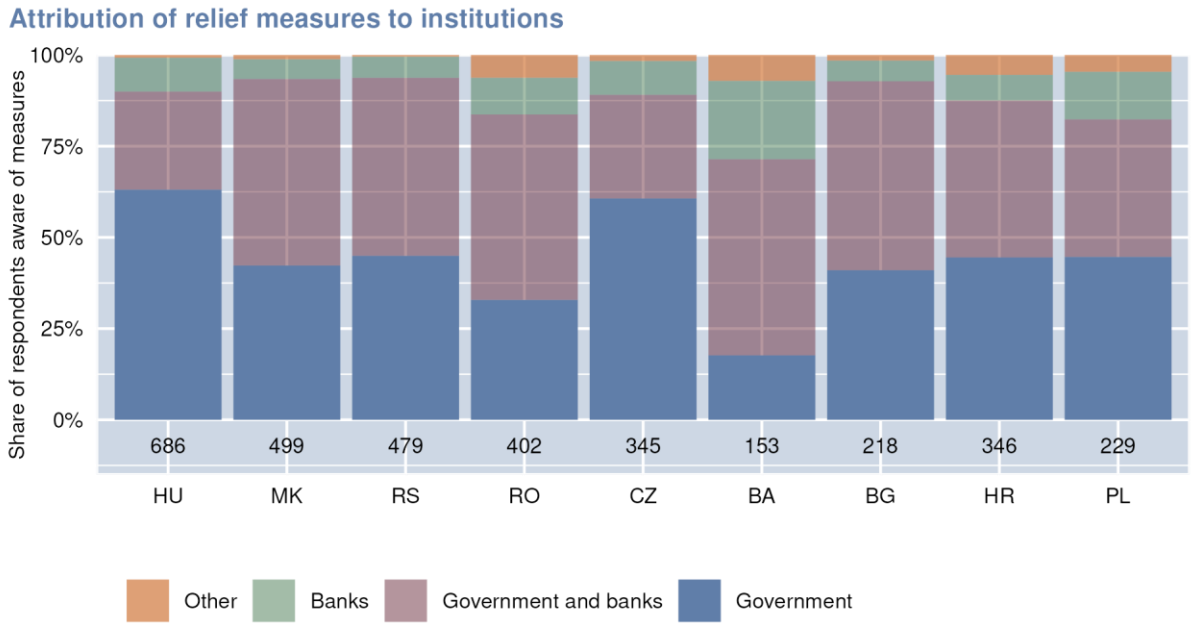
Regarding the attribution of borrower relief measures to certain institutions, we see no reason to expect a significant correlation with the design index. Chart C1 shows to which institutions the respondents aware of relief measures attributed the latter. During the early phase of the COVID-19 pandemic, banks were eager to emphasize that they were stable and part of the solution to the economic turmoil. Moreover, banks shouldered a lot of the burden that came with implementing moratoria, setting up processes, administering applications and interacting with clients. Per se, there is no correct answer to the question "Who was the driving force behind the measures that were adopted?," as both governments and banks were somehow involved in all moratorium schemes.[16]

On average, roughly 44% of respondents aware of the measures thought that the government was responsible for them. 40% attributed the measures to both the government and banks. Only 8% stated that they thought that the banks were the driving force behind the measures. The patterns are similar to the cross-country averages in North Macedonia, Bulgaria, Croatia, Poland and Serbia, but they differ somewhat in the other countries.[17] For instance, Czechia and Hungary stand out with relatively high shares of people attributing the measures solely to the government (around 60%). On the other end of the spectrum, Bosnia and Herzegovina stands out with a very low share (around 16%) of people seeing only the government as the driving force. It also has the highest share of people answering that they think banks alone were responsible (around 20%).

[16] We did not offer "Central banks" as an answer option, because we wanted to keep the answer options simple and because many studies have shown that there is very limited knowledge of central banks and their tasks among the general public (see Blinder et al., 2022).

[17] Shares of "Don't know" answers are highest in Bosnia and Herzegovina, Bulgaria and Poland (around 12%, respectively).

Chart C1



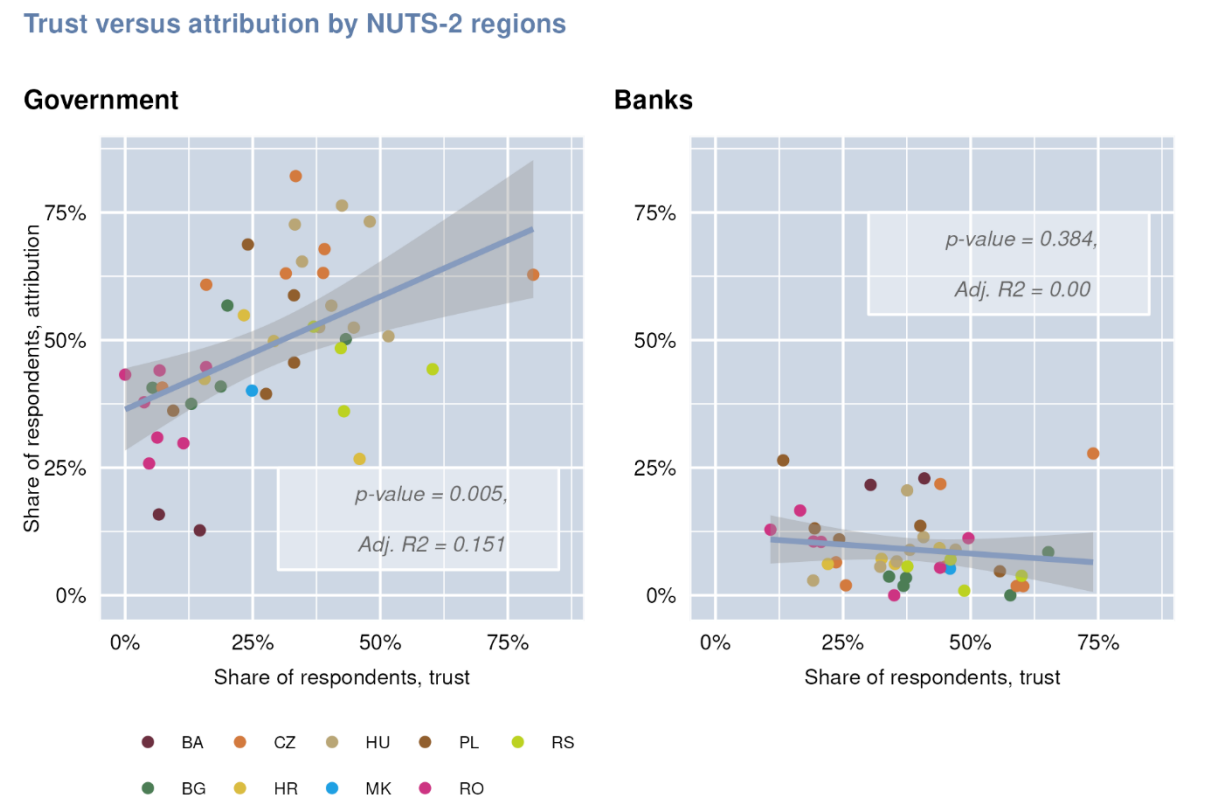
Source: 2021 OeNB Euro Survey wave.
Note: Means calculated with post-stratification weights. Number of observations for subsample of respondents aware of relief measures shown below bars.

Visual inspection suggests a very limited correlation between the index and the attribution of relief measures to the government only. While the computed correlation coefficient is around 0.4, the p-value is too high to exclude that there might be no correlation. However, this is not surprising, as there is no clear reason to assume a strong correlation. There is also no clear correlation with the institutions that were responsible for drawing up key legislation or guidelines, as listed in column 3 of table B4.

It is difficult to say what might drive respondents' perceptions. One possible explanation is that the media might have played an important role in shaping perceptions. Another possible explanation is that respondents might be prone to attribute policies of any nature to the government. A recent study, for instance, found that citizens mostly believe that the government is the main institution responsible for keeping inflation low (Van der Cruijsen et al., 2023), even though experts would likely argue that this is mainly the task of the central bank. People might also attribute support to institutions they already trust.

Using trust variables available in the OeNB Euro Survey, we can show that on the NUTS 2 level, there is a significant correlation between average trust in the government and average attribution of the measures to the government alone. However, the reverse is not true for trust in banks and attribution to banks. This could mean that depending on the institution, two different mechanisms between trust and attribution are at work here. Chart C2 visualizes these results, plotting the means of trust by NUTS 2 region and a regression line. To disentangle potential reverse causality concerns, further analyses would be needed.

Chart C2



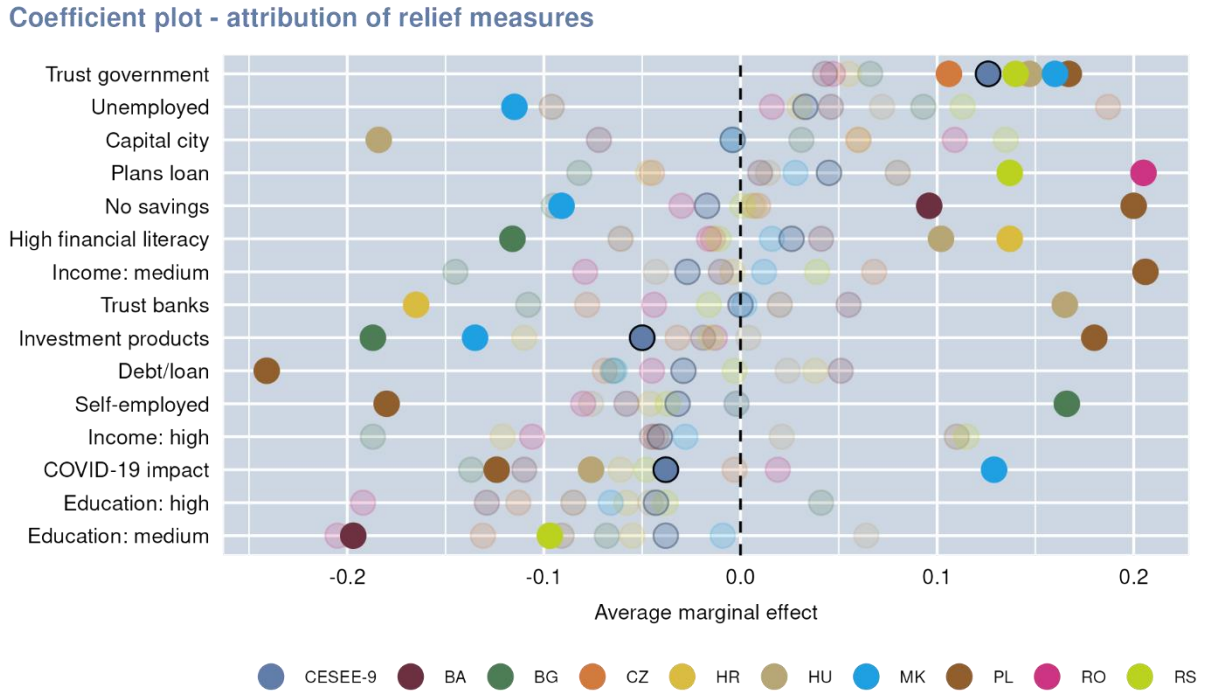
Source: 2021 OeNB Euro Survey wave.
Note: The left-hand panel plots trust in the government against attribution to the government only. The right-hand panel plots trust in banks against attribution to banks only. The sample only includes those respondents who answered the questions on trust and attribution. Only NUTS 2 regions with at least 15 non-missing observations are included, as the means become more unreliable the lower the number of observations. As robustness, we used the following numbers of observations as cut-offs: 0, 5, 25 and 50. For the government, the coefficient is insignificant when including all regions, but relatively unchanged from the baseline shown otherwise. For banks, the coefficient is negative and weakly significant if the cut-off is chosen at or below 5, while the coefficient remains insignificant for higher cut-offs. Means are weighted using post-stratification weights.

Within-country variation

For attribution, we run the baseline regressions from section 4 on the attribution of relief measures to the government only. The sample includes all respondents aware of the measures who gave an answer other than "Don't know." In this case, it is more difficult to formulate hypotheses on socioeconomic variables. As discussed in the cross-country section, it seems likely that factors like media consumption or political affiliation play a role. Thus, our only hypothesis for this section is that trust in the government should be positively related to the attribution of the measures to the government.It is therefore not surprising that in chart C3, only one variable stands out and that is trust in the government. It is strongly and positively correlated with the attribution of the borrower relief measures to the government alone and is significant in five out of nine country regressions.[18]

[18] As robustness, we tried three other alternative dependent variables in the pooled regression, with results on trust in the government always highly significant and with the sign of coefficients as expected: positive (but smaller in size) for 1) government + government and banks, negative for 2) banks only and for 3) banks + government and banks.

Chart C3



Source: 2021 OeNB Euro Survey wave.
Note: Dependent variable = 1 if respondent thinks that the driving force behind the borrower relief measures was the government. Average marginal effects from a probit model estimated by maximum likelihood. Standard errors are clustered at the PSU level. Full opacity means p-value of t-test < 0.1. Variables not shown include log(Age), Female (0/1), Married (0/1), Income: NA, Size of household.

Annex D

Regression tables for coefficient plots

Table D1

Average marginal effects of probit regressions for pooled sample

	Awareness		Attribution		Usage	
	AME	SE	AME	SE	AME	SE
Debt/loan	0.211***	−0.014	−0.029	−0.019		
Plans loan	0.080***	−0.022	0.045	−0.030	0.007	−0.022
No savings	−0.087***	−0.014	−0.017	−0.021	0.001	−0.018
Investment products	0.066***	−0.018	−0.050**	−0.025	0.004	−0.020
COVID-19 impact	0.047***	−0.015	−0.038*	−0.022	0.082***	−0.020
Trust government	0.003	−0.017	0.126***	−0.023	0.005	−0.018
Trusts banks	0.073***	−0.015	0.000	−0.022	−0.017	−0.018
Capital city	0.084***	−0.025	−0.004	−0.033	0.081***	−0.021
Log of age	0.012	−0.017	0.075***	−0.027	−0.029	−0.025
Female	−0.026**	−0.010	−0.034**	−0.017	0.005	−0.014
Size of household	−0.010*	−0.005	0.004	−0.008	0.002	−0.007
Married	0.030**	−0.014	−0.038*	−0.022	0.045**	−0.020
Income: medium	0.008	−0.018	−0.027	−0.027	0.046*	−0.025
Income: high	0.029	−0.021	−0.041	−0.031	0.043	−0.027
Education: medium	0.057***	−0.016	−0.038	−0.026	−0.009	−0.023
Education: high	0.126***	−0.020	−0.043	−0.030	−0.036	−0.027
High financial literacy	0.107***	−0.016	0.026	−0.021	−0.008	−0.017
Unemployed	−0.009	−0.018	0.033	−0.030	−0.020	−0.030
Self-employed	0.034	−0.023	−0.032	−0.029	0.035	−0.025
Country dummies	Yes		Yes		Yes	
N	7,273		3,169		2,554	
Pseudo-R2	0.17		0.07		0.17	
Clusters	1,324		966		1,024	
Log-L	−4,140.5		−2,023.6		−1,054.8	

Source: 2021 OeNB Euro Survey wave.
Note: Average marginal effects (AME) and standard errors (SE) of probit regressions. Standard errors clustered at the PSU level. Country dummies included. For detailed variable definitions, see annex table A1. Baseline for income is low income tercile, baseline for education is low education.
** p<0.10, ** p<0.05, *** p<0.01*

Table D2

Robustness to different clustering: average marginal effects of probit regressions for pooled sample

	Awareness		Attribution		Usage	
	AME	SE	AME	SE	AME	SE
Debt/loan	0.211***	−0.023	−0.029	−0.023		
Plans loan	0.080***	−0.022	0.045	−0.037	0.007	−0.026
No savings	−0.087***	−0.019	−0.017	−0.020	0.001	−0.019
Investment products	0.066***	−0.018	−0.050**	−0.023	0.004	−0.024
COVID-19 impact	0.047**	−0.021	−0.038	−0.024	0.082***	−0.023
Trust government	0.003	−0.022	0.126***	−0.023	0.005	−0.019
Trusts banks	0.073***	−0.015	0.000	−0.023	−0.017	−0.017
Capital city	0.084***	−0.032	−0.004	−0.044	0.081***	−0.020
Log of age	0.012	−0.020	0.075***	−0.024	−0.029	−0.028
Female	−0.026**	−0.012	−0.034**	−0.016	0.005	−0.014
Size of household	−0.010	−0.006	0.004	−0.009	0.002	−0.007
Married	0.030**	−0.015	−0.038*	−0.020	0.045**	−0.020
Income: medium	0.008	−0.021	−0.027	−0.030	0.046*	−0.027
Income: high	0.029	−0.026	−0.041	−0.037	0.043	−0.029
Education: medium	0.057***	−0.017	−0.038	−0.028	−0.009	−0.020
Education: high	0.126***	−0.022	−0.043	−0.027	−0.036	−0.027
High financial literacy	0.107***	−0.023	0.026	−0.022	−0.008	−0.020
Unemployed	−0.009	−0.019	0.033	−0.037	−0.020	−0.027
Self-employed	0.034	−0.026	−0.032	−0.034	0.035	−0.022
Country dummies	Yes		Yes		Yes	
N	7,273		3,169		2,554	
Pseudo-R2	0.17		0.07		0.17	
Clusters	**74**		**71**		**72**	
Log-L	−4,140.5		−2,023.6		−1,054.8	

Source: 2021 OeNB Euro Survey wave.
Note: Average marginal effects (AME) and standard errors (SE) of probit regressions. Standard errors ***clustered at the regional level****. Country dummies included. For detailed variable definitions, see annex table A1. Baseline for income is low income tercile, baseline for education is low education.*
** p<0.10, ** p<0.05, *** p<0.01*

Table D3

Average marginal effects of probit regressions on awareness of borrower relief measures

	BG	HR	CZ	HU	PL	RO	BA	MK	RS
Debt/loan	0.22***	0.0	0.32***	0.36***	0.19***	0.14***	0.13***	0.24***	0.21***
	(0.05)	(0.03)	(0.05)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Plans loan	0.1	0.12*	0.13**	0.11*	0.15**	0.13*	−0.08**	0.0	0.0
	(0.08)	(0.06)	(0.05)	(0.06)	(0.06)	(0.07)	(0.04)	(0.07)	(0.06)
No savings	0.0	−0.0	−0.10*	−0.1	−0.15***	−0.10***	−0.12***	−0.09**	−0.10**
	(0.04)	(0.04)	(0.05)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Investment products	0.0	0.10**	0.1	0.16***	0.0	0.16***	0.1	0.0	0.14**
	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.06)	(0.09)	(0.05)	(0.07)
COVID-19 impact	−0.0	0.0	0.13***	0.0	0.0	0.13***	0.0	−0.0	0.0
	(0.06)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)
Trust government	0.0	0.1	0.1	−0.0	0.10*	−0.17***	−0.0	−0.0	−0.0
	(0.05)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.04)	(0.04)	(0.04)
Trusts banks	0.1	0.1	0.09*	0.13***	0.1	0.16***	0.0	0.07*	0.0
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)	(0.04)
Capital city	0.1	0.20***	0.22***	−0.09*	0.1	0.1	0.1	0.14**	0.0
	(0.09)	(0.06)	(0.07)	(0.05)	(0.13)	(0.08)	(0.08)	(0.06)	(0.05)
Log of age	0.0	0.0	0.0	−0.0	0.1	−0.1	0.0	0.1	−0.0
	(0.07)	(0.05)	(0.06)	(0.03)	(0.05)	(0.05)	(0.04)	(0.05)	(0.06)
Female	−0.06*	−0.05*	−0.05*	0.0	−0.0	−0.08**	−0.0	0.08***	0.0
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Size of household	−0.0	0.0	−0.03*	−0.0	0.0	0.0	0.0	−0.05***	−0.03**
	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Married	0.0	0.0	0.1	0.0	−0.0	−0.0	0.0	0.11**	0.09**
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Income: medium	−0.1	−0.1	0.1	0.0	0.0	−0.12**	0.10**	0.0	0.1
	(0.06)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Income: high	0.1	−0.1	0.0	0.1	0.0	−0.1	0.1	0.1	0.13**
	(0.07)	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)
Education: medium	0.17***	0.1	0.1	−0.0	0.0	0.12*	0.0	0.14***	0.0
	(0.05)	(0.06)	(0.07)	(0.03)	(0.04)	(0.06)	(0.04)	(0.05)	(0.04)
Education: high	0.18***	0.1	0.18**	0.22***	0.10*	0.29***	0.09*	0.14**	0.09*
	(0.06)	(0.07)	(0.08)	(0.04)	(0.06)	(0.08)	(0.05)	(0.06)	(0.05)
High financial literacy	0.0	0.12***	0.0	0.12***	0.1	0.09**	0.08**	0.11**	0.26***
	(0.05)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)
Unemployed	−0.13**	0.0	−0.0	−0.1	0.0	0.0	0.0	−0.1	−0.1
	(0.05)	(0.05)	(0.07)	(0.05)	(0.06)	(0.05)	(0.03)	(0.04)	(0.06)
Self-employed	0.12*	0.0	0.0	0.1	0.0	0.1	0.15*	−0.1	−0.1
	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)	(0.06)	(0.08)	(0.06)	(0.07)
N	709	924	759	905	634	882	729	830	901
Pseudo-R2	0.09	0.07	0.2	0.32	0.11	0.16	0.16	0.17	0.19
Clusters	143	278	88	180	96	150	132	153	104
Log-L	−392.2	−561.4	−412.5	−364.5	−359.4	−507.6	−295.8	−476	−508.1

Source: 2021 OeNB Euro Survey wave.
Note: Marginal effects of probit regressions. Standard errors clustered at the PSU level. Dependent variable is 1 if the respondent stated that they were aware of borrower relief measures and 0 if they were not aware. For detailed variable definitions, see annex table A1. Baseline for income is low income tercile, baseline for education is low education.
** p<0.10, ** p<0.05, *** p<0.01*

Table D4

Average marginal effects of probit regressions on attribution of borrower relief measures to government

	BG	HR	CZ	HU	PL	RO	BA	MK	RS
Debt/loan	−0.07	0.0	−0.07	0.02	−0.24***	−0.04	0.05	−0.06	0
	(0.08)	(0.06)	(0.06)	(0.04)	(0.07)	(0.06)	(0.06)	(0.05)	(0.05)
Plans loan	−0.1	−0.05	−0.05	0.01	0.08	0.20**	0.01	0.0	0.14*
	(0.13)	(0.09)	(0.08)	(0.06)	(0.09)	(0.10)	(0.14)	(0.10)	(0.08)
No savings	−0.1	0.0	0.01	0.0	0.20***	−0.03	0.10*	−0.09*	0
	(0.06)	(0.06)	(0.07)	(0.04)	(0.07)	(0.05)	(0.06)	(0.06)	(0.05)
Investment products	−0.19**	−0.11	−0.0	0	0.18*	−0.01	−0.0	−0.14**	−0.02
	(0.08)	(0.07)	(0.07)	(0.06)	(0.10)	(0.06)	(0.09)	(0.07)	(0.07)
COVID-19 impact	−0.1	−0.1	0	−0.08*	−0.12*	0.02	−0.1	0.13**	−0.1
	(0.10)	(0.07)	(0.06)	(0.05)	(0.07)	(0.05)	(0.08)	(0.05)	(0.06)
Trust government	0.1	0.1	0.11**	0.15***	0.17*	0.05	0.0	0.16**	0.14**
	(0.09)	(0.07)	(0.05)	(0.05)	(0.09)	(0.11)	(0.07)	(0.07)	(0.06)
Trusts banks	−0.1	−0.16**	−0.08	0.16***	0.0	−0.04	0.1	0	−0.0
	(0.08)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)	(0.06)	(0.06)
Capital city	0.0	0.06	0.06	−0.18**	0.0	0.1	−0.1	0	0.1
	(0.12)	(0.07)	(0.08)	(0.07)	(.)	(0.07)	(0.06)	(0.10)	(0.09)
Log of age	0.1	0.1	0.1	0.1	0.1	0.0	−0.1	0.0	0.1
	(0.14)	(0.09)	(0.09)	(0.06)	(0.10)	(0.07)	(0.09)	(0.08)	(0.08)
Female	0.01	0.01	−0.07	−0.0	−0.0	−0.08	−0.15***	0.01	−0.0
	(0.06)	(0.05)	(0.06)	(0.03)	(0.07)	(0.05)	(0.05)	(0.04)	(0.04)
Size of household	−0.0	0.0	0.03	0.0	0.0	0.0	0.0	−0.01	−0.06***
	(0.04)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)
Married	0.1	−0.17***	−0.1	−0.0	−0.0	−0.1	0.10*	−0.02	−0.03
	(0.08)	(0.06)	(0.08)	(0.05)	(0.08)	(0.06)	(0.06)	(0.06)	(0.06)
Income: medium	−0.1	0.0	0.1	−0.0	0.21**	−0.08	−0.01	0.0	0.0
	(0.15)	(0.07)	(0.10)	(0.06)	(0.09)	(0.07)	(0.09)	(0.07)	(0.07)
Income: high	−0.2	−0.1	−0.0	0.0	0.1	−0.1	−0.1	−0.0	0.11
	(0.13)	(0.09)	(0.11)	(0.07)	(0.09)	(0.08)	(0.11)	(0.08)	(0.09)
Education: medium	−0.07	−0.1	−0.1	0.1	−0.1	−0.21	−0.20**	−0.01	−0.10*
	(0.16)	(0.10)	(0.16)	(0.04)	(0.08)	(0.13)	(0.09)	(0.07)	(0.05)
Education: high	0.04	−0.1	-0.11	−0.05	−0.08	−0.19	−0.13	−0.07	−0.04
	(0.18)	(0.10)	(0.17)	(0.06)	(0.10)	(0.14)	(0.11)	(0.08)	(0.06)
High financial literacy	−0.12*	0.14**	−0.0	0.10**	−0.1	−0.02	0.04	0.02	−0.01
	(0.07)	(0.06)	(0.06)	(0.05)	(0.07)	(0.05)	(0.06)	(0.07)	(0.05)
Unemployed	0.09	0.0	0.2	0.1	−0.1	0.0	0.1	−0.12**	0.1
	(0.18)	(0.08)	(0.13)	(0.07)	(0.11)	(0.08)	(0.06)	(0.06)	(0.09)
Self-employed	0.17**	−0.1	0.0	−0.1	−0.18**	−0.1	−0.06	0.0	−0.0
	(0.08)	(0.11)	(0.09)	(0.07)	(0.09)	(0.08)	(0.06)	(0.08)	(0.11)
N	211	337	326	652	201	387	136	455	452
Pseudo-R2	0.13	0.08	0.04	0.11	0.12	0.05	0.21	0.05	0.06
Clusters	84	173	72	172	69	115	61	123	93
Log-L	−121.5	−212	−211.5	−383.7	−119.3	−229.9	−42.1	−285	−291.7

Source: 2021 OeNB Euro Survey wave.
Note: Marginal effects of probit regressions. Standard errors clustered at the PSU level. The dependent variable is binary, taking the value 1 if the respondent stated that they attributed borrower relief measures to the government only – as opposed to (1) the government and banks, (2) banks, (3) another institution or (4) don't know. "No answer" responses are coded as missing. For detailed variable definitions, see annex table A1. Baseline for income is low income tercile, baseline for education is low education.

Table D5

Average marginal effects of probit regressions on usage of borrower relief measures

	BG	HR	CZ	HU	PL	RO	BA	MK	RS
Plans loan	0.0	0.05*	−0.02	−0.13	0.15***	0.02	−0.13*	−0.2	−0.1
	(0.05)	(0.03)	(0.08)	(0.08)	(0.04)	(0.06)	(0.07)	(0.09)	(0.07)
No savings	−0.1	−0.04*	−0.03	0.13**	0.06	−0.06	−0.05	0.12*	−0.05
	(0.04)	(0.02)	(0.07)	(0.06)	(0.05)	(0.04)	(0.05)	(0.06)	(0.06)
Investment products	0.0	−0.02	−0.0	−0.03	0.08*	0.09	0.0	0.1	−0.01
	(0.04)	(0.02)	(0.05)	(0.08)	(0.05)	(0.05)	(0.08)	(0.07)	(0.07)
COVID-19 impact	0.0	0.0	0.17***	0.1	0.0	0.16***	0.0	0.16**	0.0
	(0.08)	(0.02)	(0.06)	(0.06)	(0.05)	(0.06)	(.)	(0.07)	(0.08)
Trust government	−0.0	0.0	0.0	0.15**	0.05	0.12*	0.0	−0.1	−0.0
	(0.05)	(0.03)	(0.06)	(0.06)	(0.05)	(0.06)	(.)	(0.06)	(0.05)
Trusts banks	−0.0	−0.0	−0.06	−0.11*	0.07*	0	0.1	−0.02	−0.10*
	(0.05)	(0.03)	(0.07)	(0.06)	(0.04)	(0.05)	(0.05)	(0.07)	(0.06)
Capital city	0.07*	0	0.03	0.16*	0.0	0.1	0.11**	0.19***	0.0
	(0.03)	(0.03)	(0.07)	(0.08)	(.)	(0.06)	(0.05)	(0.07)	(0.07)
Log of age	0.1	0.0	0.1	−0.1	−0.11*	0.0	−0.0	0.0	−0.18*
	(0.08)	(0.03)	(0.10)	(0.08)	(0.07)	(0.06)	(0.05)	(0.11)	(0.10)
Female	-0.07	−0.02	−0.03	0.1	−0.0	0.01	−0.1	0.05	0.0
	(0.05)	(0.02)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
Size of household	0.0	0.0	0.01	−0.0	0.0	0.06***	0.0	−0.01	−0.03
	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)
Married	−0.1	0.04*	−0.0	0.1	0.19***	−0.0	−0.0	0.14*	0.09
	(0.06)	(0.02)	(0.08)	(0.07)	(0.06)	(0.05)	(0.05)	(0.07)	(0.07)
Income: medium	0.0	0.0	0.0	0.1	0.0	0.13	0	0.1	0.22**
	(0.08)	(0.03)	(0.09)	(0.09)	(0.07)	(0.08)	(0.06)	(0.08)	(0.10)
Income: high	0.1	0.1	0.0	0.1	0.0	0.1	−0.0	−0.0	0.29***
	(0.10)	(0.03)	(0.10)	(0.10)	(0.06)	(0.07)	(0.08)	(0.09)	(0.10)
Education: medium	0.05	0.0	0.1	0.0	−0.1	0.03	−0.1	−0.02	0.0
	(0.06)	(0.05)	(0.10)	(0.06)	(0.06)	(0.05)	(0.08)	(0.09)	(0.07)
Education: high	−0.01	0.0	0.08	−0.14**	−0.06	0	−0.03	−0.07	0.02
	(0.09)	(0.05)	(0.11)	(0.07)	(0.08)	(.)	(0.09)	(0.11)	(0.08)
High financial literacy	−0.0	−0.03	−0.1	−0.06	−0.0	0.02	0.07	0.09	−0.06
	(0.04)	(0.02)	(0.06)	(0.06)	(0.04)	(0.05)	(0.06)	(0.07)	(0.06)
Unemployed	0.01	0.0	0.1	−0.1	−0.1	0.1	0.1	−0.2	−0.1
	(0.05)	(0.04)	(0.09)	(0.12)	(0.07)	(0.06)	(0.07)	(0.11)	(0.19)
Self-employed	−0.03	0.0	0.0	0.0	0.1	0.1	0.09	0.0	−0.1
	(0.08)	(0.03)	(0.06)	(0.09)	(0.05)	(0.04)	(0.08)	(0.09)	(0.12)
N	170	527	257	353	257	175	133	298	297
Pseudo-R2	0.11	0.1	0.09	0.1	0.21	0.29	0.21	0.1	0.08
Clusters	87	238	75	150	79	89	73	120	91
Log-L	−45	−96	−107.3	−219.6	−87.8	−39.4	−33.5	−167.7	−153.5

Source: 2021 OeNB Euro Survey wave.
Note: Marginal effects of probit regressions. Standard errors clustered at the PSU level. Dependent variable is 1 if the borrower used the moratorium and 0 if they did not use it, regardless of whether they were aware of the measure or not. For detailed variable definitions, see annex table A1. Baseline for income is low income tercile, baseline for education is low education.

Annex E

Complementary table and additional map

Table E1

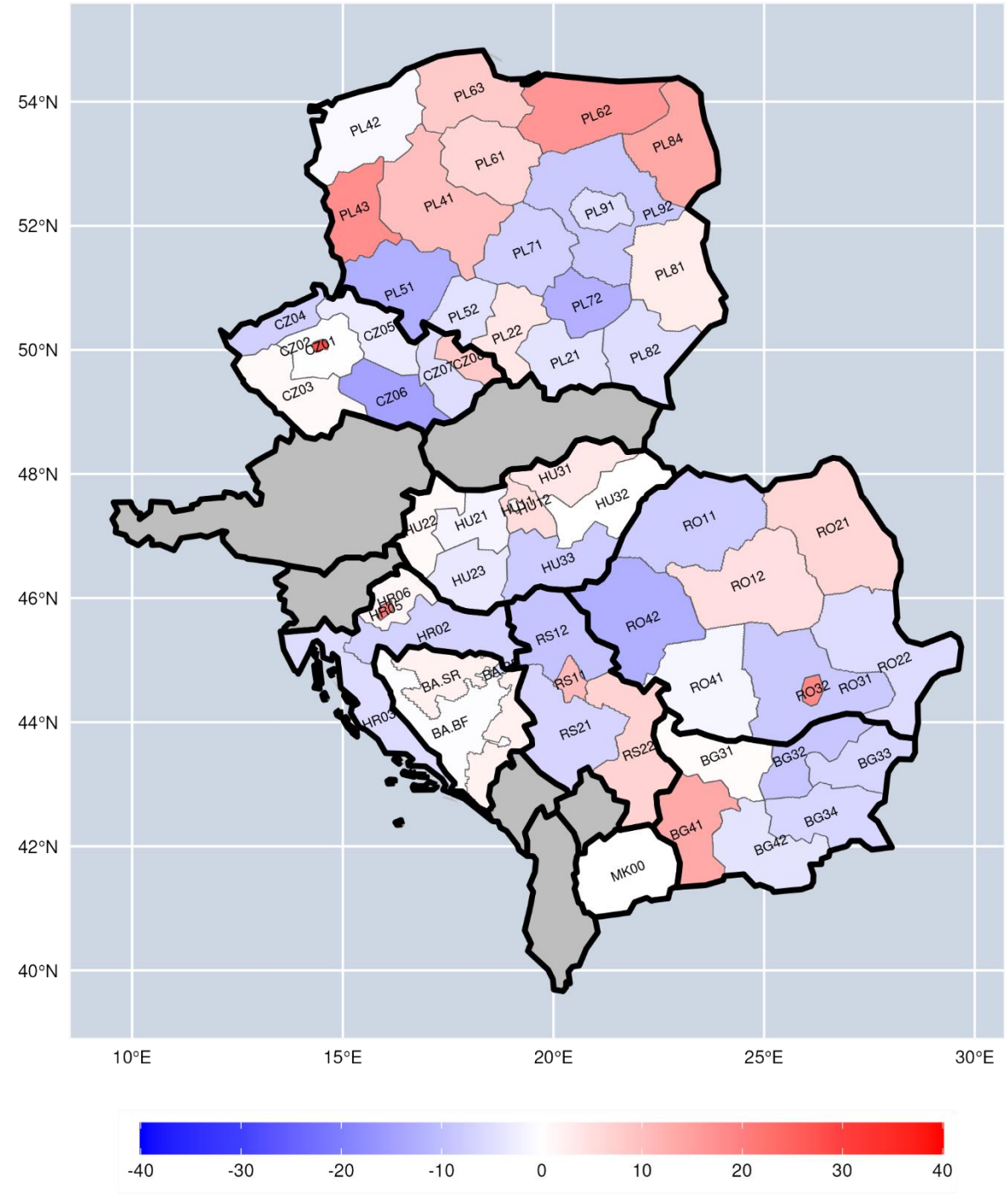
Numeric values displayed in figure 1

NUTS 2/Hijmans	Name	Δ ppt	NUTS 2	Name	Δ ppt
BA.BF	Federacija Bosna i H.	1.2	PL21	Maopolskie	−0.3
BA.BR	Brko	0.0	PL22	Iskie	2.8
BA.SR	Republika Srpska	−2.7	PL41	Wielkopolskie	14.8
BG31	Severozapaden	8.0	PL42	Zachodniopomorskie	−27.4
BG32	Severen tsentralen	−20.5	PL43	Lubuskie	10.2
BG33	Severoiztochen	−8.6	PL51	Dolnolskie	−21.4
BG34	Yugoiztochen	−0.9	PL52	Opolskie	12.6
BG41	Yugozapaden	14.5	PL61	Kujawsko-pomorskie	16.4
BG42	Yuzhen tsentralen	−4.3	PL62	Warmisko-mazurskie	2.8
CZ01	Praha	26.3	PL63	Pomorskie	−12.7
CZ02	Stední echy	9.7	PL71	Łódzkie	−8.6
CZ03	Jihozápad	−16.5	PL72	Świtokrzyskie	−22.5
CZ04	Severozápad	21.8	PL81	Lubelskie	8.3
CZ05	Severovjchod	−11.7	PL82	Podkarpackie	−0.3
CZ06	Jihovjchod	−34.8	PL84	Podlaskie	−5.8
CZ07	Stední Morava	11.7	PL91	Warszawski stoeczny	1.7
CZ08	Moravskoslezsko	11.9	PL92	Mazowiecki regionalny	10.6
HR02	Panonska Hrvatska	2.4	RO11	Nord-Vest	7.9
HR03	Jadranska Hrvatska	−6.8	RO12	Centru	−4.9
HR05	Grad Zagreb	13.5	RO21	Nord-Est	30.3
HR06	Sjeverna Hrvatska	−4.3	RO22	Sud-Est	9.1
HU11	Budapest	−3.9	RO31	Sud-Muntenia	−36.0
HU12	Pest	−3.2	RO32	Bucureti-Ilfov	1.1
HU21	Közép-Dunántúl	8.4	RO41	Sud-Vest Oltenia	−1.9
HU22	Nyugat-Dunántúl	2.7	RO42	Vest	−22.9
HU23	Dél-Dunántúl	2.7	RS11	Belgrad	8.8
HU31	Észak-Magyarország	6.7	RS12	Vojvodina	3.7
HU32	Észak-Alföld	−0.4	RS21	Region umadije i Zapadne S.	−10.5
HU33	Dél-Alföld	−8.0	RS22	Region June i Istone S.	2.4
MK00	Severna Makedonija	0.0			

Source: 2021 OeNB Euro Survey wave.

Figure E1

Differences between the regions' and countries' predicted mean awareness



Source: 2021 OeNB Euro Survey wave.
Note: Dependent variable = 1 if respondent is aware of borrower relief measures. Predictions are based on the same probit model as described in section 4.1. We transformed the predicted awareness levels for individuals to dummies, i.e. $\widehat{awareness}_{dummy} = \mathbb{1}(\widehat{awareness} > 0.5) = 1$ *before aggregating to regional/country levels. NUTS 2, except for Bosnia and Herzegovina, where regions are defined according to Hijmans (2015). NUTS 2 labels are described in table E1.*

Crypto assets in Austria: an assessment of their prevalence and the motives of their holders

Pirmin Fessler,
Beat Weber[1]

In this study, we analyze data from a preliminary survey designed to evaluate the inclusion of questions regarding crypto asset holdings of households in the Austrian segment of the Eurosystem Household Finance and Consumption Survey (HFCS). Our objective is to examine the extent of crypto asset ownership within the Austrian population and to explore the motivations behind these holdings.

Our findings reveal that a consistent, albeit small, proportion of individuals hold relatively modest quantities of crypto assets. Demographically, crypto asset holders tend to be younger than the average and predominantly male. Notably, a significant proportion of crypto asset owners (41%) in Austria initiated their investments in 2019. On average, they hold relatively low amounts of crypto assets, with the median value hovering around EUR 6,000 and the 90th percentile near EUR 6,500. Even when evaluating across various levels of crypto asset holdings, the average proportion of these assets in crypto asset owners' overall financial portfolios remains below 30% across the full distribution of crypto assets and below 15% for owners whose holdings exceed EUR 5,000. The primary motivations cited for owning crypto assets are their speculative potential for profiting from market fluctuations (36% of stated reasons), owners' curiosity about new technology (27%) and their desire to diversify portfolios of risky assets (12%).

JEL classification: E44; G29
Keywords: crypto assets; financial risk; household survey

Since the bitcoin network was established almost 15 years ago, crypto assets have attracted increasing and significant public attention and substantial economic activity.[2] Specialized exchanges have emerged where the trading of crypto assets against official currency subjects crypto assets to permanent market evaluation. So far, the market prices of bitcoin and other crypto assets have been characterized by pronounced volatility, with a number of multi-month rallies leading to successive peaks in market valuation, often followed by substantial downturns.

Although crypto asset markets have lacked comprehensive regulation so far and crypto asset market prices exhibit persistent volatility, individual owners' risks associated with crypto asset exposure have not translated into economy-wide financial stability risks in the past, mainly due to the sector's modest size and limited interconnectedness with the broader financial system (ECB, 2019; FSB, 2022). Surveying crypto asset ownership is a means for central banks to monitor crypto asset markets' potential to become a possible future source of financial stability risks. Because of evidence that, in recent years, public attention to crypto assets has been misused for substantial scamming and misleading promotion activities (FCA, 2023b; FMA, 2024), information

[1] Oesterreichische Nationalbank, Research Section, Pirmin.Fessler@oenb.at, EU and International Affairs Division, Beat.Weber@oenb.at. Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the OeNB or the Eurosystem. The authors would like to thank the journal editors, two anonymous referees and participants of an internal seminar in May 2024 dedicated to a presentation of our findings for their helpful comments and valuable suggestions.
[2] A recent survey conducted in the UK testifies to crypto assets having become a widely known component of popular culture. "Awareness of crypto assets has risen significantly since 2021 – [in 2023,] 91% of adults surveyed [said] they [had] heard of crypto assets up from 78% in 2021." (FCA, 2023a).

about households' perception of crypto assets provides important input to the design of any public policies aimed at addressing these problems.

1 Data

In this section, we review the current availability of data on crypto assets from a general viewpoint in subsection 1.1 and introduce the survey data we use in our study in subsection 1.2.

1.1 Data on crypto assets

The observation of crypto asset markets is currently hampered by a lack of reliable data. In a recent report, the Financial Stability Board (FSB) summarized global regulatory and supervisory concerns around this issue, diagnosing a "lack of transparent, consistent and trusted data on crypto asset markets and their linkages with the core financial system" (FSB, 2022). Bitcoin and many crypto asset projects it inspired are designed as networks for creating, storing and transferring electronic entries in databases run by voluntary participants with no responsible entity behind them. Over time, markets have developed where these database entries are valued and traded as assets. Assets that lack a responsible issuing entity located in a specific jurisdiction not only lack a source of economic guarantee that holds backing assets to support their value but also a legal addressee that can be subjected to regulation and reporting requirements. Over time, crypto asset markets have evolved to an extent that most of their segments now rely on various intermediaries enabling economic activities associated with crypto assets. These intermediaries facilitate a range of financial functions such as buying, selling, trading against official currency, storing crypto assets in digital wallets, borrowing against crypto asset holdings and lending crypto assets for interest. Nonfinancial functionalities are also expanding, including smart contracts that automatically execute agreements between parties, decentralized applications (dApps) that operate on blockchain technology, and the use of crypto assets for digital identity verification. The development of various other financial and nonfinancial functionalities is subject to ongoing research and entrepreneurial activities within the crypto asset sector. Regulatory authorities at the EU and national levels have started to apply both existing and new regulations on crypto asset-related activities. A comprehensive EU regulatory framework for crypto asset markets was finalized in 2023 (EU, 2023). Economic data based on any regulatory reporting requirements derived from this framework will take some additional time to become available.

In the meantime, demand for crypto asset data has been catered for by commercial data publishing entities and promoters and providers of crypto services, based on information supplied by crypto intermediaries like exchanges and by crypto asset owners participating in surveys or resulting from blockchain data analysis. Because the quality, reliability and interpretation of results from many of these sources is difficult to assess due to a lack of mandatory reporting requirements and limited transparency and standardization with respect to data and methods, some central banks and financial regulatory and supervisory authorities have made attempts to produce more reliable data on their own by conducting and publishing user surveys on crypto asset ownership among households. Nonreliable survey results based on nonrepresentative sampling methods often suggest that a large and growing share of the population owns bitcoin, often referring to households' purchases of this crypto asset as an "adoption" by "users," as if there were any special activities associated with bitcoin ownership beyond owning and trading them like any other items of a portfolio. Such results are potentially misleading not only for policymakers but also for retail

investors as they may trigger psychological biases like the "fear of missing out" to the detriment of a proper assessment of risks associated with purchasing crypto assets.

In Europe, UK authorities have published detailed and informative surveys on households' crypto asset ownership for a number of years. The Financial Conduct Authority's most recent report finds that a rather high number of persons (close to one in ten UK citizens) may own crypto assets, but it points out an important caveat: "As this was an online only survey, the results do not include those adults that are digitally excluded. As a result, this may overestimate the number of crypto asset users." (FCA, 2023a). People who do not use computers will neither participate in online surveys nor be very likely to own digital assets like crypto assets. According to Statistics Austria, 6% of Austrians said they had not used the internet for several months, and 43% said they did not shop online (Statistics Austria, 2023). Under such circumstances, face-to-face interviewing seems more promising than online-only surveys when it comes to achieving representative results, always provided that cost and health considerations allow for personal interviews (during the COVID-19 pandemic, for instance, social distancing constrained non-online surveys).

In our 2022 OeNB Barometer survey, face-to-face interviews were possible, establishing favorable conditions for generating a picture of current crypto asset ownership in Austria that is as representative and accurate as possible. We used this survey as a pretest to explore the inclusion of crypto asset ownership in future waves of the comprehensive Household Finance and Consumption Survey (HFCS) carried out in Austria on behalf of the Eurosystem. To provide some hints at changes over time where appropriate, we report 2022 OeNB Barometer survey results in comparison with the results of a previous OeNB Barometer survey on household crypto asset ownership conducted in 2018 (Stix, 2021).

1.2 Experimental pretest data

As a pretest for the upcoming HFCS wave, we used the OeNB Barometer survey, a smaller, methodologically less sophisticated OeNB survey. Traditionally, the OeNB Barometer survey relied on computer-assisted personal interviewing (CAPI) only, with exemptions during the COVID-19 pandemic. For the 2022 wave, a CAPI/CAWI (computer-assisted web interviewing) mix was applied, including both face-to-face and online interviews. This approach allowed us to test the effect of differences in sampling schemes and modes on outcomes.

While CAPI interviews were conducted using the usual methodological approach (based on stratified multistage clustered random sampling), in addition two lower-quality variants of sampling-mode combinations of the survey design were used for the CAWI interviews:

1) **CAWI-access panel,** based on a random draw from the access panel (an IFES[3] interviewee pool) and CAWI. Conditional incentive (upon successful completion of interview): EUR 15 voucher.
2) **CAWI-push to web,** used to keep the sampling quality sufficiently high while allowing for a change in interview mode to CAWI. Individuals were invited by an invitation letter and a reminder to participate in an online interview (push to web). Postal addresses were used as the sampling frame. Conditional incentive (upon successful completion of interview): EUR 15 voucher.

[3] The Institute for Empirical Social Research (IFES) provides social, market and opinion research and has carried out HFCS interviews in Austria on behalf of Oesterreichische Nationalbank.

3) **CAPI,** based on a random sample from postal addresses and CAPI.

The list above ranks the three methods from the lowest to the highest quality: The first method uses CAWI based on a convenience sample; the second uses CAWI based on a random address sample; and the third method uses CAPI as an interview mode and is based on random sampling from postal addresses and CAPI interviews. A random sample generally provides higher-quality data than a convenience sample. This is because a convenience sample does not ensure the representativeness of results, nor does it allow for accurate uncertainty calculations, even when there is no unit or item nonresponse.

Table 1 illustrates the composition of our survey's pretest sample. It shows the response distribution across the different data collection methods. For the CAWI-access panel method, we secured a net sample of 460 participants from a gross sample of 2,942 persons, which resulted in a response rate of 15.6%. The CAWI-push to web method yielded a net sample of 18 respondents from a gross sample of 703 persons, translating to a notably lower response rate of 2.6%. The CAPI approach resulted in the most substantial response rate of 33.8%, with 953 respondents from a gross sample of 2,816 persons. These figures underscore the varying degrees of response each method achieved with the target population, with CAPI proving to be the most effective in terms of response rate. These differing response rates are critical for understanding the representativeness and potential biases in survey-based research, particularly when assessing the penetration of crypto asset ownership and related perceptions in the Austrian market. In our analysis, "individual-level crypto asset ownership" refers to the crypto asset ownership status of a single person within a household, whereas "household-level crypto asset ownership" refers to any crypto assets owned by one or more members of a household. The exact survey questions (in German) can be found in the annex.

Table 1

Pretest sample

	Gross sample	Net sample	Response rate
	Number		%
CAWI-access panel	2,942	460	15.6
CAWI-push to web	703	18	2.6
CAPI	2,816	953	33.8

Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.

Table 2 compares the subsets of our pretest sample resulting from the three methods described above, focusing on estimates of the prevalence of crypto asset holders based on the different data collection methods.

The CAWI-access panel data indicate a higher incidence of crypto asset ownership, with 5.3% of individuals and 8.2% of households reporting holdings, both unweighted and slightly increasing to 5.3% and 8.9%, respectively, after weighting. This potentially reflects a selection bias toward internet-savvy respondents, a characteristic inherent to the online nature of the CAWI methodology.

The CAWI-push to web subset, while utilizing a true probability sampling approach akin to the CAPI sample and thereby yielding a more representative sample, still yields higher ownership rates, like the CAWI-access panel method, namely 6.3% (unweighted) for both the individual and

household levels, which adjusts to 5.3% after weighting. This could be due to the push-to-web approach still requiring internet usage, thus not entirely eliminating the bias toward more technologically inclined participants. However, as the push-to-web approach only yielded a very small unit nonresponse rate, it might also suffer from a large nonresponse bias. Given the small number (18) of respondents in this category, it is hardly possible to judge this approach in our study.

In contrast, the CAPI method, characterized by its probability-based sampling and face-to-face interviews, thus ensuring a more representative demographic cross-section, shows a lower ownership rate of 2.2% for individuals (2.8% when weighted) and 3.0% for households (3.9% when weighted). This suggests that the CAWI-access panel may overrepresent crypto asset ownership due to its internet user bias, whereas CAPI results are likely more indicative of the general population.

Thus, table 2 highlights how important it is to consider the mode of data collection in survey-based research, particularly when measuring phenomena such as crypto asset ownership that may be inherently linked to technology usage. The weighted estimates, adjusted to Austrian population demographics, serve to mitigate these biases and afford a more accurate depiction of crypto asset ownership across the country. However, it is imperative to note the OeNB Barometer survey's limitation in not incorporating nonresponse weights, a factor that must be taken into account when interpreting these findings.

Table 2

Pretest sample subset estimates

	Observations	Share of crypto asset holders			
		Individual level		Household level	
		Unweighted	Weighted	Unweighted	Weighted
	Number	*%*			
CAWI-access panel	460	5.3	5.3	8.2	8.9
CAWI-push to web	18	6.3	5.3	6.3	5.3
CAPI	953	2.2	2.8	3.0	3.9

Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.

Note: Weights refer to post-stratification weights calculated for the overall sample, which reweight results to match the Austrian population (individual level, aged 16+) based on province of residence, gender, age, education and political party preference (standard weights for the OeNB Barometer survey). Like many other surveys, the OeNB Barometer survey does not allow for proper nonresponse weights.

Due to the small sample size and the low proportion of crypto asset owners (as shown in table 2), we are working with a limited number of observations. There are 66 crypto asset owners in our sample, of whom only 35 responded to the valuation question, resulting in a conditional response rate of 53%. In the CAPI sample, although the response rate improves to 64% (18 out of 28 crypto asset owners responded), the sample size remains very small. Consequently, we opted to provide robust percentile estimates and a binned scatter plot that comprehensively and clearly cover almost the entire distribution of the observed data but are more accessible compared to just plotting the few observations of crypto asset values and allow us to include weights in a meaningful way. We avoided calculating mean values or aggregate measures which could be misleading due

to the small sample size and the additional nonresponse issue. While the larger sample size and advanced methodology of the HFCS will help alleviate these issues identified in our pretest, they will not completely resolve them. To accurately track such a minor segment of potentially risky assets with precision and conditional on other characteristics, significantly larger survey sample sizes would be required.

2 Results

In the following subsections, we discuss the results on the share of crypto asset holders among households in Austria, their socioeconomic characteristics, the size and share of their holdings and their motives.

2.1 Share of crypto asset holders in the Austrian population

Like the OeNB Barometer survey conducted in 2018, the 2022 survey was conducted in a period (end-May to mid-August) when crypto asset market prices had fallen considerably from a historical peak reached several months before. In such periods, survey results are likely to be less distorted by a more transient segment of crypto asset owners participating only during bull market runs before exiting the market for good. This refers to participants who only engage with the market during periods of rising prices (bull markets) and typically withdraw completely once these conditions subside.

According to the 2018 survey, the share of crypto asset owners in the Austrian population was 1.6% (with an additional 1% indicating that they had previously owned crypto assets but sold them before the survey was conducted). From the share of non-owning survey participants indicating that they were interested in buying crypto assets in the future, our analysis suggested a market potential of 5% for crypto asset ownership.

With about 3% of crypto asset ownership among Austria's population in 2022, the recent survey shows an increase in ownership compared to 2018. Despite this growth, which is associated with price increases in crypto asset markets over a number of months, large media exposure and a new historical peak reached in crypto asset market prices in late 2021, this figure remains below the potential expected in 2018.

Table 3 compares estimates from the overall sample, including all three data collection methods, to estimates using the CAPI sample only. In both cases, weights are calibrated to represent the full population. One can clearly see that, in line with table 2, also the combination of all data collection methods yields a somewhat larger estimated share of crypto asset holders: in the case of individuals, 3.5% instead of 3%; and in the case of households, 5.3% instead of 4%. We regard the CAPI-only sample estimate as the more trustworthy metric. Despite the smaller number of observations, it benefits from robust probability sampling and does not depend on internet accessibility as a prerequisite, unlike CAWI. Moreover, a nonprobability sample such as the one obtained from the access panel is technically inept at enabling the estimation of precise standard errors. Given our preference for a less biased estimate and the ability to attach valid standard errors, we opted to proceed with the CAPI sample for the subsequent stages of our analysis.

Table 3

Data selection and preferred pretest sample estimate

	Observations	Share of crypto asset holders	
		Individual level	Household level
	Number	*%*	
Overall sample and weights	1,431	3.5	5.3
CAPI sample and weights	953	3.0	4.0

Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.

Note: Weights refer to post-stratification weights, which are calculated for both the overall sample and CAPI and which reweight results to match the Austrian population (individual level, aged 16+; see table 1). Note, however, that here CAPI weights reweight to the full population while in table 1, CAPI is only a subset of the overall reweighted sample.

Table 4 places our preferred estimates within the broader context of existing research on crypto asset ownership in Austria, also detailing the corresponding 95% confidence intervals where available. While the findings from Abramova et al. (2022), which originated from a wholly access panel-based study, may appear less robust due to the nonprobability nature of the sampling method, our results align closely with those from other studies employing representative sampling techniques. It is important to highlight that the figure provided by Triple A represents a commercial estimate provided by a firm active in the crypto asset markets; the methodology behind their data collection remains unspecified. Interestingly, despite potential methodological uncertainties, their estimate indicates an even smaller proportion of crypto asset owners than ours.

Table 4

Comparison with other avialable estimates for the share of crypto asset holders in Austria

	Estimate reference year(s)	Estimate of share of crypto holders	95% confidence intervall	
			Lower bound	Upper bound
		%		
HFCS crypto pretest 2022, individual level	2022	3.0	1.5	4.4
HFCS crypto pretest 2022, household level	2022	4.0	2.3	5.7
Stix (2021), individual level	2018/2019	1.6	1.2	2.2
Abramova et al. (2022), individual level	2021	7.0	n.a.	n.a.
Ciaian et al. (2022), individual level	2019	2.9	2.5	3.3
Triple A, individual level[1]	2023	1.3	n.a.	n.a.

Source: OeNB Barometer survey, HFCS crypto asset pretest 2022, studies and website cited.

[1] https://triple-a.io/cryptocurrency-ownership-data .

Note: n.a. = not available.

2.2 Who holds crypto assets?

Our 2018 survey had identified crypto asset owners as being more likely to be male, young and more educated than non-owners, and in particular as being more risk embracing in their attitude, which was often expressed by their ownership of other risky assets on top of crypto asset holdings. A recent OeNB survey conducted in selected Central, Eastern and Southeastern European (CESEE) countries[4] in fall 2023 reports a similar pattern for these countries.

Table 5

Descriptive socioeconomic characterization of crypto asset holders

	Breakdown	Share of crypto asset holders		Probability of holding crypto assets (household level)	
		Individual level	Household level	Marginal effects after logit	Standard error
		%	%		
Age (years)	15–29	7.2	7.8	–	–
	30–44	3.7	5.1	-0.041	0.034
	45–59	2.2	4.2	-0.041	0.031
	60–79	0.8	1.1	-0.041	0.050
	80+	0.0	0.0	0	–
Gender	Man	5.1	6.2	–	–
	Woman	0.9	1.9	-0.041**	0.020
Education	Primary	0.0	1.0	–	–
	Lower secondary	3.7	3.7	0.044	0.032
	Higher secondary	2.8	5.3	0.053	0.036
	Tertiary	4.6	4.6	0.040	0.047
Job status	Full-time	4.3	5.3	–	–
	Part-time	0.6	4.9	0.054	0.038
	Unemployed	13.4	13.4	0.064	0.043
	Retired	0.5	0.5	-0.088	0.064
	Other	0.0	3.2	0.023	0.040
Personal income (EUR/month)	No income	0.0	2.1	-0.113	0.083
	0–900	1.6	4.7	-0.079	0.063
	900–1,350	3.2	4.3	-0.067	0.057
	1,350–1,650	3.9	4.5	-0.052	0.052
	1,650–1,950	0.3	0.3	-0.160**	0.072
	1,950–3,000	4.5	5.6	-0.038	0.040
	3,000+	1.6	10.3	–	–
Municipality size (number of inhabitants)	0–3,000	1.8	3.5	–	–
	3,000–5,000	3.9	3.9	0.001	0.034
	5,000–1 million	4.8	5.5	0.003	0.022
	1 million+	0.3	1.8	-0.037	0.035

Source: OeNB Barometer survey, HFCS crypto assest pretest 2022.

Note: The two right-hand columns show marginal effects and their standard errors after a logit regression where a dummy indicating "holding crypto assets" is the dependent variable and all socioeconomic characteristics are used as independent explanatory variables. No marginal effects are shown for reference categories.
*** denotes statistical significance at the 5% level.*

[4] See the report on 2023 Euro Survey results, forthcoming in the OeNB Reports series in 2024.

In the 2022 survey results reported in table 5, the comparatively higher crypto asset ownership among younger people and males again stands out among the relevant socioeconomic characteristics.

The age group below 30 years has a considerably higher share of crypto asset holders than other age groups, with participation particularly low among those past retirement age. Crypto asset ownership is strikingly higher among men than among women.

With regard to other household characteristics like education, job status, personal income and size of residents' municipality, no clear pattern emerges. Notable outliers within these categories do not point to explanatory power: The high share of crypto asset ownership among the unemployed seems striking but lacks significance due to the small number of unemployed people owning crypto assets in our sample. The surprisingly low share of crypto asset ownership among inhabitants of big cities as compared to inhabitants of smaller municipalities is likely to be driven by the comparatively large share of old people among the inhabitants of Vienna, Austria's only city in this category. A similar reasoning applies to educational factors. The low level of crypto asset ownership among people with only primary education reflects the dominance of elderly people in this educational category.

Crypto asset owners in our sample are more likely to be male and young but cannot be distinguished by a particular education level, job status, personal income level or municipality size of their residency.

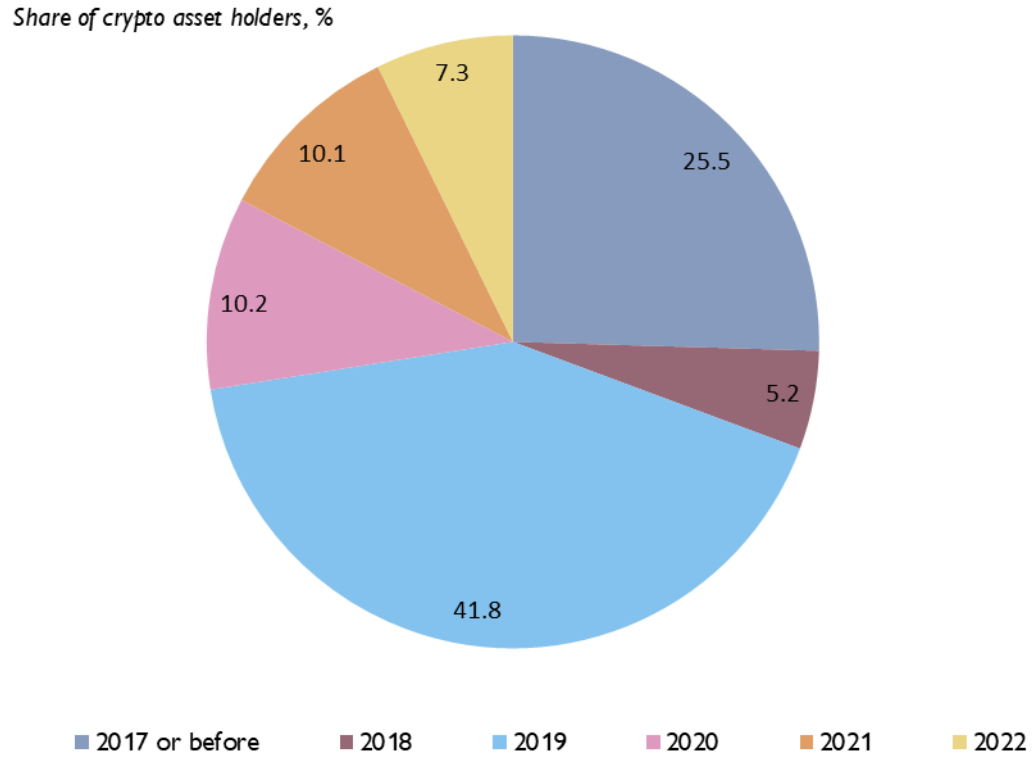
Our survey contains interesting information on the longevity of crypto asset ownership. As shown in chart 1, one-quarter of crypto asset owners covered in the 2022 survey acquired their first crypto asset holdings in 2017 or before; an additional 5% entered the market in 2018 (note that crypto asset market prices reached a historical peak at the end of 2017 and deteriorated in 2018). The largest group (around 40%) started buying crypto assets in 2019 (which was characterized by rallying crypto asset market prices in the first two quarters). Only slightly more than one-quarter of current crypto asset owners joined the market in the 2020s (in 2021, crypto asset market prices reached a new historical peak).

The information about market entry dates suggests that behind the approximate doubling of the share of crypto asset owners in the Austrian population between 2018 and 2022, there is a considerable fluctuation in crypto asset market participation. A substantial number of previous crypto asset owners is likely to have exited the market before 2022, with 2019 obviously having been a particularly successful year for finding persistent first-time buyers to sell their holdings to.

Episodes of spectacular transitory price increases in crypto asset markets traditionally serve as a key mechanism to attract new retail investors, resulting in the support of price momentum (Cornelli et al., 2023). Such episodes continued to occur after 2019, with crypto asset market prices reaching an all-time high in 2021, followed by a severe and prolonged market downturn until 2023. That crypto asset market veterans dominate over more recently arrived market participants among current crypto asset-owning households in our survey in spite of the more recent historical price peak is a noteworthy sign of the continuously diminishing growth in permanent household participation in the period before the survey was conducted.

Chart 1

Year of first market entry of crypto asset holders at time of survey

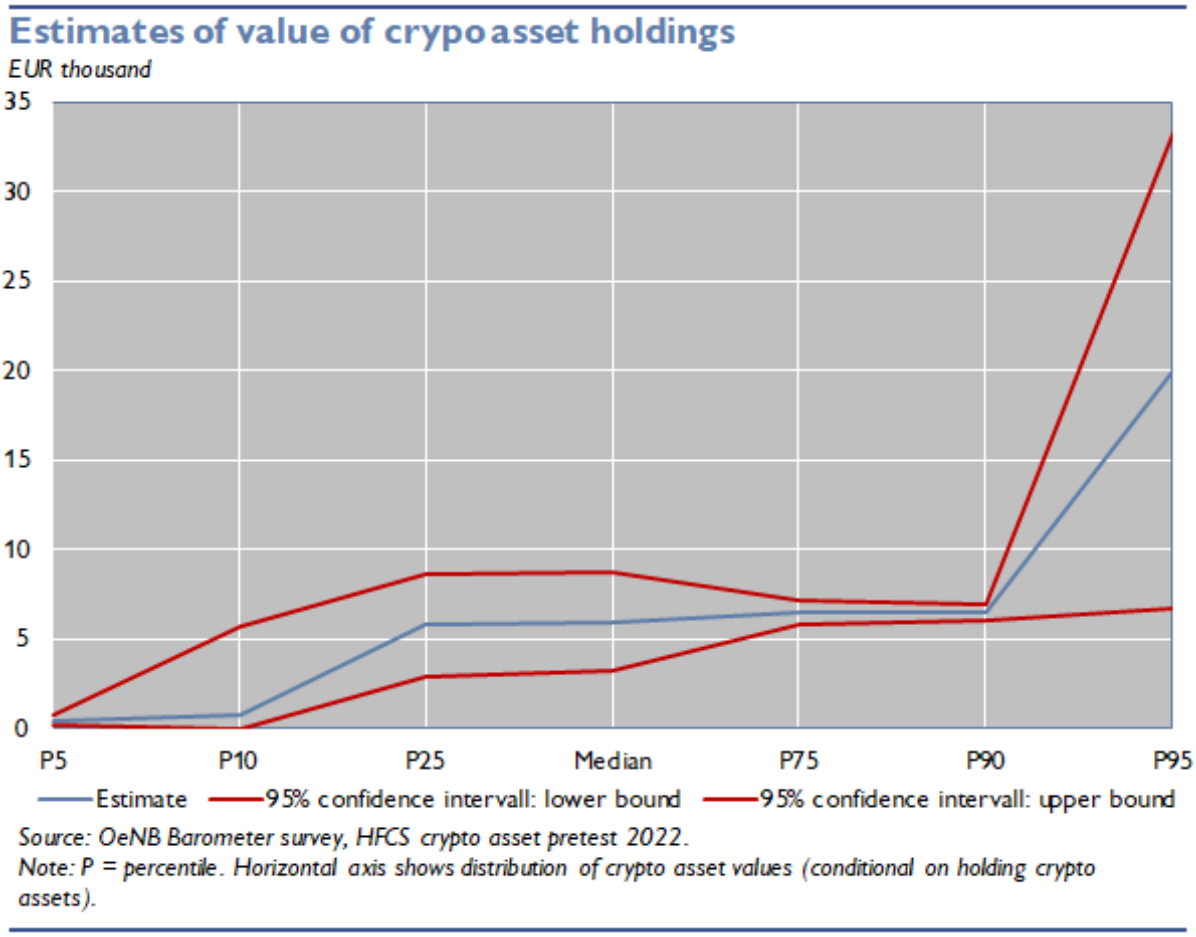


Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.

2.3 What volumes of crypto assets do owners hold?

Chart 2 shows that the market value of crypto assets held by the median crypto asset-owning individual lies below EUR 10,000. As the 90th percentile also lies below that value, this statement holds for more than 90% of crypto asset holders. Even up to the 95th percentile, crypto asset holdings remain comparably modest (below a market value of EUR 20,000), which implies that less than 5% of owners hold more than EUR 20,000 in crypto assets.

Chart 2

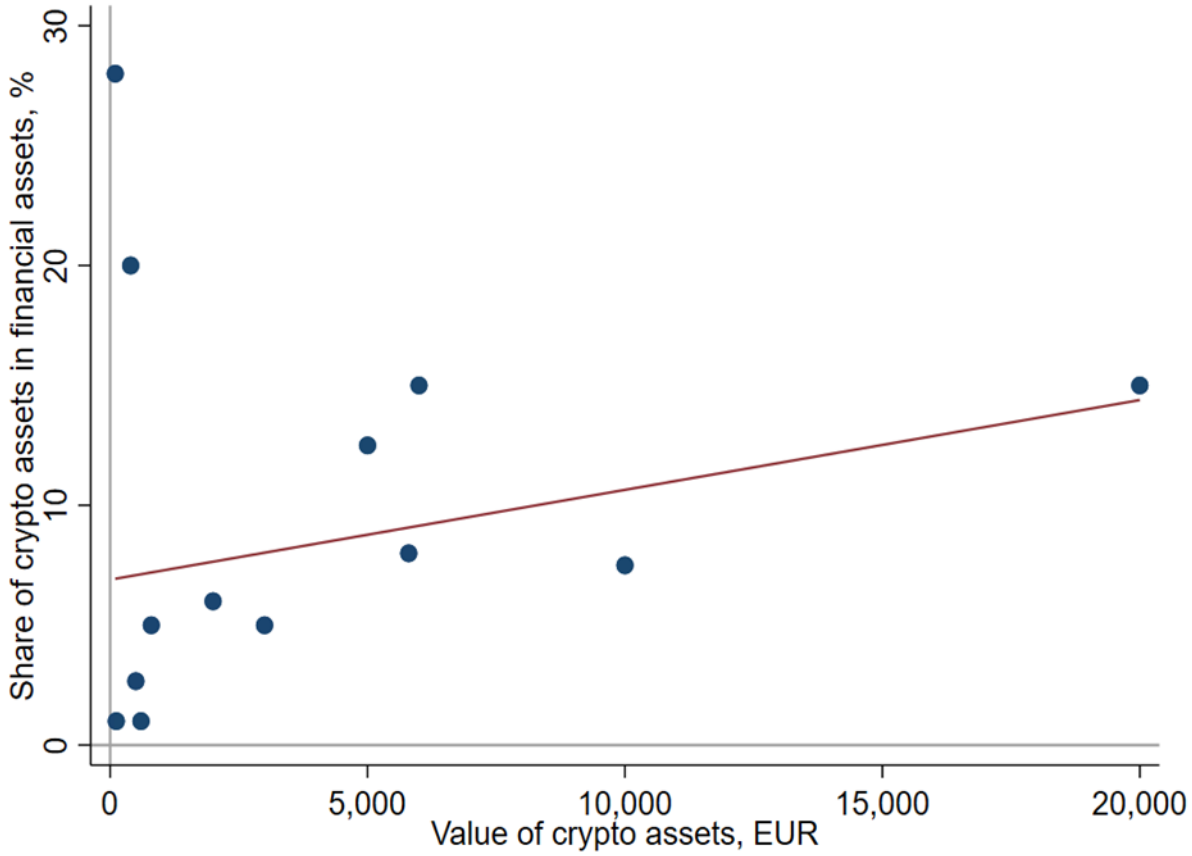


Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.
Note: P = percentile. Horizontal axis shows distribution of crypto asset values (conditional on holding crypto assets).

Our survey results do not provide new evidence of a rise in reckless financial behavior, financial illiteracy or lack of risk awareness among crypto asset holders, nor any evidence of crypto assets being of significant macrofinancial relevance. None of the survey respondents has gone "all in" with regard to crypto assets in an attempt to exit the monetary and financial system. Instead, crypto assets are usually held jointly with other assets as part of respondents' portfolio. A large share of respondents explicitly mentions the diversification of risks in their portfolio as the main motivation for holding crypto assets (see below).

Chart 3

Value of crypto assets held as a share of total financial wealth



Source: OeNB Barometer survey, HFCS crypto asset pretest 2022.
Note: This binned scatter plot shows the relation between the value of crypto assets (EUR) and the share of crypto assets in financial assets (%) for households owning crypto assets. Each point represents the average share of crypto assets in households' financial assets within a specific range of crypto asset values. The line indicates the overall trend in the data.

Among crypto asset owners, average crypto asset holdings represent around 10% of their financial assets, as reported in chart 3 by means of a binned scatterplot. Dots in chart 3 represent averages for clusters of households that are similar with regard to the value of their crypto assets. Outliers with a higher share of crypto assets in their portfolios tend to be among households with smaller portfolios, but they typically do not have more than 30% of their financial assets invested in crypto assets. Among the thousands of crypto assets currently available on crypto asset markets, bitcoin and Ethereum dominate portfolios by far. 80% of crypto asset owners in our sample own bitcoin, 40% own Ethereum and only about 10% hold other crypto assets as either their only crypto asset or as part of their crypto asset portfolio.

2.4 What are crypto asset holders' motives?

Most crypto asset owners surveyed in Austria in 2018 stated that they perceived crypto asset ownership as an investment with a prospect for capital gains. Many cited an "interest in technology" as an important motive. About one-quarter of crypto asset-owning respondents in 2018 mentioned crypto assets' current or future use for payments, an even smaller share of

owners cited cost savings in payments, and a small minority was motivated by mistrust in the monetary and financial system (Stix, 2021).

Our 2022 survey asked crypto asset owners to describe their motives in their own words. Results show that, with one important exception, the main motives for crypto asset ownership have hardly changed. The major motives cited by crypto asset owners in 2022 are the speculative prospect of profiting from changes in crypto asset prices (36% of the number of motives mentioned), curiosity about new technology (27%) and an attempt to diversify their portfolios of risky assets (12%). Distrust in money and banking coupled with a belief that crypto assets represent some kind of viable alternative continues to motivate a minority among crypto asset owners (about one in five motives mentioned). But in contrast to some previous surveys and the alleged key attractions of crypto assets according to some segments of crypto asset marketing, it is noteworthy that survey participants did not mention that they intended using crypto assets for making payments or that they held or used them for reasons of privacy. For about 7% of motives mentioned in the survey, crypto asset owners added that they experienced some form of disappointment with crypto assets.

Fundamental differences in perception about the purpose and potential of crypto assets (Weber, 2022) persist, but the results of our survey suggest that at least some differences are more likely to have grown smaller rather than larger over time in light of experience gained with the performance of crypto assets and services. From our survey, there is no evidence of widespread changes in individual behavior associated with crypto assets that would give rise to significant concerns and issues around personal financial health, financial literacy or financial stability.

3 Conclusions

About 3% of Austria's population own crypto assets. To a large extent, their crypto asset ownership means holding modest sums that represent only a small fraction of their personal portfolios (10% of households' financial assets on average). With regard to socioeconomic characteristics, crypto asset ownership is pronouncedly more prevalent among younger people and males. The major motives given for crypto asset ownership are the speculative prospect of profiting from changes in crypto asset prices (36% of the number of motives mentioned), curiosity about new technology (27%) and an attempt to diversify risky asset portfolios (12%). Although a small minority among crypto asset owners do consider crypto assets an alternative to the monetary and financial system, we see no evidence of crypto assets being actually used to pay or denominate prices for goods and services.

Persistent crypto asset ownership among Austrian households is dominated by "crypto veterans" who entered the market in 2019 or before, whereas later cohorts with persistent crypto asset ownership are found to be becoming smaller by the year, even though crypto asset prices reached a historical peak shortly before our survey was conducted.

Given the limited focus of our survey, we can neither give a full picture of crypto assets held in Austria beyond those held by households nor provide information on the financing of crypto assets held or any other information relevant for arriving at a comprehensive risk assessment. The share of crypto assets held in private portfolios within our sample and the information owners provided on their motives do not point to particularly reckless financial behavior, financial illiteracy or a lack of risk awareness among crypto asset holders in Austrian households or to crypto assets being of significant macrofinancial relevance.

Nevertheless, given the unpredictability, volatility and risks that have come to characterize crypto asset markets, from a public policy perspective we recommend improving their monitoring.[5] Due to the absence of register data that directly link crypto assets to individual or household owners, it seems useful to include a new category in future updates of household balance sheet surveys like the Eurosystem's Household Finance and Consumption Survey (HFCS). Notably, the Austrian HFCS is poised to become the first large household wealth survey to classify crypto assets as a distinct, not a residual category. We anticipate that this classification will be adopted by other household wealth surveys, making it possible to better understand the role of crypto assets in household portfolios and the broader economy.

We advocate for policies that promote such initiatives. Having access to comprehensive data on the prevalence and distribution of crypto assets in investors' portfolios supports the effective design and implementation of a broad range of related economic and regulatory analyses and policies.

[5] See also Saggese et al. (2023) for recent research on methods how to assess the solvency of crypto service providers based on other data sources.

References

Abramova, S., R. Böhme, H. Elsinger, H. Stix and M. Summer. 2022. What can CBDC designers learn from asking potential users? Results from a survey of Austrian residents. OeNB Working Paper 241.

Bank for International Settlements (BIS). 2018. Cryptocurrencies: looking beyond the hype. BIS Annual Economic Report 2018. Chapter V. https://www.bis.org/publ/arpdf/ar2018e5.pdf

Ciaian, P., A. Cupák, P. Fessler and A. Kancs. 2023. Environmental-Social-Governance Preferences and Investments in Crypto-Assets. OeNB Working Paper 243. https://www.oenb.at/dam/jcr:620ec055-6841-4300-9eaf-fbe7a423a0f8/WP-243.pdf

Cornelli, G., S. Doerr, J. Frost and I. Gambacorta. 2023. Crypto shocks and retail losses. BIS Bulletin 69. https://www.bis.org/publ/bisbull69.pdf

ECB Crypto-Assets Task Force. 2019. Crypto-Assets: Implications for financial stability, monetary policy, and payments and market infrastructures. ECB Occasional Paper No 223. May.

European Union (EU). 2023. Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937. EUR-Lex – 02023R1114-20240109 – EN – EUR-Lex (europa.eu)

Financial Conduct Authority (FCA). 2023a. Research Note: Cryptoassets consumer research 2023 (Wave 4). Research Note. 8 June 2023. https://www.fca.org.uk/publication/research-notes/research-note-cryptoasset-consumer-research-2023-wave4.pdf

Financial Conduct Authority (FCA). 2023b. Financial watchdog stops thousands of misleading ads and promotions. https://www.fca.org.uk/news/press-releases/financial-watchdog-stops-thousands-misleading-ads-promotions

Financial Stability Board (FSB). 2022. Assessment of Risks to Financial Stability from Crypto-assets. https://www.fsb.org/wp-content/uploads/P160222.pdf

Finanzmarktaufsicht (FMA). 2024. Zahl der Whistleblower und Verbraucher-Beschwerden nimmt zu. https://www.fma.gv.at/zahl-der-whistleblower-und-verbraucher-beschwerden-nimmt-zu/

Pernice, I. and B. Scott. 2021. Cryptocurrency. Internet Policy Review 10/2. https://policyreview.info/glossary/cryptocurrency

Saggese, P., E. Segalla, M. Sigmund, B. Raunig, F. Zangerl and B. Haslhofer. 2023. Assessing the Solvency of Virtual Asset Service Providers: Are Current Standards Sufficient? OeNB Working Paper 248. https://www.oenb.at/dam/jcr:91ee2032-1751-487b-850d-81138a68f3cd/WP-248_03112023.pdf

Statistics Austria. 2023. ICT usage in households. https://www.statistik.at/en/statistics/research-innovation-digitalisation/digital-economy-and-society/ict-usage-in-households

Stix, H. 2021. Ownership and purchase intention of crypto-assets: survey results. Empirica 48(1). 65–99.

Weber, B. 2022. How much cash is in crypto? In: Monetary Policy & the Economy Q1–Q2/22. 75–90. https://www.oenb.at/dam/jcr:dde140cf-1329-4293-b94c-cd42cca627ff/06_Mop_Q1-2_22_How-much-cash-is-in-crypto.pdf

Annex

Pretest questions (in German)[6]

Question 20: crypto asset holdings

Besitzen Sie oder ein anderes Haushaltsmitglied Bitcoin oder ähnliche Kryptoanlagen?

- Ja, ich selbst
- Ja, ein anderes Haushaltsmitglied
- Nein
- Weiß nicht
- Keine Angabe

Question 20.1: value of crypto asset holdings

Wie hoch ist derzeit der Wert dieser Kryptoanlagen insgesamt in Euro?

- Numerische Angabe in EUR, zehnstellig
- Weiß nicht
- Keine Angabe

Question 20.2: crypto asset market entry

In welchem Jahr haben Sie erstmals solche Kryptoanlagen gekauft?

- Numerische Jahresangabe, vierstellig
- Weiß nicht
- Keine Angabe

Question 20.3: portfolio share of crypto assets

Welcher Anteil Ihres gesamten Finanzvermögens, also Konten, Spareinlagen, Bausparverträge, Lebensversicherungen, Aktienvermögen etc., ist in etwa in solche Kryptoanlagen investiert?

- Numerische Angabe in %, zweistellig
- Weiß nicht
- Keine Angabe

Question 20.4: reason for holding crypto assets

Können Sie in wenigen Worten sagen, aus welchem Grund Sie Kryptoanlagen halten?

- Offene Antworten notieren
- Weiß nicht
- Keine Angabe

[6] English translations are available from the authors upon request.

Question 20.5: type of crypto assets

Können Sie uns sagen, welche Kryptoanlagen Sie halten?

(Mehrfachantwort erlaubt)

- Genannt
- Nicht genannt
- Liste von drei Variablen:
    a) Bitcoin
    b) Ethereum
    c) Sonstige: offene Antwort, Aufzählung
- Weiß nicht
- Keine Angaben

Enjoy the silence? (De)globalization and cross-border investment – a gravity approach

Ana Abeliansky, Christian Alexander Belabed, Julian Mayrhuber[1]

Amidst increasing geopolitical tensions and the growing discourse on "deglobalization," we study how geopolitical (de)alignment correlates with one of the main drivers of globalization – cross-border investment. Extending a gravity model with data on voting behavior at the United Nations General Assembly, we find that an increase of geopolitical dealignment is associated with a decline in both foreign direct investment (FDI) and portfolio investment (PI). The decline is stronger for FDI. The relevance of geopolitical dealignment to FDI has increased after the financial crisis, suggesting that geopolitical considerations are becoming increasingly important for foreign capital allocation. While an increase in the geopolitical distance between "nonfriendly" country pairs is associated with a significant decline in cross-border investment, our results do not show such a strong relation for "friendly" country pairs, indicating that geopolitical differences between "friendly" countries do not immediately lead to a reduction of bilateral investment. Overall, our findings suggest that continued geopolitical fragmentation is likely to lead to a decline in cross-border investment.

JEL classification: F02, F21, F36
Keywords: capital flows, cross-border investment, deglobalization, geopolitical fragmentation

Since the COVID-19 pandemic, the war in Ukraine and a period of high inflation, concepts like deglobalization, near-shoring, friend-shoring, re-shoring, on-shoring and de-risking have dominated media and think-tank discussions. There is no doubt that globalization has reshaped the economic landscape, changed economic ties between countries and influenced the effectiveness of monetary policy. Issues related to these transformations are the impact of globalization on productivity, its effect on inflation trends, the implications of global spillovers on the financial markets and their potential to trigger extreme and synchronized global uncertainty shocks. According to the ECB (2021), globalization may affect monetary policy transmission (e.g. by weakening the interest rate channel by lowering natural interest rates, increasing the probability of reaching the zero lower bound and reducing policy space) at least in the short run. We might thus suspect that deglobalization may affect monetary policy transmission in the opposite direction.[2] Assessments of such disintegration, or fragmentation, and of the channels through

[1] Oesterreichische Nationalbank, International Economics Section. Corresponding author: christianalexander.belabed@oenb.at. Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the OeNB or the Eurosystem. The authors would like to thank the editors of the OeNB Bulletin, an anonymous referee and the participants of a research seminar of the Vienna Institute for Economic Studies (wiiw), in particular Mahdi Ghodsi, Branimir Jovanovic and Nina Vujanovic, and of a research workshop of the OeNB's International Economics Section for most helpful comments. Christian A. Belabed would like to thank the wiiw for hosting him from April to September 2023 during a job rotation. We would also like to thank Wolfgang Lechthaler and Predrag Cetkovic (both OeNB) for most valuable comments and discussions since the inception of the (De)Globalization Monitor. All remaining errors are our own.
This publication is part of a larger project on (de)globalization, the (De)Globalization Monitor (GloMo), conducted at the OeNB's International Economics Section. The project comprises analyses of capital flows and cross-border investment (CapMo), trade (TradeMo) and migration (MigMo). All related publications, data and interactive charts will be published on a dedicated webpage which will be the project's central hub. Members of the project team are Ana Abeliansky, Christian Alexander Belabed, Jonathan Fitter, Julian Mayrhuber, Anna Katharina Raggl and Paul Ramskogler (all OeNB, International Economics Section).

[2] For a full assessment and more details on the effect of globalization on monetary policy transmission, please refer to ECB (2021, chapter 5).

which it would work can be found in Góes and Bekkers (2022), IMF (2023) and Aiyar et al. (2023). To promote a more structured discussion and provide continuous updates on these issues, the International Economics Section at the Oesterreichische Nationalbank (OeNB) developed the (De)Globalization Monitor (GloMo). Its main goal is to assess whether geopolitical tensions give rise to major changes in the globalization process, affecting cross-border capital flows and investment, trade and migration.

In this paper we investigate whether political (de)alignment has corollaries on international investment positions. We estimate the relationship between geopolitical dealignment and both bilateral foreign direct investment (FDI) and portfolio investment (PI) by extending a gravity model. We use the ideal point distance (IPD) measure from Bailey et al. (2017), which is based on the voting behavior observed at the United Nations General Assembly (UNGA). While no method of computing geopolitical (de)alignment is undisputed, Bailey et al. (2017) argue that the IPD's consideration of UNGA agenda changes renders it more suitable for cross-time analysis than traditional measures like the S-score proposed by Signorino and Ritter (1999). Our results suggest that geopolitical fragmentation is negatively related to cross-border investment (FDI and PI) when standard gravity control variables and source-/destination-year fixed effects are controlled for. Our heterogeneity analysis shows that geopolitical dealignment comes with a larger impact on FDI after the financial crisis. The effect of geopolitical fragmentation on FDI is also larger when emerging market and developing economies (EMDEs) are the source or destination countries of investment. Moreover, we find that among "friendly" country pairs, the effect of geopolitical dealignment on FDI and PI is less significant than for country pairs that are politically more distant. This suggests that countries with closely aligned geopolitical preferences do not immediately reduce bilateral investments when their geopolitical distance increases.

We then use the results from our gravity model estimation to conduct a few simple bloc-building scenarios to better understand the potential implications of varying degrees of geopolitical fragmentation. In the most severe scenario, in which a US bloc and a China bloc disengage entirely from cross-border investment, the global FDI stock decreases by 15.6%, while the global PI stock decreases by 3.8% (holding all other factors constant). This scenario yields severe results, but it is quite unlikely. More likely scenarios suggest much less significant reductions of FDI and PI stocks.

We organize the remainder of this paper as follows. In section 1, we review the most recent literature on deglobalization in general and on geopolitical fragmentation and cross-border investment in particular. In section 2, we estimate a gravity model, the workhorse model of international economics, to investigate the relationship between geopolitical fragmentation and cross-border investment. Section 3 presents a selection of bloc-building scenarios and their impacts on global FDI and portfolio investment stocks, and section 4 concludes.

1 Literature review

Recent literature on deglobalization shows that there is (yet) little agreement as to whether deglobalization has happened or is happening. Also, most of the literature we reviewed deals with the potential deglobalization of trade and only a few papers investigate cross-border investment. Starting with the literature that finds no signs of deglobalization or fragmentation, Di Sano et al. (2023), who base their assessment on the trade of intermediate goods, note that there has been

no strong evidence of deglobalization so far but stress the real risks associated with such a scenario. However, as they point out, such aggregate data may mask major heterogeneity on the firm level and call for further research using more granular data or surveys on the company sector's plans to relocate production. In a comparative historical approach, O'Rourke (2019) concludes that, when compared to the 1930s – a time when many nations followed a full-fledged beggar-thy-neighbor policy – deglobalization is not really happening at the moment. One indication is that trade declined after the pandemic, but by much less than anticipated, and rebounded much more quickly than previously expected (Williamson, 2021). Kobrin (2017), while acknowledging the recent rise of geopolitical tensions, argues that the benefits of technological advancements have changed the way the international economic system operates beyond the point of no return. Assessing the situation of global value chains, Antras (2020) agrees with others that trade flows had slowed down since the financial crisis but fails to identify any systematic evidence in favor of deglobalization. He considers the recent slowdown as a development that was to be expected after a phase of "hyperglobalization" observed since the 1990s. Most recently, Kaaresvirta et al. (2023) weighed in and concluded that while tensions between the United States and China weighed on their bilateral trade and investment activities, there are little signs of global fragmentation or a split into competing spheres. Cevik (2023) concludes as well that there are no signs of deglobalization in international trade flows. Finally, the ECB (2021) notes that evidence for deglobalization has been limited so far.

Other studies suggest at least some degree of deglobalization: Della Posta (2021) estimates that the globalization "honeymoon" will enter a phase of diminishing returns, setting the global economic system on a path of deglobalization if the "losers" of globalization are not compensated. Then, the "honeymoon" turns into a "divorce" scenario. Taking a specific emerging-markets view, Gupta and Numar (2021) find that reduced globalization is occurring while intensified protectionism negatively affects developing nations' future growth paths. Owen (2021) projects that the international economic order will be split into two more or less equal blocs. One will be led by a retreating hegemon, the USA, and the other by a rising hegemon, China. Inter-bloc interaction will be limited, while intra-bloc interaction will be maintained. Ripsman (2021) also documents a deterioration of cooperation among great international powers, while Witt (2019) suggests that a globalization patchwork is the most likely outcome, with nations restricting cross-border activities to countries with similar policy preferences. Bordo and James (2019) also suggest that deglobalization started after the financial crisis, emphasizing the uncertainty of capital movements, pushbacks against democracy and international governance mechanisms.

Regarding the literature on capital flows and cross-border investment, and in favor of the view that (partial) deglobalization has already begun, Dadush (2022) analyzes aggregate global capital flows and concludes that deglobalization of capital flows is visible. However, his data end in 2019 although data for 2020 and 2021 would have been available at the time of publication in late 2022. Data for the two years missing from his paper point to a strong rebound of global capital flows although these decreased again in 2022. Goldberg and Reed (2023) state that capital flows and trade exhibit a slowdown after the financial crisis but not a complete reversal. In some regions (e.g. the USA, China or India), the inward stock of FDI even increased in the post-crisis period, suggesting that there might be opposing narratives of post-crisis (de)globalization. Eichenauer and Wang (2024) find that the introduction of national security-related investment screening

mechanisms (ISMs) leads to a reduction of cross-border mergers and acquisitions (M&A), an important part of FDI.[3] As the authors show, the number of ISMs began to rise in 2011 and again in 2019. National security concerns are also clearly at the center of geopolitical fragmentation. Bencivelli et al. (2023) move in a similar direction while also proposing a way to reconcile ISMs with otherwise liberal investment regimes. Their results suggest that transparency about restrictive regulation may enhance the attractiveness of a potential FDI destination. Busse and Hefeker (2007) show that political risk, including internal and external conflict, is among the most important determinants of FDI. Kempf et al. (2023) analyze political determinants of cross-border capital allocations and find that the ideological alignment of US investors with foreign governments drives up cross-border capital allocation (banks and equity mutual funds in their paper). Ideological alignment, however, differs from geopolitical alignment and refers to the political party affiliations of domestic investors and not to a country's foreign policy preferences. Finally, and contrarily to intuition, Damioli and Gregori (2023) find that higher diplomatic distance between European countries is associated with an increase in M&A in the EU. The authors reckon that higher flows compensate for the weakness of diplomatic relations.

Perhaps most closely related to our approach is Aiyar et al. (2024) on the issue of FDI and the IMF (2023) on portfolio investment. Like our study, their analyses are based on a standard gravity model with measures for geopolitical dealignment such as the IPD and the S-score. Aiyar et al. (2024) note that FDI becomes more responsive to geopolitical developments and that the geopolitical vulnerability of host countries is significantly tilted toward EMDEs. The IMF (2023) reaches a similar conclusion for non-FDI stocks (PI and cross-border banking claims), implying sizable reallocations of bilateral shares of capital flows to more aligned countries. However, the authors use different estimation methods for FDI flows (Poisson pseudo-maximum likelihood – PPML) and non-FDI stocks (ordinary least squares – OLS), which renders any comparison and interpretation of the results somewhat difficult. In addition, Aiyar et al. (2024) analyze greenfield FDI *flows*[4] using fDi Markets data, while the IMF (2023) studies non-FDI *stocks*. To address these issues, we use a single comprehensive dataset for FDI and PI stocks from comparable sources. We use the same empirical methods to analyze both variables and we are therefore able to compare and interpret the results in a more consistent manner.

Summarizing, the literature does not (yet) provide clear guidance as to whether deglobalization or fragmentation are happening or have already happened. Studies on capital flows and cross-border investment suggest potentially sizable and significant effects of geopolitical fragmentation, but a causal interpretation is not possible in most of them.[5] Also, those that focus on pure

[3] ISMs may be introduced for a variety of reasons, the most relevant for our purpose being concerns about national security. In October 2020, for instance, the EU introduced FDI screening in response to concerns about national security but also to protect its industries, e.g. from a transfer of protected technology to potential geopolitical rivals. Reasons for implementing ISMs may also include the protection of key infrastructure sectors such as health, energy or telecommunications from foreign takeovers. Security concerns can play a role here as well but not necessarily. See, for instance, UNCTAD (2023) or Bencivelli et al. (2023) for more details and further literature on ISMs.

[4] As robustness check they also study brownfield FDI *flows* (M&A).

[5] While we do not study the drivers of (de)globalization in this analysis, possible drivers of deglobalization or fragmentation may include an increased desire for supply chain resilience (e.g. reshoring efforts of medical supplies during and after the COVID-19 pandemic), geopolitical tensions between countries or regions (e.g. the US-China trade dispute resulting in friend- or near-shoring) or populist political pressures resulting in more inward-oriented economic policies (e.g. discussions of immigration to the UK before Brexit).

aggregate global capital flows may miss information from a potentially increased concentration of sources and/or destinations of investment. It follows that analyses of bilateral capital flows and cross-border investment become more important, especially in the context of geopolitical fragmentation.

2 The impact of geopolitical fragmentation on international investment

In this section, we address the empirical relationship between geopolitical fragmentation and cross-border investment using a gravity model.

2.1 Data

For geopolitical fragmentation, we use data on voting behavior at the United Nations General Assembly (UNGA) from Bailey et al. (2017). This dataset is widely used in political science but also in recent contributions in international economics (e.g. Aiyar, 2024, or IMF, 2023). Our main variable of interest is the ideal point distance (IPD), a measure for differences in foreign policy preferences between country pairs. It is calculated by first estimating unilateral ideal points for each country, based on its voting behavior, using the USA as the country of reference. Subsequently, the IPD is derived by computing the absolute value of the differences in ideal points between country pairs. The dataset provides an alternative measure, the Lijphart Index of Agreement (see Lijphart, 1963), calculated by simply relying on the voting similarities of each country pair. We transform it linearly to obtain the more prominent S-score as proposed by Signorino and Ritter (1999).[6] Bailey et al. (2017) and Voeten (2021) argue that the IPD offers a few advantages which make it suitable for comparisons across time, particularly as it incorporates UNGA agenda changes. This is why we rely on the IPD as our main variable in our gravity model analysis. However, the IPD and the S-score are highly correlated (0.872) in our sample and the robustness analysis shows that we obtain similar estimates when using the two different measures.

To provide some intuition about the IPD, chart 1 shows the unilateral ideal point estimates for selected countries over time. To illustrate the main dynamics, consider first the case of Iran. While the country was, geopolitically, located between China and Brazil in the 1970s, the situation changed after the Islamic Revolution of 1979. Iran's new foreign policy agenda led to a significant change in the country's voting behavior at the UNGA, increasing its geopolitical distance to almost all other countries. In the case of Iran, we would then expect cross-border investment from countries at the other end of the geopolitical spectrum (the USA or the UK, for instance) to decrease significantly or drop to zero (as it happened). The other case is Russia, which was an outlier until the fall of the Soviet Union in 1991. Since then, it has moved to a more geopolitically central position, which is possibly associated with increasing both in- and outward cross-border investment.[7] Notwithstanding some movements across time periods, China's foreign policy

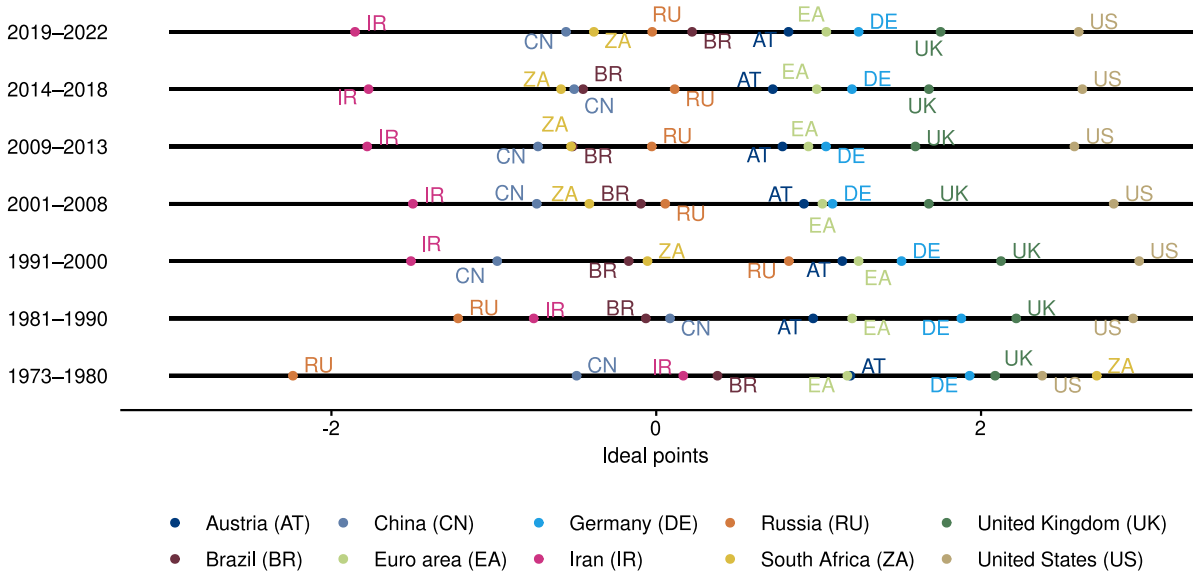
[6] The S-score is an Euclidian measure of distance between every country pair in the UNGA and is calculated as follows: $S_{ab} = 1 - \frac{\sum|Y_{av} - Y_{bv}|}{V}$; v = 1…n (index of votes), ab = any two countries *a* and *b*, Y_{av} = voting behavior of country *a* in vote *v* (yea = 1, abstain = 0, nay = 3), Y_{bv} = voting behavior of country *b* in vote *v* (yea = 1, abstain = 0, nay = 3). The S-score then takes a value between 1 (all countries maximally agree) and –1 (all countries maximally disagree). For more details, see Signorino and Ritter (1999).

[7] A word of caution on the interpretation of ideal points: Correspondence with one of the authors of Bailey et al. (2017) made it clear that e.g. the war in Ukraine does not per se lead to the geopolitical repositioning of a country in the UNGA as long as it does not result in a change of foreign policy preferences. We are also not certain whether and how voting in emergency

preferences have not changed much over time. Following some initial "zig-zagging," the country's foreign policy preferences, as revealed in the UNGA, remained relatively stable since the early 2000s. Finally, the euro area aggregate shows little change in its foreign policy preferences, although its geopolitical distance to the United States has increased moderately over time. Nonetheless, such a moderate change of geopolitical distance seems insufficient for us to expect major swings in cross-border investment activities.

Chart 1

Unilateral ideal points, period averages



Source: Bailey et al. (2017).
Note: Based on UN General Assembly (UNGA) voting behavior, ideal points estimate countries' foreign policy preferences. South Africa was suspended from the UNGA in 1974 due to its apartheid regime and rejoined in 1994 after democratic elections had taken place. Russia was represented by the Soviet Union until 1991.

For our analysis, we take data on FDI stocks from the OECD FDI statistics, the IMF's Coordinated Direct Investment Survey (CDIS) and the FinFlows database (see Nardo et al., 2020, for details).[8] For portfolio investment, we use the IMF's Coordinated Portfolio Investment Survey (CPIS) as the main source and the FinFlows database to supplement missing values. Further, we obtain the standard gravity variables (i.e. distance, contiguity, common colonial history and common language) from the Centre d'Études Prospectives et d'Informations Internationales (CEPII; see Conte et al., 2022, for a description of the dataset). Finally, the bilateral investment treaties in force were taken from Alschner et al. (2021). Table 1 shows the summary statistics for the maximum available sample. On average, the stock of portfolio investment is higher than the stock

sessions enters the database of Bailey et al. (2017). However, there have been only 11 emergency sessions since 1956, and we assume that voting behavior in an emergency session does not deviate too far from that in a regular session.

[8] We use OECD FDI data wherever available. If data for specific years are missing, we fill in the gaps by interpolating using growth rates from the CDIS database. Additionally, we rely on CDIS and FinFlows when adding information for country pairs for which OECD data are fully missing. Our complete dataset is composed of observations from the following sources: CDIS (23,246), FinFlows (25,326), OECD (71,364); gaps in OECD data are interpolated by using the growth rate derived from CDIS (3,614).

of FDI. This shows the importance of stock and bond markets across the globe. The mean statistics also suggest that more countries seem to share a common language (comlang) rather than a common border (contig) or a common colonial past (comcol). Overall, the analysis covers 79 source countries, 189 destination countries, and the sample period range is from 2001 to 2022.

Table 2 shows the bi-variate correlations in the analysis, which have the expected signs – e.g. FDI is positively correlated with PI; both investment variables are negatively related to geopolitical and geographical distance (ln(dist)). Finally, sharing a border or a language or ratifying a bilateral investment treaty (BIT) are associated with higher investments.

Table 1

Summary statistics

Variable	Mean	Standard deviation	Standard deviation (between)	Standard deviation (within)	Number of observations	Minimum value	Maximum value
FDI	3,441.7	25,524.38	16,742.36	10,645.67	123,550	0	1,406,424.1
Portfolio investment	5,680	45,831.53	29,738.52	19,908.47	123,550	0	2,221,054.2
IPD(t-1), standardized	1.34	1	0.96	0.24	123,550	0	6.1
Ln(dist)	8.51	0.93	0.86	0	123,550	4	9.9
Contig	0.03	0.17	0.15	0	123,550	0	1
Comcol	0.03	0.17	0.19	0	123,550	0	1
Comlang	0.11	0.32	0.32	0	123,550	0	1
BIT	0.33	0.47	0.42	0.14	123,550	0	1

Source: Authors' calculations.
Note: IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.

Table 2

Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) FDI	1							
(2) Portfolio investment	0.690	1						
(3) IPD(t-1), standardized	-0.019	-0.010	1					
(4) Ln(dist)	-0.120	-0.086	0.322	1				
(5) Contig	0.117	0.124	-0.139	-0.389	1			
(6) Comcol	-0.014	-0.019	-0.082	-0.065	0.038	1		
(7) Comlang	0.064	0.064	0.049	-0.017	0.112	0.156	1	
(8) BIT	0.028	0.016	-0.120	-0.401	0.102	-0.031	-0.062	1

Source: Authors' calculations.
Note: IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.

2.2 Gravity model specifications

To test the importance of geopolitical fragmentation, as measured by the IPD from Bailey et al. (2017), we use the workhorse model of international trade applied to cross-border investment.

The gravity model of trade is the standard tool for assessing the relevance of barriers for cross-border economic exchange (see Guiso et al., 2009, and Bergstrand et al., 2014, for an empirical application, or Kox and Rojas-Romagosa, 2020, for a theoretically founded empirical application to FDI[9]). We base our empirical model on Anderson and Van Wincoop (2003)[10], who provided the first theoretical foundation to the widely known gravity model put forward by Tinbergen (1962).

The equation for estimation is the following,

$$x_{i,j,t} = \alpha_1 * ipd_{i,j,t-1} + \alpha_2 * \ln(dist_{i,j}) + \alpha_3 * contig_{i,j} + \alpha_4 * comcol_{i,j} + a_5 * comlang_{i,j} + \alpha_6 * bit_{i,j,t} + \beta_{i,t} + \gamma_{j,t} + \upsilon_{i,j,t}, (1)$$

where $x_{i,j,t}$ are stocks of FDI (*FDI*) or portfolio investment, as indicated respectively in the regression tables between country *i* and country *j* in year t.[11] ipd is the (standardized) geopolitical distance (lagged one year to allow investment to react and to reduce endogeneity concerns); $contig, comcol$ and $comlang$ are dummy variables that indicate whether countries share a common border, a common colonial past or a common language (respectively). bit is another dummy variable, which is time variant and takes the value of one when both countries have a bilateral investment treaty (or zero otherwise) which entered into force in year t. $\ln(dist)$ shows the natural logarithm of the distance between the capital cities of country *i* and *j*. $\beta_{i,t}$ and $\gamma_{j,t}$ are source/destination country-year fixed effects to account for multilateral resistance.[12] In addition, these dummies allow us to partial out business cycle movements and anything that is country specific and time variant, like the institutional framework of the source or destination country. Finally, $\upsilon_{i,j,t}$ is the error term, of which we assume that it is well behaved. We will use the PPML estimator for equation (1), as proposed by Silva and Tenreyro (2006). The PPML estimator allows for the inclusion of zeros in the dependent variable and reduces the heteroskedasticity concerns that might arise due to the alternative logarithmic transformation of the exponential form of the theoretical gravity model.

We expect to find a negative estimate for IPD, since increasing geopolitical differences could, for instance, deter trust in the fair treatment of foreign investors or source countries could decide that it is not in their interest to invest in the destination country despite a potentially positive commercial outcome. Geographical distance should have a negative sign, since the monitoring costs of investments increase with geographical distance and the latter also captures cultural

[9] Kox and Rojas-Romagosa (2020) developed a microfounded partial equilibrium model analyzing bilateral FDI within the gravity framework, providing a testable equation similar to that of Anderson and van Wincoop (2003). The model from Kox and Rojas-Romagosa (2020) was based on recent work by Anderson et al. (2019, 2020). Anderson et al. (2019) investigated the links between trade and investment and their corollaries to welfare mostly from a theoretical perspective; while Anderson et al. (2020) delved into the relationship between trade and investment but with a focus on economic growth.

[10] See Bergstrand and Egger (2007) for one of the first theoretical foundations for the gravity model of trade applied to FDI (providing a testable equation similar to the one introduced by Anderson and van Wincoop (2003)).

[11] We focus on stocks rather than on flows because flows are more volatile and can also take negative values, which the PPML estimator cannot handle.

[12] Multilateral resistance terms allow to control for third-country effects. This is important when assessing barriers in economic exchange between countries; e.g. when assessing the importance of the distance between Australia and New Zealand, one needs to consider who the alternative trade partners of these countries are and account for this.

differences which could affect business relationships (Giuliano et al., 2014). The negative relationship between geographical distance and cross-border investment is expected to be weaker than in the case of international trade (which proxies for trade costs in that case), since in the case of a multinational company, a higher geographical distance might be an incentive to serve that market via FDI rather than by exporting. This would make the coefficient less negative than in the case of international trade (this last argument would not apply for portfolio investment). Contiguity, sharing a common colonial past and sharing a common language are expected to have a positive sign since they are proxies for "closeness" – in terms of geography or "culture" (this could also extend to a common legal system and to smaller communication costs). Finally, signing, ratifying and having a free trade agreement in force are expected to increase investment since the aim of such agreements is to create optimal conditions between investor countries – from the promotion to the protection of investments (Egger and Merlo, 2012).

2.3 Baseline results

Table 3 shows the results of estimating equation (1) with the PPML estimator. For both investment vehicles, we first estimate a model that only includes IPD and then a second one where we add the different covariates of the gravity model and assess whether the importance of IPD persists while we add variables that could be correlated with it, like geographical distance. We then estimate a PPML regression with bilateral fixed effects which controls for all the country-pair time-invariant heterogeneity. In columns (1) to (3) (which show the determinants of FDI), our variable of interest, IPD, shows the expected sign and is statistically significant at the 1% level in columns (1) and (2). As expected, the estimated coefficient for IPD in column (2) is smaller than in column (1) since we control for a wide array of bilateral variables that could be correlated with IPD. An increase of one standard deviation (all else being equal) is associated with a 34.6% decrease in FDI (column (2)). Column (3) does not indicate a statistically significant relationship between FDI and IPD when controlling for bilateral fixed effects. This could be because most of the variation of the IPD variable is cross-sectional rather than "within" (see table 1).

Regarding the control variables, geographical distance has a negative sign, indicating that if countries are further apart, less foreign direct investment between them is expected. A 1% increase in bilateral distance – holding all else constant – is associated with a decrease in bilateral FDI of approximately 0.5%, on average (model (2)). Contiguity and common language have the expected sign, but are not statistically significant. This could be because, when partialing out all country- and time-specific variables, sharing a colonial past is correlated in the sample with having a common language and potentially being a neighboring country. Unexpectedly, having a bilateral investment treaty in force has no significant relationship with bilateral investment positions. This might be because certain countries might be more prone to sign treaties because of time-invariant factors that we do not control for.[13]

Columns (4) to (6) show the results for portfolio investment. The main difference with FDI is that the size of the coefficient of IPD is smaller and that the coefficient in column (6) is statistically significant. We believe that these differences might be explained by the fact that PI relies less on political factors and portfolio investors mostly care about returns (this is why the size of the IPD

[13] In column (3), when we control for time-invariant country pair heterogeneity, we do find that the coefficient is statistically significant (and has the expected sign). We refrain from using this as our main model since IPD, our variable of interest, mostly shows cross-sectional variation (see table 1).

coefficient is smaller for PI than for FDI). Also, PI is much more volatile and therefore reacts more strongly to changes in the political differences between country pairs (in contrast, FDI is a long-term investment, with high exit costs). The time variation between country pairs with respect to the entry into force of bilateral investment treaties does not seem to matter for portfolio investment since these agreements usually focus on matters that are more important for long-term investors (e.g. equal treatment of domestic and foreign companies in public procurement; dispute settlement rules; compensations in case of expropriations; economic incentives for investments like tax rebates).

Overall, our results suggest a negative relationship between geopolitical distance and cross-border investment. When we focus on a particular variation in the data using country-pair fixed effects, the estimated coefficients are smaller in size and sometimes insignificant. We refrain from using this as our main model since IPD, our variable of interest, mostly has cross-sectional variation (see table 1). Therefore, in the following heterogeneity analysis, we proceed by focusing on estimates using source-/destination country-time fixed effects.

Table 3

Baseline results

	FDI			Portfolio investment		
	(1)	(2)	(3)	(4)	(5)	(6)
IPD(t-1)	-0.546***	-0.346***	-0.022	-0.288***	-0.146***	-0.105***
	(0.049)	(0.046)	(0.037)	(0.078)	(0.053)	(0.023)
Ln(dist)		-0.486***			-0.305***	
		(0.05)			(0.047)	
Contig		0.139			0.37***	
		(0.14)			(0.12)	
Comcol		0.924***			1.56***	
		(0.304)			(0.466)	
Comlang		0.156			0.358***	
		(0.118)			(0.111)	
BIT		-0.047	0.257**		0.554***	-0.061
		(0.11)	(0.105)		(0.114)	(0.063)
Constant	11.459***	14.975***	11.075***	12.071***	13.985***	12.085***
	(0.069)	(0.401)	(0.06)	(0.11)	(0.391)	(0.038)
Number of observations	123,541	123,541	122,943	123,541	123,541	122,943
Pseudo R-squared	0.868	0.896	0.983	0.927	0.955	0.994
Source country-year FE	Y	Y	Y	Y	Y	Y
Destination country-year FE	Y	Y	Y	Y	Y	Y
Source-destination country FE	N	N	Y	N	N	Y

Source: Authors' calculations.
*Note: Standard errors clustered at the country-pair level are given in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1; Y = yes, N = no; FE = fixed effects; IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.*

2.4 Heterogeneity analysis

We now proceed to analyzing the importance of political distance with respect to time, source and destination country income groups, and the political relationships between countries. For the time dimension, we divided the sample period into several "globalization phases"[14] and for the country income groups, we used the IMF definition of advanced economies (AEs) and emerging market and developing economies (EMDEs) from 2021 (IMF, 2021). Finally, following Bosone et al. (2024), we divide the country pairs into four groups: "friends," "close," "distant" and "rivals," creating a dummy for each group by indicating whether it belongs to the respective quartile of the distribution of IPD across the sample. To implement the heterogeneity analysis, we will interact IPD with source economy type, destination economy type and each type of relationship (based on the quartile-distribution of IPD) to observe the distinct correlations for each group.

Chart 2 panel (a) (and table A1 in the annex) shows that the negative relation between differences in geopolitical views and FDI intensified with time. While in the period from 2001 to 2008, a one standard deviation increase in IPD was related to a 24% decrease in FDI, between 2019 and 2022, this relationship amounted to a 38% decrease. Additionally, as demonstrated in table A2 column (1) in the annex, the difference in the estimates between both periods is significant. Chart 2 panel (b) shows that if the source economy is an EMDE, there is an extra "penalty" for FDI in case of geopolitical differences. The same holds true when the destination country is an EMDE country. To explain this, we hypothesize that EMDEs could have weaker institutions and political alignment could be a way to diminish this risk. Moreover, in chart 2 panel (c) we see that the IPD does not play a significant role in FDI allocation between "friends," while the coefficient is significant and very similar for the other groups. This indicates that, unlike in the case of the other "nonfriendly" groups ("close," "distant," "rivals"), an increase in geopolitical distance within "friends" does not immediately result in a decrease in FDI.[15]

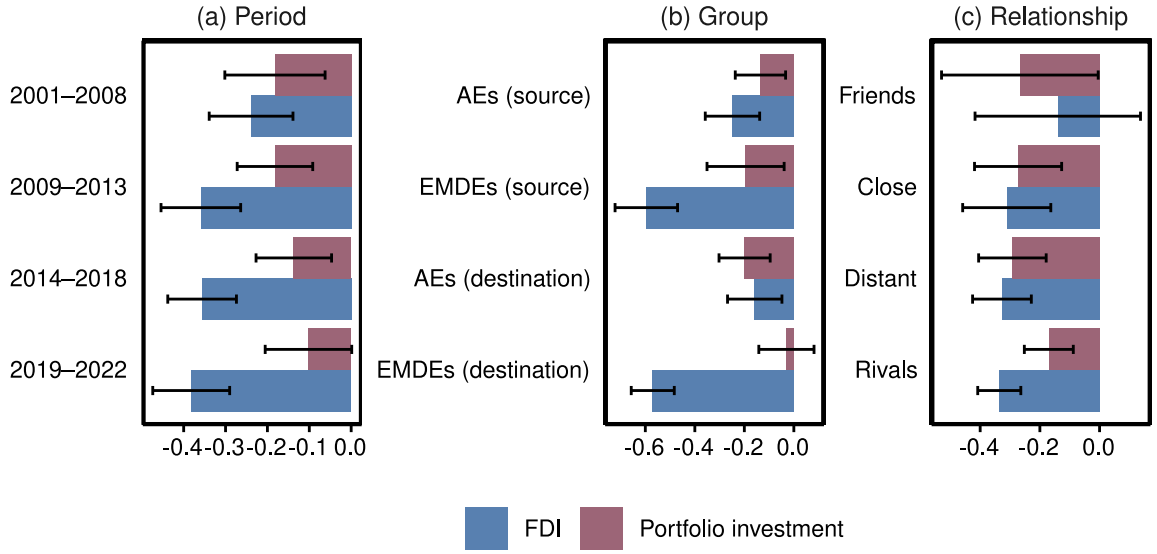
Chart 2 panel (a) suggests that the importance of geopolitical distance for portfolio investment decreases over time. However, as shown in table A2 column (2) in the annex, the differences to the baseline period (2001–2008) in estimates for periods after the financial crisis are not significant. Here, PI – on average – reacts less strongly to political differences if destination countries are EMDEs (and it is not statistically significantly different from zero). With respect to the source country, there seem to be no differences between AEs and EMDEs. This could be explained by the fact that source countries' investors mostly care about returns. Finally, chart 2 panel (c) shows that for portfolio investment, the IPD coefficient is only barely significant at the 10% level for "friendly" country pairs. Interestingly, although the IPD remains significant between "rivals," its importance appears to diminish when compared to "close" and "distant" countries. One could argue that once countries have become rivals, a further increase in geopolitical distance only leads to a comparatively smaller decrease in their bilateral portfolio allocation.

[14] 2001–2008, the "goldilocks" phase: rapid increase of capital flows until the financial crisis; 2009–2013, the "hangover" phase: decline of capital flows; 2014–2018, the "return of imperialism" phase: Russia's annexation of Crimea, Brexit, emerging US-China trade disputes; 2019–2022, the "multiple crises" phase: the COVID-19 pandemic, the return of inflation, war in Europe and indications of geopolitical fragmentation.

[15] Interestingly, when including country-pair fixed effects in this specification, the coefficient of IPD interacted with "rivals" is significantly smaller (and negative) compared to the interaction with "friends" (as a baseline), indicating that whenever the political ties between two countries considerably deteriorate, bilateral FDI allocation goes down significantly.

Chart 2

FDI, portfolio investment and geopolitical distance



Source: Authors' calculation.
Note: This chart shows the coefficients from the gravity model analysis for the ideal point distance with various interactions. In addition, 90% confidence bands are shown. AEs = advanced economies; EMDEs = emerging market and developing economies.

2.5 Robustness analysis

To assess the robustness of our results, we first use an alternative variable as a measure for political distance: the S-score by Signorino and Ritter (1999). To have comparable results, we use the standardized value as well. Table A3 in the annex shows the results for FDI and PI in columns (2) and (7), respectively. The estimates are quantitatively similar to the results in the baseline estimations, see columns (1) and (6). Since the USA is among the largest recipients and sources of FDI and PI, we remove the USA as an investment source and destination country in columns (3) and (8). We find that the coefficient of IPD is smaller for FDI when we exclude the United States, while we find no difference in the coefficient for the analogous analysis but for portfolio investment. Since the USA has a significant stock of FDI abroad and is also among the largest FDI recipients and a quick withdrawal of these investments would be difficult, taking out the largest "player" from our estimations might impact the results. Interestingly, when China is excluded, neither coefficient is affected. The reason could be that China's (relative) importance is smaller. Furthermore, a comparatively large share of investments from China is made via offshore centers with no UNGA mandate and is therefore not included in the sample.

Finally, columns (5) and (10) show the results restricting the time dimension to remove the period starting in 2020, when the COVID-19 pandemic started. Given the distress observed since the pandemic, we wanted to see whether results remained the same when we excluded this period – and that is what the results show.

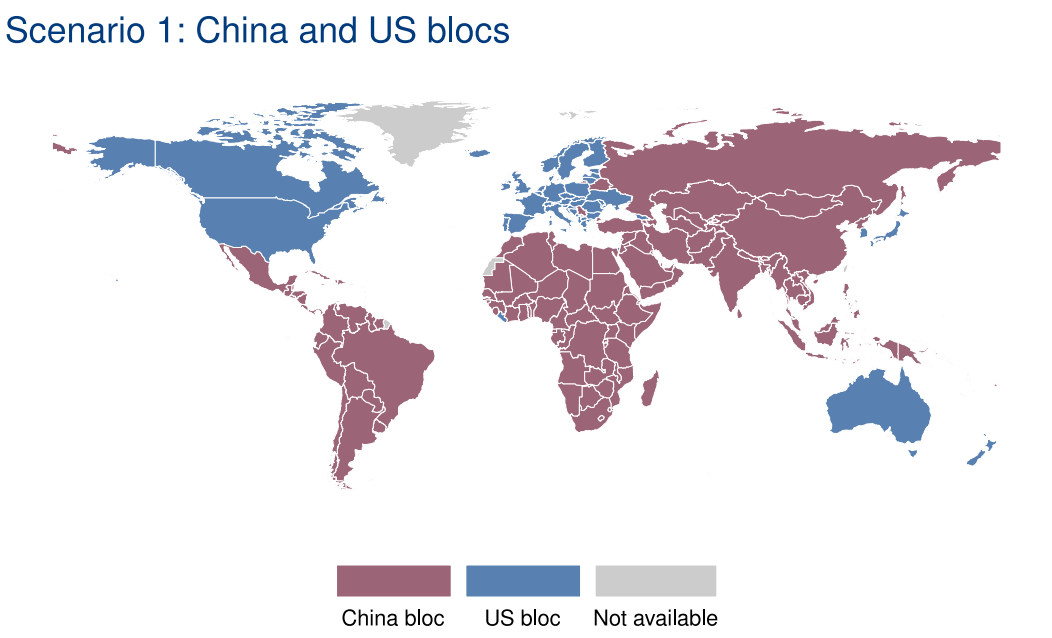
Summarizing, our analysis shows that political alignment matters more for FDI positions than for portfolio positions. Nevertheless, when we investigate the average effect on country pairs across

time, we find that the changes in IPD do not matter for long-term investments, while they matter for shorter-term investments.

3 Bloc-building scenarios

Based on the results obtained from our gravity model analysis, we present two hypothetical and simple scenarios on bloc-building that illustrate the potential impact of increased geopolitical fragmentation on global cross-border investment stocks. In scenario 1, shown in chart 3, countries are categorized by their geopolitical distance to either China or the USA and assigned to blocs accordingly[16]. A country is assigned to the US-led bloc if its geopolitical distance is shorter to the USA than to China, and vice versa. Almost all countries in Asia, Africa, Latin America and the Caribbean are assigned to the China bloc. North America, large parts of Europe, Japan, South Korea, Australia and New Zealand are assigned to the US bloc. This is certainly a rather extreme scenario, so we relaxed it in scenario 2 by allowing for a nonaligned bloc, as shown in chart 4. It comprises all countries which are neither in the quartile closest to the USA nor in that closest to China. Unlike in scenario 1, most of Asia and Latin America as well as large parts of Africa are now nonaligned.

Chart 3

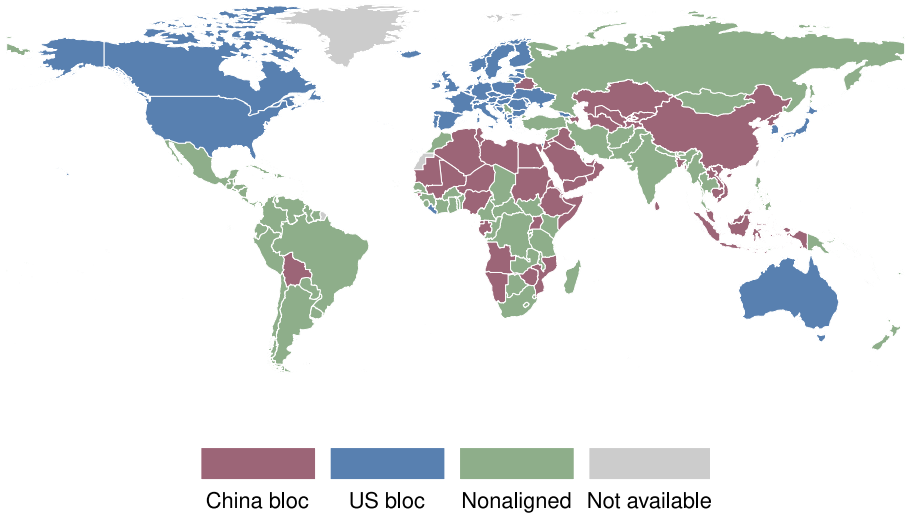


Source: Bailey et al. (2017).
Note: Blocs are established based on ideal point distances to the USA and China in 2022. Countries that are geopolitically closer to the USA are assigned to the US bloc; countries that are geopolitically closer to China are assigned to the China bloc. 2021 data are used for Türkiye and Venezuela as 2022 data are not available.

[16] See Owen (2021) for a discussion of the emergence of two US- and China-led political blocs.

Chart 4

Scenario 2: China, US and nonaligned blocs



Source: Bailey et al. (2017).
Note: Blocs are established based on ideal point distances to the USA and China in 2022. Countries that are neither in the closest quartile of the USA nor in that of China are assignd to the nonaligned bloc. The remaining countries are either in the US or the China bloc, depending on which ideal point distance is smaller. 2021 data are used for Türkiye and Venezuela as 2022 data are not available.

To assess the impact of these two bloc-building scenarios on global investment positions, we use the coefficients from column (2) in table 3 for FDI (–0.346) and from column (5) in table 3 for portfolio investment (–0.146). We use cross-border investment data for 2022. First, we assume the geopolitical distance between all countries in one bloc to all countries in the other bloc to increase by one standard deviation, which approximately equals the increase of foreign policy divergence between the USA and Chile after the election of Salvador Allende and related changes in Chile's foreign policy. Note again that a one standard deviation increase in geopolitical distance is associated with a bilateral decline of FDI and PI of 34.6% and 14.6%, respectively. Based on data on cross-border investment positions in 2022, we then reduce all bilateral stocks of investment (both FDI and PI) between the countries of the two blocs by these magnitudes, initially for the first scenario described above. All existing investment relations within a bloc (e.g. between the USA and Germany or between China and Malaysia) remain intact. The decline of bilateral cross-border investment between countries of the two blocs corresponds to a 5.4% decline in global FDI positions and a 1.2% decline in global PI in scenario 1, ceteris paribus, as shown in table 4.[17]

When we introduce a nonaligned bloc in the second scenario and perform the same analysis as for scenario 1, the global effects of a reduction in investment are significantly smaller and amount to a 1.7% decline in global FDI and a 0.4% decline in global PI (all else held constant). This is due

[17] These numbers are essentially derived from the calculated reduction in the stock of FDI (PI), using the estimated coefficients for bilateral investment positions between countries from different blocks divided by the total stock of FDI (PI) in the same year (holding all else constant).

to the fact that the nonaligned bloc does not change its investment relations with either the US- or the China-led bloc. As before, there is no change of bilateral investment positions between countries of the same bloc. In other words, a smaller number of countries engage in geopolitical divestment (we still have two blocs but with fewer countries overall), which has a smaller effect on global cross-border investment.

Table 4

Bloc-building scenarios: results

	Scenario 1: US and China blocs		Scenario 2: China, US and nonaligned blocs	
	One standard deviation	3.2 standard deviations	One standard deviation	3.2 standard deviations
	(1)	(2)	(3)	(4)
	%			
FDI	-5.4	-15.6	-1.7	-4.9
Portfolio investment	-1.2	-3.8	-0.4	-1.3

Source: Authors' calculations.
Note: Results are based on the coefficients from the gravity analysis.

Another, rather extreme, assumption would be to increase geopolitical dealignment between all countries of the US bloc and all countries of the China bloc by 3.2 standard deviations (for the two different scenarios), which equals the change in foreign policy alignment between the USA and Iran after the Islamic Revolution took place in Iran in 1979. This would then imply a complete reduction of FDI positions between the blocs (3.2 x 34.6%), which corresponds to a 15.6% decline in global FDI in scenario 1 and a 4.9% decline in scenario 2 with a nonaligned bloc.[18] The effects on portfolio investment under this extreme assumption are equivalent to a 3.8% decline in global PI in scenario 1 and a 1.3% decline in scenario 2.

The overall implications for global cross-border investment stocks are economically significant in all scenarios, but their strength depends on the degree of bloc-building and geopolitical fragmentation. However, the reader should take these results with caution since they rely on a particular "blocalization" of the world (while holding all else constant) and on specific assumptions on how investments adjust to the related political (de)alignment movements.

4 Concluding remarks

In the context of increasing geopolitical tensions and a growing debate on "deglobalization," we investigate whether increasing geopolitical fragmentation leads to a reduction of bilateral stocks of cross-border investment. To answer this question, we use a largely homogeneous dataset for a large sample of countries, employing a standard gravity model applied to cross-border capital allocation (FDI and portfolio investment) and estimated with a Poisson pseudo-maximum likelihood (PPML) regression.

[18] Since 3.2 x 34.6% is larger than 100% and we wanted to avoid negative positions in our analysis, we capped the value at 100%.

The results indicate that geopolitical fragmentation, as measured by the ideal point distance (IPD), exhibits a negative and statistically significant relationship with FDI. On average, an increase of one standard deviation is associated with a 34.6% decrease in the stock of FDI. This study also explores the corollaries on portfolio investment, revealing that the coefficient of IPD is smaller for portfolio investment than for FDI but remains statistically significant, with an increase of one standard deviation being associated with a 14.6% decrease in the stock of portfolio investment. Furthermore, we observe that the impact of geopolitical dealignment on FDI has increased over time and is larger for EMDEs – both as source and destination countries – than for other countries. Among "friendly" country pairs, the role of IPD for FDI and portfolio investment is less significant than for country pairs that are politically more distant, indicating that countries with more aligned foreign policy preferences do not immediately reduce bilateral investment when their foreign policies diverge.

Based on the obtained coefficients from the baseline specification, we conduct simple bloc-building scenarios. Assuming the world is divided into a US and a China bloc, an increase of geopolitical distance between these two blocs that is equal to the increase of IPD between the USA and Iran after the Islamic Revolution of 1979 would lead to a 15.6% reduction in global FDI and a 3.8% decrease in global portfolio investment, ceteris paribus.

Overall, our results show that political fragmentation is affecting investment with different strength with respect to the investment type in question. This is important for policymakers since FDI has the potential to be a source of technology transfer (e.g. technologies or operational practices), to support exchange rate stability (in case of incoming investments) and economic growth (especially in case of greenfield FDI), to increase international trade (given the interlinkages between cross-border investment and trade) and to improve competition (as competition increases with the number of foreign firms involved and this can improve innovation and reduce prices). Similarly, portfolio investments allow for risk diversification, improve liquidity and provide funding for projects with positive effects for the domestic economy, such as higher employment. Therefore, it is important for countries to reflect on these matters when they consider engaging in actions resulting in geopolitical fragmentation.

Future avenues of research include assessing the importance of other barriers to capital flows, such as capital controls or investment screening, and trying to identify the role of tax havens to get a better picture of the role of ultimate investors in capital allocation.

References

Aiyar, S., A. Ilyina et al. 2023. Geoeconomic fragmentation and the future of multilateralism. Staff Discussion Note SDN/2023/001. International Monetary Fund.

Aiyar, S., D. Malacrino and A. F. Presbitero. 2024. Investing in friends: The role of geopolitical alignment in FDI flows. European Journal of Political Economy 83. June 24. 102508.

Alschner, W., M. Elsig and R. Polanco. 2021. Introducing the electronic database of investment treaties: The genesis of a new database and its use. World trade review 20(1). 73–94.

Anderson, J. E. and E. Van Wincoop. 2003. Gravity with gravitas: A solution to the border puzzle. American Economic Review 93(1). 170–192.

Anderson, J. E., M. Larch and Y. V. Yotov. 2019. Trade and investment in the global economy: A multi-country dynamic analysis. European Economic Review 120. 103311.

Anderson, J. E., M. Larch and Y. V. Yotov. 2020. Transitional Growth and Trade with Frictions: A Structural Estimation Framework. The Economic Journal, 130 (630). 1583–1607.

Antras, P. 2020. De-Globalisation? Global value chains in the post-Covid age. NBER Working Paper 28115. National Bureau of Economic Research.

Bailey, M.A., A. Strezhnev and E. Voeten. 2017. Estimating dyadic state preferences from UN voting data, Journal of Conflict Resolution 61(2). 430-456.

Bencivelli, L., V. Faubert, F. L. Gallo and P. Négrin. 2023. Who's afraid of foreign investment screening? Working Paper. Banque de France.

Berden, K., J. H. Bergstrand and E. Van Etten. 2014. Governance and globalisation. The World Economy 37(3). 353–386.

Bergstrand, J. H. and P. Egger. 2007. A knowledge-and-physical-capital model of international trade flows, foreign direct investment, and multinational enterprises. Journal of International Economics 73(2). 278–308.

Bordo, M. and H. James. 2019. The trade-offs between macroeconomics, political economy and international relations, Financial History Review 26(3). 247–266.

Bosone, C., E. Dautovic and M. Fidora. 2024. How geopolitics is changing trade. ECB Economic Bulletin Issue 2/2024.

Busse, M. and C. Hefeker. 2007. Political risk, institutions and foreign direct investment. European journal of political economy 23(2). 397–415.

Conte, M., P. Cotterlaz and T. Mayer. 2023. The CEPII gravity database. CEPII documentation. CEPII - Gravity

Dadush, U. 2022. Deglobalisation and protectionism. Bruegel Working Paper 18/2022. Bruegel.

Damioli, G. and W. D. Gregori. 2023. Diplomatic relations and cross-border investments in the European Union. European Journal of Political Economy 76. 102261.

Della Posta, P. 2021. An analysis of the current backlash of economic globalization in a model with heterogeneous agents. Metroeconomica, 72(1). 101–120.

Di Sano, M., V. Gunnella and L. Lebastard. 2023. Deglobalisation: risk or reality? ECB Blog. Deglobalisation: risk or reality? (europa.eu)

ECB 2021. The implications of globalization for the ECB monetary policy strategy. ECB Occasional Paper 263. European Central Bank.

Egger, P. and V. Merlo. 2012. Bits bite: An anatomy of the impact of bilateral investment treaties on multinational firms. The Scandinavian Journal of Economics 114(4). 1240–1266.

Eichenauer, V. and F. Wang. 2024. Mild deglobalization: Foreign investment screening and cross-border investment. Kiel Working Paper 2265.

Goes, C. and E. Bekkers. 2022. The impact of geopolitical conflicts on trade, growth and innovation. WTO Working Paper ERSD-2022-09. World Trade Organization.

Goldberg, P. K. and T. Reed. 2023. Is the global economy deglobalizing? And if so, why? And what is next? NBER Working Paper 31115. National Bureau of Economic Research.

Giuliano, P., A. Spilimbergo and G. Tonon. 2014. Genetic distance, transportation costs, and trade. Journal of Economic Geography 14(1). 179–198.

Gupta, S. and N. Kumar. 2021. Dynamics of globalization effect in India, Managerial and Decision Economics, 42(6). 1394–1406.

IMF 2023. Geopolitics and financial fragmentation: Implications for macro-financial policy. In: IMF Global Financial Stability Report (chapter 3). International Monetary Fund.

Kaaresvirta, J., E. Kerola and R. Nuutilainen. 2023. Do international investment and trade flows show any signs of fragmentation? BOFIT Policy Brief 2023-12. Bank of Finland.

Kempf, E., M. Luo, L. Schäfer and M. Tsoutsoura. 2023. Political ideology and international capital allocation. Journal of Financial Economics 148(2). 150–173.

Kobrin, S. J. 2017. Bricks and mortar in a borderless world: Globalization, the backlash, and the multinational enterprise. Global Strategy Journal 7(2). 159–171.

Kox, H. L. and H. Rojas-Romagosa. 2020. How trade and investment agreements affect bilateral foreign direct investment: Results from a structural gravity model. The World Economy 43(12).

Lijphart, A. 1963. The analysis of bloc voting in the General Assembly: A critique and a proposal. American Political Science Review 57(4). 902–917.

Nardo, M., N. Ndacyayisenga, A. Pagano and S. Zeugner. 2020. FinFlows: a database for bilateral financial investment stocks and flows. European Commission. Joint Research Centre Data Catalogue - FINFLOWS: A database for bilateral financial inves… - European Commission (europa.eu)

O'Rourke, K. H. 2019. Economic history and contemporary challenges to globalization. The Journal of Economic History 79(2). 356–382.

Owen, J. M. 2021. Two emerging international orders? China and the United States. International Affairs 97(5). 1415–1431.

Ripsman, N. M. 2021. Globalization, deglobalization and Great Power politics. International Affairs, 97(5). 1317–1333.

Santos Silva, J. M. C. and S. Tenreyro. 2006. The log of gravity. The Review of Economics and Statistics 88(4). 641–658.

Signorino, C. S. and J. M. Ritter. 1999. Tau-b or not tau-b: Measuring the similarity of foreign policy positions. International Studies Quarterly 43 (1). 115–144.

Voeten, E., A. Strezhnev and M. Bailey. 2009. United Nations General Assembly Voting Data. Harvard Dataverse. United Nations General Assembly Voting Data - Erik Voeten Dataverse (harvard.edu)

Williamson, P. 2021. De-Globalisation and decoupling: Post-COVID-19 myths versus realities. Management and Organization Review 17(1). 29–34.

Witt, M. A. 2019. China's challenge: Geopolitics, de-globalization, and the future of Chinese business. Management and Organization Review 15(4). 687–704.

Witt, M. A., A. Y. Lewin, P. P. Li and A. Gaur. 2023. Decoupling in international business: Evidence, drivers, impact, and implications for IB research. Journal of World Business 58(1). 101399.

Annex

Table A1

Heterogeneity analysis

	FDI					Portfolio investment				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
IPD(t-1)	-0.346***					-0.146***				
	(0.046)					(0.053)				
Ln(dist)	-0.486***	-0.486***	-0.492***	-0.516***	-0.485***	-0.305***	-0.304***	-0.306***	-0.3***	-0.298***
	(0.05)	(0.05)	(0.051)	(0.048)	(0.049)	(0.047)	(0.047)	(0.047)	(0.046)	(0.047)
Contig	0.139	0.136	0.122	0.115	0.142	0.37***	0.371***	0.368***	0.376***	0.392***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.138)	(0.12)	(0.121)	(0.12)	(0.12)	(0.12)
Comcol	0.924***	0.919***	0.895***	0.967***	0.917***	1.56***	1.584***	1.557***	1.678***	1.515***
	(0.304)	(0.302)	(0.298)	(0.293)	(0.305)	(0.466)	(0.467)	(0.451)	(0.451)	(0.46)
Comlang	0.156	0.162	0.193	0.21*	0.154	0.358***	0.357***	0.362***	0.342***	0.327***
	(0.118)	(0.118)	(0.119)	(0.113)	(0.116)	(0.111)	(0.111)	(0.111)	(0.109)	(0.11)
BIT	-0.047	-0.051	-0.038	-0.013	-0.044	0.554***	0.56***	0.553***	0.543***	0.51***
	(0.11)	(0.11)	(0.11)	(0.104)	(0.108)	(0.114)	(0.116)	(0.114)	(0.116)	(0.107)
2001-08#IPD(t-1)		-0.239***					-0.182**			
		(0.061)					(0.073)			
2009-13#IPD(t-1)		-0.359***					-0.182***			
		(0.058)					(0.055)			
2014-18#IPD(t-1)		-0.356***					-0.137**			
		(0.05)					(0.055)			
2019-22#IPD(t-1)		-0.382***					-0.102			
		(0.056)					(0.063)			
AEs(o.)#IPD(t-1)			-0.248***					-0.135**		
			(0.067)					(0.062)		
EMDEs(o.)#IPD(t-1)			-0.596***					-0.195**		
			(0.077)					(0.095)		
AEs(d.)#IPD(t-1)				-0.158**					-0.199***	
				(0.067)					(0.063)	
EMDEs(d.)#IPD(t-1)				-0.57***					-0.03	
				(0.053)					(0.068)	
Friends#IPD(t-1)					-0.14					-0.267*
					(0.169)					(0.16)
Close#IPD(t-1)					-0.311***					-0.273***
					(0.09)					(0.089)
Distant#IPD(t-1)					-0.327***					-0.292***
					(0.06)					(0.069)
Rivals#IPD(t-1)					-0.336***					-0.17***
					(0.044)					(0.05)
Constant	14.975***	14.959***	14.918***	15.09***	14.94***	13.985***	13.97***	13.985***	13.989***	14.054***
	(0.401)	(0.402)	(0.407)	(0.391)	(0.405)	(0.391)	(0.395)	(0.39)	(0.393)	(0.394)
Number of observations	123,541	123,541	123,541	122,334	123,541	123,541	123,541	123,541	122,334	123,541
Pseudo R-squared	0.896	0.896	0.896	0.898	0.896	0.955	0.955	0.955	0.955	0.955
Source country-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Destination country-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Source: Authors' calculations.

*Note: Standard errors clustered at the country-pair level are given in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1; Y = yes, N = no; FE = fixed effects; IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.*

In chart 2 panel (a) we observe that the confidence intervals are very close to one another, so we provide an alternative specification to assess the difference between them. Here, the baseline period is from 2001 to 2008, and we observe that the three follow-up periods are different to the baseline (table A2).

Table A2

Heterogeneity analysis, period differences

	FDI	Portfolio investment
	(1)	(2)
IPD(t-1)	-0.239***	-0.182**
	(0.061)	(0.073)
Ln(dist)	-0.486***	-0.304***
	(0.05)	(0.047)
Contig	0.136	0.371***
	(0.14)	(0.121)
Comcol	0.919***	1.584***
	(0.302)	(0.467)
Comlang	0.162	0.357***
	(0.118)	(0.111)
BIT	-0.051	0.56***
	(0.11)	(0.116)
2009-13#IPD(t-1)	-0.12*	-0.001
	(0.064)	(0.043)
2014-18#IPD(t-1)	-0.117**	0.045
	(0.058)	(0.045)
2019-22#IPD(t-1)	-0.143**	0.08
	(0.068)	(0.072)
Constant	14.959***	13.97***
	(0.402)	(0.395)
Number of observations	123,541	123,541
Pseudo R-squared	0.896	0.955
Source country-year FE	Y	Y
Destination country-year FE	Y	Y

Source: Authors' calculations.
*Note: Standard errors clustered at the country-pair level are given in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1; Y = yes, N = no; FE = fixed effects; IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.*

Table A3

Robustness checks

	FDI					Portfolio investment				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
IPD(t-1)	-0.346***		-0.148***	-0.346***	-0.33***	-0.146***		-0.146**	-0.139***	-0.16***
	(0.046)		(0.054)	(0.051)	(0.046)	(0.053)		(0.072)	(0.053)	(0.055)
Ln(dist)	-0.486***	-0.47***	-0.797***	-0.464***	-0.507***	-0.305***	-0.289***	-0.374***	-0.274***	-0.295***
	(0.05)	(0.053)	(0.053)	(0.052)	(0.054)	(0.047)	(0.048)	(0.054)	(0.046)	(0.051)
Contig	0.139	0.104	0.123	0.196	0.121	0.37***	0.356***	0.295***	0.389***	0.345***
	(0.14)	(0.142)	(0.125)	(0.143)	(0.147)	(0.12)	(0.121)	(0.114)	(0.12)	(0.122)
Comcol	0.924***	1.056***	0.616**	1.051***	0.881***	1.56***	1.588***	1.575***	1.702***	1.618***
	(0.304)	(0.305)	(0.312)	(0.311)	(0.311)	(0.466)	(0.455)	(0.473)	(0.445)	(0.444)
Comlang	0.156	0.199	0.211*	0.138	0.151	0.358***	0.369***	0.376***	0.366***	0.406***
	(0.118)	(0.122)	(0.127)	(0.12)	(0.12)	(0.111)	(0.112)	(0.117)	(0.111)	(0.112)
BIT	-0.047	-0.076	0.045	-0.057	-0.103	0.554***	0.542***	0.228**	0.62***	0.592***
	(0.11)	(0.113)	(0.115)	(0.119)	(0.122)	(0.114)	(0.114)	(0.113)	(0.116)	(0.127)
S-score(t-1)		-0.292***					-0.156***			
		(0.052)					(0.051)			
Constant	14.975***	13.928***	15.974***	14.812***	15.084***	13.985***	13.422***	13.556***	13.714***	13.73***
	(0.401)	(0.458)	(0.392)	(0.418)	(0.438)	(0.391)	(0.422)	(0.406)	(0.384)	(0.426)
Number of observations	123,541	123,541	119,349	120,390	104,304	123,541	123,541	119,349	120,390	104,304
Pseudo R-squared	0.896	0.894	0.872	0.898	0.895	0.955	0.955	0.942	0.958	0.952
Source country-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Destination country-year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Source-destination country FE	N	N	N	N	N	N	N	N	N	N
Sample	Full	S-score	Excluding USA	Excluding China	Excluding 2020–2022	Full	S-score	Excluding USA	Excluding China	Excluding 2020–2022

Source: Authors' calculations.
*Note: Standard errors clustered at the country-pair level are given in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1; Y = yes, N = no; FE = fixed effects; IPD(t-1) = ideal point distance, lagged; ln(dist) = geographical distance, logged; contig = common border; comcol = common colonial past; comlang = common language; BIT = bilateral investment treaty.*

Address: Otto-Wagner-Platz 3, 1090 Vienna
PO Box 61, 1011 Vienna, Austria
Website: www.oenb.at

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