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Contents

Studies

Event wrap-ups

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Call for applications: Klaus Liebscher Economic Research Scholarship

Please e-mail applications to *scholarship@oenb.at* by the end of October 2021. Applicants will be notified of the jury's decision by end-November 2021.

The Oesterreichische Nationalbank (OeNB) invites applications for the "Klaus Liebscher Economic Research Scholarship." This scholarship program gives outstanding researchers the opportunity to contribute their expertise to the research activities of the OeNB's Economic Analysis and Research Department. This contribution will take the form of remunerated consultancy services.

The scholarship program targets Austrian and international experts with a proven research record in economics and finance, and postdoctoral research experience. Applicants need to be in active employment and should be interested in broadening their research experience and expanding their personal research networks. Given the OeNB's strategic research focus on Central, Eastern and Southeastern Europe, the analysis of economic developments in this region will be a key field of research in this context.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. The selected scholarship recipients will be expected to collaborate with the OeNB's research staff on a prespecified topic and are invited to participate actively in the department's internal seminars and other research activities. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. As a rule, the consultancy services under the scholarship will be provided over a period of two to three months. As far as possible, an adequate accommodation for the stay in Vienna will be provided.[1]

Applicants must provide the following documents and information:
- a letter of motivation, including an indication of the time period envisaged for the consultancy
- a detailed consultancy proposal
- a description of current research topics and activities
- an academic curriculum vitae
- an up-to-date list of publications (or an extract therefrom)
- the names of two references that the OeNB may contact to obtain further information about the applicant
- evidence of basic income during the term of the scholarship (employment contract with the applicant's home institution)
- written confirmation by the home institution that the provision of consultancy services by the applicant is not in violation of the applicant's employment contract with the home institution

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[1] *We assume that the coronavirus crisis will abate in the course of 2021. We are also exploring alternative formats to continue research cooperation under the scholarship program for as long as we cannot resume visits due to the pandemic situation.*

Studies

Prevalence and determinants of nonbank borrowing in CESEE: evidence from the OeNB Euro Survey

Katharina Allinger, Elisabeth Beckmann[1]

Household vulnerabilities related to debt are often assessed by using information on bank loans, which, in terms of volume, certainly account for the most important form of indebtedness. Households can, however, also take on nonbank debt that potentially exposes them to greater risks. Drawing on the OeNB Euro Survey that is conducted regularly in Central, Eastern and Southeastern European (CESEE) countries, we present new and unique evidence on a dozen forms of debt for ten countries of this region. Specifically, we analyze which factors determine whether households hold bank debt versus what we refer to as secondary formal debt, i.e. debt from nonbank financial companies such as payday lenders. Policymakers in many jurisdictions have had a watchful eye on this kind of debt given that nonbank financial companies often target financially excluded or poor individuals by offering small, high-cost loans. In bivariate probit regressions, we show that individuals with characteristics that suggest increased vulner-ability – e.g. lower income, unemployment, exclusion from banking services – are more likely to have secondary formal debt. We further find that the relationship with bank concentration is U-shaped. Finally, we provide some preliminary evidence that secondary formal debt is associated with a higher probability of arrears.

After the global financial crisis (GFC), household indebtedness in Central, Eastern and Southeastern Europe (CESEE) and related vulnerabilities attracted more attention. Analyses usually focused on the most important source of debt in bank-dominated CESEE economies: bank loans. However, not all household debt is owed to banks. The share of people with bank products can be low, and use of nonbank financial services high, particularly in emerging economies and among the poorer segments of societies (e.g. Beck and Brown, 2011; Banerjee and Duflo, 2007; Demirguc-Kunt et al., 2018). With the exception of the USA, there are few data and analytical studies on nonbank lending. Our study therefore provides an important addition to the literature.

We use data from the OeNB Euro Survey for ten CESEE economies (CESEE-10)[2] to shed light on the prevalence of 12 different sources of indebtedness, which we assign to the following broad categories: bank debt, debt from nonbank financial companies ("secondary formal debt"), informal debt, e.g. from family and friends, and utility debt, i.e. money owed to utilities, e.g. for water, gas or energy usage. The evidence we present is novel and unique; to our knowledge no comparable

cross-country dataset exists on this topic. After providing a general picture of indebtedness, we zoom in on bank debt and secondary formal debt. We address the following research questions: (1) Do borrowers of secondary formal debt in CESEE-10 have personal and sociodemographic characteristics that mark them as more vulnerable than bank borrowers? (2) Are individuals with secondary formal debt more likely to be excluded from the banking system? (3) Is secondary formal debt more prevalent in rural or urban areas? (4) How do the factors local banking market, bank competition and concentration affect secondary formal borrowing?

Shedding light on secondary formal debt is highly relevant from a central bank perspective: it helps (a) better understand potential financial stability issues related to this type of lending, and (b) establish if and to what extent secondary formal lending needs to be monitored and regulated. We chose to focus on secondary formal debt because it introduces more pressing policy issues than other types of nonbank lending. In particular, even though informal debt is much more prevalent, we do not analyze its determinants for several reasons. First, more favorable terms tend to apply to informal debt (see e.g. Karaivanov and Kessler, 2018) than to secondary formal debt. The latter has been criticized for its unfavorable conditions ("subprime" or "shark" loans) and for contributing to debt repayment issues and other negative outcomes for borrowers. Second, borrowing from families and friends is generally based on informal agreements that are outside the legal scope of regulatory authorities. Secondary formal lenders, on the other hand, have attracted the attention of regulators in several jurisdictions over the past years (for the EU, see e.g. Bouyon and Oliinyk, 2019, or the European Commission's evaluation of the Consumer Credit Directive 2008/48/EC). In some cases, such lenders have even been banned, with a case in point being state payday loan banks in the USA.

Indeed, we find that borrowers who are more vulnerable and excluded from the financial system are more likely to hold secondary formal debt. Lack of access to banks, i.e. a low density of bank branches, per se does not drive secondary formal borrowing. Instead, secondary formal debt is more prevalent in environments with banking markets that are either highly concentrated or not concentrated at all; the relationship with bank concentration is therefore U-shaped. Finally, we provide some preliminary noncausal evidence regarding the debt sustainability of borrowers with secondary formal debt: this type of debt is associated with a higher probability of arrears.

Our study connects to various strands of the literature, which we discuss in section 1. Section 2 provides an overview of the data and their limitations. Section 3 presents the descriptive evidence. In section 4, we describe our empirical strategy before presenting analytical results and robustness analyses in section 5. Section 6 summarizes our results and discusses both policy conclusions and avenues for future research.

1 Literature and hypotheses

Our study is most closely related to the – rather scarce – literature that investigates which demand and supply factors influence the decision to borrow from banks or nonbanks. Data on nonbank borrowing are generally few and far between. For the USA, some researchers have investigated the sociodemographic characteristics

associated with the demand for so-called alternative financial services (AFSs)[3]. They found that AFS use in the USA is associated with lower income, lower levels of education and living in a larger household, including being married and having children. In the USA, being non-white and unbanked is also associated with higher AFS use (Gross et al., 2012; Lusardi and de Bassa Scheresberg, 2013; Birkenmaier and Fu, 2016). Lusardi and de Bassa Scheresberg (2013) also find that lower credit scores matter for AFS usage. Some studies also find that being unemployed and not owning one's home is related to higher AFS usage (Gross et al., 2012; Lusardi and de Bassa Scheresberg, 2013). Including a dummy to measure income shocks also increases the likelihood of AFS use (Lusardi and de Bassa Scheresberg, 2013). Papers focusing on financial literacy found that lower financial literacy is associated with higher AFS usage (Lusardi and de Bassa Scheresberg, 2013; Seay and Robb, 2013; Robb et al., 2015). Moreover, other sociodemographic controls like gender and age are also often significantly associated with AFS usage. It should be noted that most of these studies are based on the same data, and the authors control for account ownership ("bankedness") but not for bank loans or other forms of indebtedness.

Few studies we are aware of cover jurisdictions other than the USA. In one such study, Klapper et al. (2012) use panel data on the indebtedness of Russian households for 2008 to 2009 and find that households with both lower education and financial literacy are more likely to have nonbank debt.[4] Individuals who live in one-person households or those who have experienced a negative income shock during the last 12 months are also more likely to have nonbank debt.

Regarding supply factors, such as bank concentration, Smith et al. (2008) look at four counties in Pennsylvania and find evidence supporting the hypotheses that AFS providers are located in areas where there are no banks ("spatial void hypothesis") and that these areas are characterized by an above-average share of minority groups. Other studies could not corroborate the "spatial void hypothesis" (e.g. Fowler et al., 2014). However, many studies find that US AFS providers are concentrated in communities with low-income households and/or have high shares of minorities (e.g. Prager, 2014; Fowler et al., 2014).

In addition, our study is also related to the literature on why individuals are banked or unbanked, which does not center on borrowing decisions, but on bank account ownership. However, there is likely to be some overlap regarding the reasons for not having bank debt and not having bank accounts. Given better data availability, e.g. thanks to the Global Findex survey of the World Bank (Demirguc-Kunt et al., 2018), this is a larger literature, which we cannot discuss in detail here. Still, the sociodemographic differences found between banked and unbanked households follow patterns that are similar to the ones discussed above for AFS use. A recent CESEE-related study covering Poland (Szopiński, 2019) also includes a detailed literature review on related works from other regions. In an analysis that links bank concentration, competition and inclusion, Owen and Pereira (2018)

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[3] *The definition of AFSs in this literature depends on the data source, but mostly includes credit and transaction AFSs. Some of the credit AFSs are US specific, but they tend to include payday loans and pawnshops. We focus on studies that include at least some credit AFSs.*

[4] *The main drawback of this study is that the measure for nonbank loans is calculated as the difference between people having stated that they have "any debt" and people having stated that they have "bank debt." This study thus does not capture the individuals that have both nonbank debt and bank debt.*

show that a more highly concentrated banking sector is associated with better access to bank accounts, provided that the market power of banks is limited.

We present the literature relevant to our short discussion of debt sustainability directly in section 5.3.

1.1 Testable hypotheses

Based on the review of previous research, we formulate the following testable hypotheses: (1) individual demand for different debt instruments is directly affected by sociodemographic and personal characteristics. We thus expect to find that borrowers of bank and secondary formal debt have different characteristics in this regard. In particular, we hypothesize that households borrowing from nonbank financial companies have (2) a lower income and (3) are more credit constrained than borrowers of bank debt. We further conjecture that the choice of debt may be affected by the way individuals assess banks' stability and trustworthiness and that (4) trust in banks increases the likelihood of their borrowing from banks. Turning to factors that are related to the supply side, we argue that the distribution of banks plays a role for the supply and use of secondary formal debt. We hypothesize that (5) proximity to banks increases households' likelihood of holding bank debt and that bank concentration has a nonlinear effect on the use of secondary formal debt. The literature on bank concentration and competition has highlighted that the competitiveness of the banking system cannot be defined only based on market structure indicators (e.g. Yildirim and Philippatos, 2007). While competition improves access to finance, the results on concentration are mixed (e.g. Owen and Pereira, 2018).

We argue that secondary formal lenders are more likely to be located either (a) in areas that have a very dense bank branch network (and low concentration) and some individuals may be credit constrained due to intense competition or (b) in areas marked by no or very few banks and no or very little competition, i.e. areas of high concentration. The latter could lead to banks easing their requirements for borrowers for profitability reasons. This, in turn, could drive up the number of vulnerable bank borrowers that turn to secondary formal lenders to cope with repayment difficulties with their bank debt. Moreover, we expect that urbanicity also plays a role here. Densely populated areas are likely to have higher shares of minorities and poorer communities, which could attract secondary formal lenders.

2 Data

The main data source for this study is the OeNB Euro Survey[5] – a cross-sectional face-to-face survey of individuals aged 15 or older that is conducted on a regular basis in CESEE countries. The survey covers six EU member states which are not part of the euro area (Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania) and four candidates and potential candidates (Albania, Bosnia and Herzegovina, North Macedonia, Serbia). In each country and in each survey wave, a sample of 1,000 individuals is polled based on multistage random sampling procedures. Individuals within households are selected based on the "first-birthday method," i.e. the selection of the respondent within the household is also random. Each sample reflects a country's population characteristics in terms of age, gender,

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[5] *For more information, see www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html.*

Table 1

Debt categories based on the 2016 and 2019 OeNB Euro Survey

Debt category	Baseline	Robustness	Robustness
Bank overdraft Bank loan	Bank debt	Narrow bank debt	Bank debt
Credit card debt Installment credit at store or company	Bank debt	Consumer credit	Bank debt
Internet loan Payday loan Pawnshop credit Debt owed to another private lender	Secondary formal debt	Secondary formal debt	Nonbank debt
Debt owed to family or friends Debt owed to employer Other	Informal debt	Informal debt	Nonbank debt
Delayed payment of bills to utility provider	Utility debt	Utility debt	Nonbank debt

Source: OeNB Euro Survey, authors' compilation.

region and ethnicity. Sampling weights are calibrated on census population statistics for age, gender, region, and where available, on education and ethnicity. Weights are calibrated separately for each country and wave.

For this study, we use data from the 2016 and 2019 fall waves of the OeNB Euro Survey, which, in addition to the core questions, included questions about debt and in particular nonbank debt.

Our main area of interest concerns the types of debt owed to the 12 sources (see table 1) respondents could choose from in this question:[6] "Finally, let me ask you one question about the sources of any money you may have borrowed or owe. In general, do you currently owe any money to any of the following sources?"[7]

Based on this question, we categorize 12 forms of debt into groups[8] that we use as our baseline and for robustness checks. Our categorization is similar to that used by Rona-Tas and Guseva (2018), who distinguish between primary formal lending (banks and credit cooperatives), secondary formal lending and informal lending. In our baseline, we subsume bank loans, bank overdrafts, credit card debt and store credit under the formal *"bank debt"* definition. This decision is based on theoretical considerations. Banks are likely to apply similar creditworthiness assessments or administrative requirements (e.g. identification) for all their products, which implies

[6] *Putting the question in exactly the same way in ten countries allows comparability across countries, but such standardized debt measures may not accurately reflect country-specific concepts of debt. For example, delaying payment of bills to utility providers may be perceived as debt in some countries but not in others.*

[7] *The interviewer instructions included the following definitions:*
Internet loan provider: a company which provides personal loans for any purpose only via the internet. That loan provider is not necessarily a bank.
Payday lender: a payday loan is a small, short-term loan from a nonbank lender that typically carries high interest rates and comes due on the next payday. As a security, borrowers must give lenders access to their current account or write a check for the full balance (including interest) in advance.
Pawnshop or pawnbroker: a store which offers loans in exchange for personal property as equivalent collateral. If the loan is repaid in the contractually agreed time frame, the collateral may be repurchased at its initial price plus interest. If the loan cannot be repaid on time, the collateral may be liquidated by the pawnshop through a pawnbroker or second-hand dealer through sales to customers.

[8] *Leasing is also included in the survey question but omitted from our analysis, as it is, strictly speaking, not a form of debt but a contract not unlike a rental agreement.*

that these products should be grouped together for the purpose of this study despite differing characteristics. As a second group, we define *"secondary formal debt."* Such debt comes from organizations without a bank license that offer a narrow product range focusing on small, high-cost credit. In this category, we include payday loans, loans from other private lenders, pawnshop debt and internet loans. *"Informal debt"* corresponds to borrowing from family and friends as well as employers. Distinguishing secondary formal from informal debt is backed up by the broader nonbank debt literature: the strand on informal borrowing mainly investigates research questions concerning the role of social networks, trust and social capital. Research on secondary formal lending, by contrast, revolves around implications for financial stability, household vulnerability and debt sustainability.

The OeNB Euro Survey questionnaire focuses on individuals rather than households. In contrast to research based on household-level surveys, the OeNB Euro Survey allows us to link personal characteristics and attitudes directly to behavior regarding the type of debt an individual holds. However, loans are typically held by households rather than by individuals. As to bank loans, the questionnaire accounts for this by asking whether respondents have loans alone or jointly with their partners. Apart from bank loans, we do not have that kind of information for other forms of debt. Yet, between 67% (Albania) and 94% (Hungary) of respondents state that they are involved in managing household finances. Moreover, assortative matching suggests that responses within a given household are similar across its members. We therefore consider it reasonable to assume that the responses regarding individual debt are a good proxy for household debt. Previous research comparing the OeNB Euro Survey results on loans with aggregate statistics (Beckmann et al., 2011) corroborates this assumption.

Beyond debt, the OeNB Euro Survey also elicits information on socioeconomic characteristics, indicators of wealth, income and income shocks, information on individual finances, beliefs, expectations and trust as well as financial literacy. Table A1 in the annex defines the variables we use to investigate our research hypotheses. Table A2 shows the summary statistics.

The survey also contains the addresses (at the street level) of the primary sampling units (PSUs)[9].

We merge the survey data with the OeNB bank branch data for CESEE (Beckmann et al., 2018). Specifically, we use two indicators of the local banking environment: (1) the distance from the PSU to the nearest bank branch and (2) the Herfindahl index of bank concentration. To compute the Herfindahl index, we calculate the market shares of each bank within a radius of 20 km[10] around each PSU:

$$H_{Branch} = \sum_{i=1}^{N_{Banks}} q_i^2$$

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[9] *Put simply, primary sampling units are the point where the interviewers start the random route sampling to select specific addresses, and ultimately individuals, to participate in the survey. Depending on the country, there are between 100 and 300 PSUs per wave. The maximum number of interviews conducted around one PSU is 25.*

[10] *We also compute the same indicator for a radius of 5 km.*

where N_{Banks} denotes the number of banks within 20 km from each PSU and q_i is the number of branches of bank i within 20 km/number of all bank branches within 20 km. The Herfindahl index can thus vary between close to 0 and 1.[11] If there are no bank branches within 20 km of the PSU, the index equals 1.

When interpreting the results presented in this paper, the following issues should be taken into account: first, the survey question on indebtedness only queries about the distribution of different forms of debt but not about amounts. Therefore, our analyses are limited to the extensive margin. Detailed information, e.g. regarding date of origin, loan currency and purpose, is only available for an individual's largest, most important loan; this information cannot be matched to our question on nonbank sources of debt. We do not know, and hence cannot discuss, the sequencing of different debt instruments. Second, while the total sample comprises 20,000 observations, the number of observations for certain forms of debt is relatively small. This means that for any meaningful analysis, we have to pool observations across countries and waves.[12]
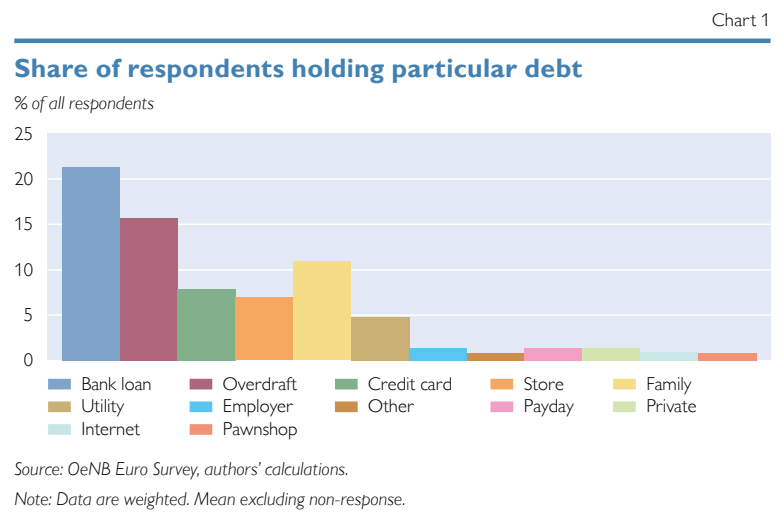
3 Descriptive results on debt instruments

The following section sheds light on how many individuals hold which form of debt and how widespread different forms of debt are in CESEE-10.

3.1 Comparison by instruments

Overall, 42% or 8,652 of the respondents in our sample have some form of debt. Of those with some form of debt, about 61% have only bank debt, 20% only nonbank debt, and 19% have both bank and nonbank debt.

Chart 1 shows the share of people who responded "yes" to owing money to any of the 12 sources.[13] The most common debt instruments are bank loans (21%), bank overdrafts (16%) and loans from family and friends (11%). Credit card debt, store credit and utility debt account for shares between 5% and 7%, while all other forms of debt are only held by a small fraction below 2% each of the sample. A breakdown by the broad debt categories we defined in section 2 (see table 1, baseline) shows that 32% of respondents have at least one form of bank debt. 15% have either informal or utility debt and 3.5% have secondary formal debt.

Chart 1

Share of respondents holding particular debt

% of all respondents

Legend: Bank loan, Overdraft, Credit card, Store, Family, Utility, Employer, Other, Payday, Private, Internet, Pawnshop

Source: OeNB Euro Survey, authors' calculations.

Note: Data are weighted. Mean excluding non-response.

[11] *When using this measure as an indicator of bank concentration, one has to assume that each branch serves an equal number of customers, which is, admittedly, a strong assumption.*

[12] *To analyze the heterogeneities between countries, one could collect indicators about regulation or credit registry coverage and study how these interact with individual characteristics in influencing the choice of debt. As the empirical analysis will still include country and wave fixed effects, the insights from such an analysis are likely to be limited.*
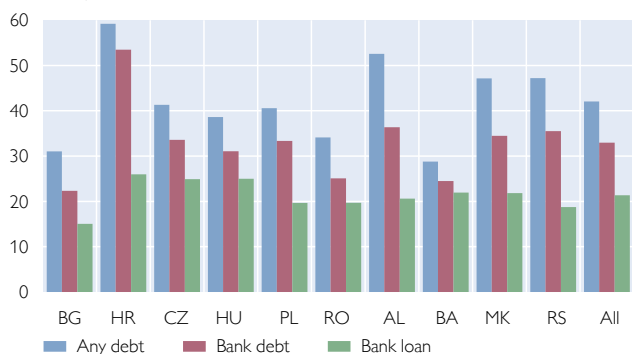
[13] *The differences across waves are small, so we pooled both waves.*

Chart 2

Country comparison: share of respondents holding particular types of debt
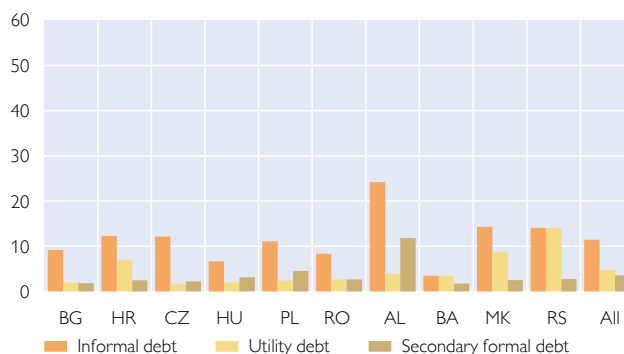
Debt overall and bank debt

% of all respondents

Informal, utility and secondary formal debt

% of all respondents

Source: OeNB Euro Survey.

3.2 Comparison by country

Chart 2 breaks down household indebtedness in CESEE-10 by country and broadly defined types of debt. The share of respondents that owe money to at least one source is highest in Croatia, with 59%, followed by Albania, Serbia and North Macedonia that each have a share close to 50%. In the other countries, the shares range between 41% in the Czech Republic and 28% in Bosnia and Herzegovina. In some countries, the share of bank debt is very close to the share of people with any debt (e.g. Croatia), while in others the gap is wider (e.g. Albania, North Macedonia). In some countries, almost everyone with bank debt has a bank loan (e.g. Bosnia and Herzegovina, Romania). In other countries, bank debt is not primarily in the form of bank loans (e.g. Croatia, Serbia).

Informal borrowing is most prevalent in Albania, with 25% of individuals reporting some form of informal debt. This is followed by Serbia and North Macedonia (about 14%). In the remainder of the countries, the shares range between 12% in Croatia and the Czech Republic and 3.5% in Bosnia and Herzegovina. Finally, secondary formal debt accounts for the lowest shares in all countries. Again, Albania stands out, with 12% of respondents having at least one form of such debt. In the remainder of CESEE-10, the shares are much lower, ranging between 4.5% in Poland and 1.8% in Bulgaria and Bosnia and Herzegovina. As to utility debt, Serbia records the highest share (14%) in CESEE-10.

4 Empirical strategy

In our econometric analysis, we aim to model the determinants of holding debt in the form of bank debt and/or as secondary formal debt while taking into account that individuals may also hold informal or utility debt. In this section, we are going to discuss the choice of the econometric method and the challenges we had to address.

Given the structure of the survey question that is at the center of our analysis (section 2), we could choose from various econometric methods: multivariate probit, seemingly unrelated bivariate probit and multinomial logit. These models take the

interdependence of the different forms of debt into account. In our preferred specification, we estimate bivariate probit models, where the two binary outcomes are correlated, and their determinants are estimated jointly. We chose this method over the others for the following reasons. Estimating a multinomial logit model would require that the data be arranged into exclusive categories. While this is possible, it implies that individuals take only one decision on their debt portfolio. We think that this assumption does not correctly reflect the process of taking on debt, which instead is a process where a decision is taken separately for each form of debt. Therefore, we employ multinomial logit models only for robustness analyses.

At the same time, the decision to take on, e.g., overdraft debt and debt from family and friends is very likely to be correlated. We therefore estimate the decisions simultaneously. One option would be to estimate a multivariate probit model with 12 equations. However, analyzing the factors determining whether individuals take on bank debt or secondary formal debt does not require us to understand the determinants of taking on utility debt. We, therefore, reduce the number of debt instruments to two main categories of interest – bank debt and secondary formal debt – and include the other forms of debt as control variables.

The bivariate probit model is specified as:

$$Y_1 = \begin{cases} 1 \text{ if } Y_1^* > 0 \\ 0 \text{ otherwise} \end{cases}$$

$$Y_2 = \begin{cases} 1 \text{ if } Y_2^* > 0 \\ 0 \text{ otherwise} \end{cases}$$

$$\text{where } \begin{cases} Y_1^* = X_1\beta_1 + \varepsilon_1 \\ Y_2^* = X_2\beta_2 + \varepsilon_2 \end{cases} \text{ and } \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix} \mid X \sim N \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right).$$

In the baseline specification, Y_1 is *bank debt* and Y_2 is *secondary formal debt* (see table 1 for definitions). Our control variables *X* are informed by previous research and a tradeoff between capturing important determinants of borrowing and not overloading the model. In the baseline specification, the control variables are as follows:

1. Socioeconomic controls: *age, gender, size of household, manages household finances, education, labor market status, own house, condition of residence*
2. Controls for other debt: *debt owed to utility provider, debt owed to family, friends or employer*
3. Controls for personal beliefs and preferences: *risk averse, impulsive, time prefer- ence – live today*
4. Controls for the local environment: *size of town*

In addition, the baseline specification also includes the following explanatory variables that are related to our hypotheses: *income, foreign currency income, income shock, trust in banks, applied for bank loan, loan application refused, bank perceived as far.* For a definition of each of the variables, see table A1 in the annex.

We expand the baseline specification and include further explanatory variables that are of particular interest: we focus on the role of the local banking environment by including measures of distance to the nearest bank and bank concentration in the proximity of the individual's residence.

The baseline control and explanatory variables are included in all the models we present in this study, but tables mostly only show the coefficients relevant for the hypothesis that is being discussed.

One challenge that we need to address in analyzing the determinants of holding bank and secondary formal debt is the fact that not all individuals in our sample are indebted. We address this by first estimating a probit model for the full sample, where we analyze who is indebted. We then reduce the sample to those individuals that have any debt and analyze what drives their choice of debt source in bivariate probit regressions as specified above. Arguably, this introduces selection bias to the latter estimates as indebted individuals are likely to be more financially (dis)stressed than the population average. Addressing the selection bias would require modeling the determinants of indebtedness and the choice in what form this debt is held jointly. We would need to find a suitable exclusion restriction, i.e. an instrumental variable that affects whether an individual is indebted but does not affect in what form that individual holds the debt. However, lenders will restrict credit on their assessment of how likely they consider the debtor to be able to repay the loan – a fact that considerably reduces the possible number of instruments for modeling the selection. In our main analyses, we stick to the subsample of indebted individuals and acknowledge that this constrains us in drawing conclusions for the population as a whole.

5 Analytical results on nonbank borrowing

In this section, we discuss our findings regarding the five hypotheses formulated above as well as some robustness checks. Section 5.3 provides some additional noncausal evidence on arrears and secondary formal debt.

For the main analyses, we restrict our sample to individuals with debt. To allow the reader to assess the possible selection bias discussed above, we estimate a probit model where the dependent variable is binary and takes the value 1 if the individual has any type of debt listed in table 1 and 0 if individuals have no debt. The explanatory variables comprise socioeconomic characteristics, personal beliefs and preferences as well as indicators of the local environment. Table A3 in the annex shows what characterizes indebted individuals compared with individuals who do not have debt. In sociodemographic terms, people who report having any debt compared with people with no debt are on average younger, more likely to live in larger households and manage household finances and are less likely to be unemployed. The condition of their residence is also more often assessed as "poor" by the interviewer. Education and income are only weakly associated with indebtedness. The following analyses focus exclusively on the subset of indebted individuals. Our results remain robust when we include individuals without debt (see table A4 in the annex).

5.1 Determinants of holding secondary formal debt

The following tables show results of a bivariate probit where the dependent variables are bank debt and secondary formal debt. We presented our control variables and the explanatory variables included in the baseline in section 4 above.

The results for control variables[14] are only shown in table 2 but all controls and baseline explanatory variables are included in tables 2 to 4.

The baseline explanatory variables (income category dummies, income shock, income in euro or remittances, application for/rejection of bank loans, having a bank account, trusting banks, perceived distance to banks) are also included in all specifications of tables 2 to 4 but shown step by step to facilitate readability.

In all specifications, the parameter *rho* is significant, which indicates that the equations should be estimated jointly with the bivariate probit and not with two separate probits.

Hypothesis 1: Borrowers of bank and secondary formal debt have different sociodemographic characteristics

The results in column 3 (secondary formal debt = 1, bank debt = 0) of table 2 demonstrate that individuals are less likely to hold secondary formal debt and no bank debt if they manage household finances, have secondary or tertiary education, own their residence and live in smaller households. People are more likely to fall into this category if they are unemployed.[15] Regarding personal characteristics, individuals with secondary formal debt are significantly less risk averse and more impulsive.

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[14] *As we focus on bank and secondary formal debt, informal debt and utility debt are only presented and discussed as part of our control variables. Results of bivariate probit models for individuals with only informal or utility debt are available upon request.*

[15] *Income and trust variables are discussed below under hypotheses 2 and 4.*

Table 2

Bank borrowers versus secondary formal borrowers: How do they differ?

Dependent variables	Bank debt vs. secondary formal debt		
Sample	Indebted individuals		
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Age	0.00	0.00	0.00
	(0.000)	(0.000)	(0.000)
Female	−0.004	0.007	−0.002
	(0.004)	(0.007)	(0.002)
Manages household finances	−0.001	0.039***	−0.007**
	(0.006)	(0.011)	(0.003)
Education – secondary	−0.011*	0.047***	−0.012***
	(0.006)	(0.012)	(0.004)
Education – tertiary	−0.005	0.053***	−0.011***
	(0.008)	(0.014)	(0.004)
Income – refused answer	−0.011	0.022*	−0.008**
	(0.007)	(0.012)	(0.004)
Income medium	−0.002	0.020*	−0.005
	(0.006)	(0.011)	(0.003)
Income high	−0.009	0.052***	−0.012***
	(0.007)	(0.012)	(0.003)
Income shock	0.015***	−0.002	0.005**
	(0.005)	(0.008)	(0.002)
Income in EUR or remittances	0.023***	−0.031***	0.013***
	(0.005)	(0.010)	(0.003)
Unemployed	0.008	−0.066***	0.015***
	(0.006)	(0.011)	(0.003)
Self-employed	0.008	−0.015	0.005
	(0.007)	(0.013)	(0.004)
Retired	−0.007	0.016	−0.005
	(0.010)	(0.016)	(0.005)
Own house	−0.024***	0.028**	−0.013***
	(0.006)	(0.011)	(0.003)
Condition of residence poor	0.005	−0.017	0.005
	(0.006)	(0.011)	(0.003)
Size of household	0.007***	−0.003	0.003***
	(0.002)	(0.003)	(0.001)
Risk averse	−0.031***	0.007	−0.011**
	(0.008)	(0.016)	(0.005)
Impulsive	0.027***	−0.026***	0.013***
	(0.005)	(0.009)	(0.003)
Time preference – live today	0.008*	−0.005	0.003
	(0.005)	(0.008)	(0.002)
Trust in banks	−0.014***	0.038***	−0.011***
	(0.005)	(0.008)	(0.003)
Debt owed to family, friends or employer	−0.006	−0.214***	0.037***
	(0.004)	(0.006)	(0.003)
Debt owed to utility provider	0.011*	−0.144***	0.030***
	(0.005)	(0.009)	(0.003)
Rho	−0.202***	−0.202***	−0.202***
	(0.035)	(0.035)	(0.035)
Country-wave fixed effects	Yes	Yes	Yes
Further explanatory variables: as specified for baseline in section 4	Yes	Yes	Yes
Log-L	−3,463	−3,463	−3,463
N	7,223	7,223	7,223

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

This is broadly in line with what researchers in the USA have found regarding the sociodemographic characteristics of individuals using alternative financial services (see section 1). For individuals holding only bank debt (column 2 of table 2), but no secondary formal debt, roughly the same coefficients are significant, and their signs are reversed.

Individuals with both secondary formal debt and bank debt (column 1 of table 2) seem to be more similar to those who have only secondary formal debt than to those who have only bank debt. They are, however, less likely to also owe money to family, friends, employers or utility providers.[16]

There is no way for us to discern why people chose to have both kinds of debt and which came first. However, when we look at the coefficients, we could come up with several possible hypotheses. For instance, not being risk averse and being impulsive each increase the likelihood of having both kinds of debt by about 3 percentage points. This could indicate that people that have both kinds of debt might underestimate the medium-term risks of using several sources of debt. It is also interesting to note that the coefficient on loans from family, friends and employers is insignificant – some individuals might have had to turn to secondary formal sources because they were not able to borrow from family and friends.[17]

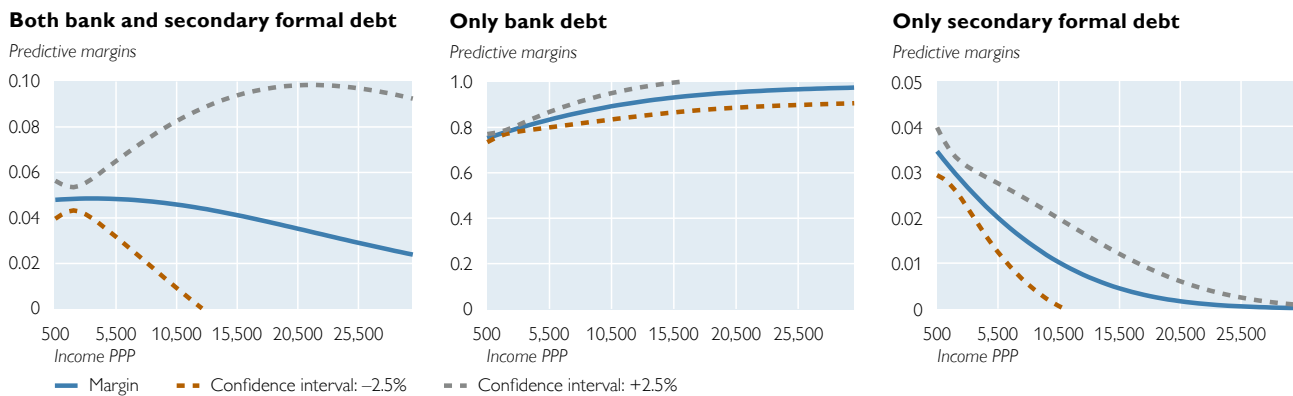### Hypothesis 2: Borrowers using secondary formal debt have lower income

We hypothesize that bank borrowers have higher income than borrowers of secondary formal debt. Table 2 shows that holders of secondary formal debt are less likely to belong to the highest income category, and the opposite is true for those holding only bank debt. People are more likely to have secondary formal debt only or in combination with bank debt if they experienced an income shock in the past 12 months and if they receive income in euro or remittances.

In addition, we ran regressions by using a continuous income variable in euro (applying purchasing power parity transformations). We show the results in chart 3. The right-hand panel clearly shows that the probability of individuals having only secondary formal debt is highest for those with low income and practically zero for those with high income. The probability of having only bank debt shows a reversed picture (middle panel), with those at the lower end of the income distribution having a probability of roughly 75% of owning only bank products. For people with higher incomes, this increases to above 90%; please recall though that we only consider indebted individuals in our regression. For individuals with both kinds of debts (left-hand panel), the line of predicted margins is mildly downward sloping, but confidence intervals are high for the upper three quarters of the income distribution.

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[16] *Additional explanatory variables are included in the baseline but shown in tables 3 and 4: income category dummies, income shock, income in euro or remittances, application for/rejection of bank loans, perceived distance to banks and size of town.*

[17] *This interpretation is corroborated in table 3, with individuals saying that they are unlikely to be able to borrow from family and friends if in need.*

Chart 3

Marginal propensity to hold different forms of debt at representative values of income

Both bank and secondary formal debt

Predictive margins

Only bank debt

Predictive margins

Only secondary formal debt

Predictive margins

—— Margin   ---- Confidence interval: −2.5%   - - - Confidence interval: +2.5%

Source: Authors' calculations.

Hypothesis 3: Borrowers with secondary formal debt are more credit constrained

We also hypothesize that bank borrowers are less credit constrained than borrowers from secondary formal institutions. Columns 1 to 3 of table 3 show the variables included in our baseline, which confirm that the probability of holding secondary formal debt increases for people that were rejected by at least one bank when applying for a loan. The coefficient is particularly high for those holding both kinds of debt. One of several possible explanations could be that these are people who are not deemed eligible for a large loan and have to rely on smaller-volume, high-cost sources of debt from banks and nonbanks to reach their desired amount of financing.

Columns 4 to 6 show our baseline with additional variables that measure whether people think that they could borrow from family and friends or banks if in need: Individuals who think that they are credit constrained by banks have a higher probability of holding only secondary formal debt. Those who think that they are credit constrained by family and friends have a higher likelihood of holding secondary formal debt alone or together with bank debt.

Hypothesis 4: Trust in banks is important for borrowing decisions

Individuals who trust banks are more likely to have only bank debt and less likely to have secondary formal debt (see table 2). The coefficients remain unaffected when we include whether individuals remember a time of banking crises during transition when access to deposits was restricted. When we add whether individuals think that banks are stable and whether they trust the central bank, the former has the same coefficient signs as trust in banks, while the coefficients for trust in the central bank are insignificant. This may be due to the fact that trust in banks and in the central bank is highly correlated in most countries.[18]

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[18] *Detailed estimation results are available from the authors upon request.*

Table 3

Are bank borrowers more credit constrained than secondary formal borrowers?

Dependent variables	Bank debt vs. secondary formal debt					
Sample	Indebted individuals					
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Applied for bank loan	−0.001 (0.005)	0.161*** (0.008)	−0.030*** (0.003)	−0.001 (0.005)	0.152*** (0.008)	−0.029*** (0.003)
Bank loan refused	0.029*** (0.006)	−0.049*** (0.012)	0.018*** (0.003)	0.027*** (0.006)	−0.041*** (0.012)	0.016*** (0.003)
Credit constrained – bank				0.005 (0.005)	−0.058*** (0.008)	0.012*** (0.003)
Credit constrained – family and friends				0.015*** (0.004)	0.003 (0.008)	0.004* (0.002)
Rho	−0.202*** (0.035)	−0.202*** (0.035)	−0.202*** (0.035)	−0.186*** (0.036)	−0.186*** (0.036)	−0.186*** (0.036)
Country-wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Further variables: as specified for baseline in section 4	Yes	Yes	Yes	Yes	Yes	Yes
Log-L	−3,463	−3,463	−3,463	−3,270	−3,270	−3,270
N	7,223	7,223	7,223	6,877	6,877	6,877

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

Hypothesis 5: Bank concentration affects the use of secondary formal debt versus bank debt

We now turn to supply-side determinants and study how the local banking environment affects our dependent variables. The coefficients in table 4 show that the objective distance to the next bank is insignificant, while the subjective distance is highly significant.[19] This makes sense intuitively as the same objective distance could be harder to overcome for some individuals and in some regions than in others, which makes the subjective variable the more important one. We also add bank concentration, measured by the Herfindahl index within 20 km of the PSU. Where bank concentration is high, individuals are more likely to have only bank debt and less likely to have only secondary formal debt.

[19] *Only the latter is included in our baseline in table 2.*

Table 4

Does bank proximity or concentration affect whether individuals hold bank or secondary formal debt?

Dependent variables	Bank debt vs. secondary formal debt					
Sample	Indebted individuals					
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Distance to next bank (log)	−0.001 (0.001)	0.00 (0.002)	0.00 (0.000)			
Bank perceived as far	0.016*** (0.005)	−0.026*** (0.009)	0.010*** (0.003)	0.014*** (0.005)	−0.022** (0.009)	0.008*** (0.003)
Herfindahl index of bank concentration, 20 km				−0.055 (0.037)	0.151** (0.065)	−0.045** (0.020)
Size of town (log)				0.00 (0.001)	0.003 (0.003)	−0.001 (0.001)
Rho	−0.201*** (0.035)	−0.201*** (0.035)	−0.201*** (0.035)	−0.199*** (0.035)	−0.199*** (0.035)	−0.199*** (0.035)
Country-wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Further variables: as specified for baseline in section 4	Yes	Yes	Yes	Yes	Yes	Yes
Log-L	−3,462	−3,462	−3,462	−3,453	−3,453	−3,453
N	7,210	7,210	7,210	7,210	7,210	7,210

Source: Authors' calculations.

Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Theoretically, secondary formal institutions are likely to be located either in environments with almost no bank competition (see "spatial void hypothesis" in section 1) or in environments with very high bank penetration. In other words, the effect of bank concentration on secondary formal debt versus bank debt is expected to be nonlinear. Chart 4 confirms our hypothesis by presenting a U-shaped and an inverse U-shaped picture when we plot the predictive margins for our three columns for different levels of the Herfindahl index.
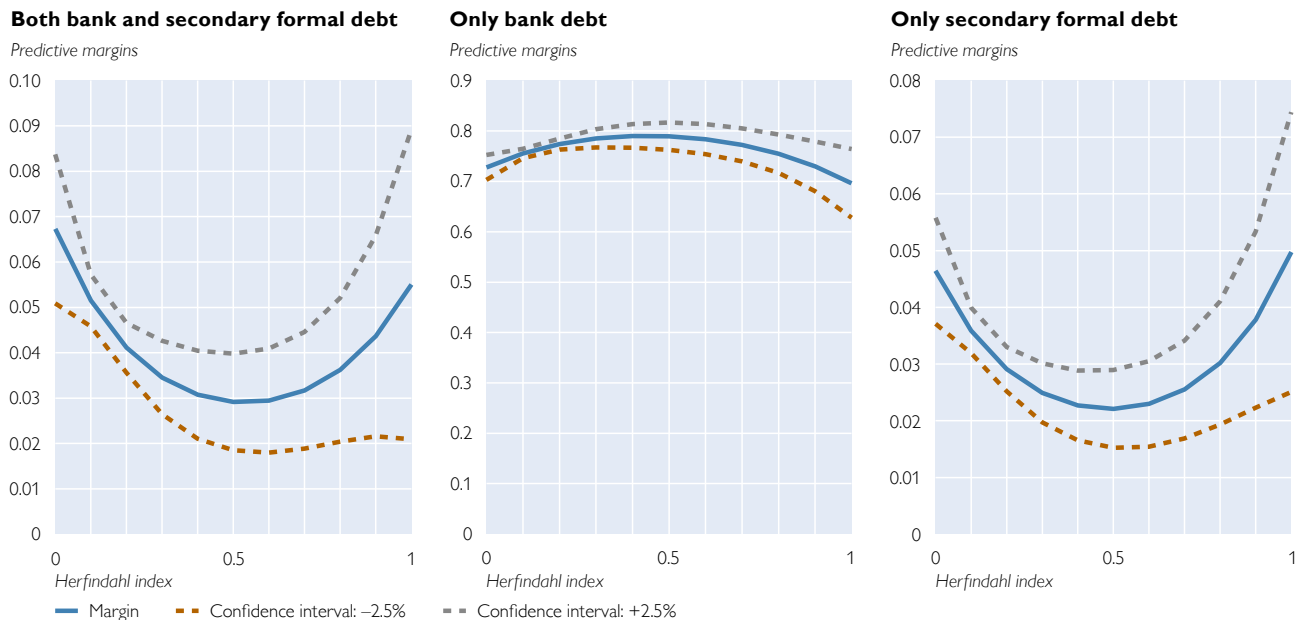
5.2 Robustness analyses

To scrutinize the robustness of our results, we conduct several additional analyses. For these analyses we use the same set of explanatory and control variables as in our baseline. First, we consider the heterogeneity of the countries covered in our sample. We repeat the estimations, dropping one country at a time, to check that results are not driven by a particular country. We find that the results are robust. Second, we take into account that the sample was selected for each wave and country separately and cluster standard errors at the country-wave level. Alternatively, we consider the sampling design within countries and cluster standard errors at the PSU-wave level. Finally, we account for differences in economic developments within countries by controlling for average stable night lights following Henderson et al. (2012). The significance of the results is not affected.

We further check the robustness of our results by considering research on financial literacy. According to this literature, one reason for individuals to hold too much debt is lack of financial literacy (e.g. Lusardi and Tufano, 2015), which, inter alia, leads individuals to underestimate interest rate growth and to overborrow

Chart 4

Marginal propensity to hold bank vs. secondary formal debt at representative values of bank concentration

Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Predictive margins	*Predictive margins*	*Predictive margins*

Margin — — Confidence interval: –2.5% — — Confidence interval: +2.5%

Source: Authors' calculations.

(e.g. Stango and Zinman, 2009). The OeNB Euro Survey contains questions about four dimensions of financial literacy: interest rates, inflation, exchange rate risk and risk literacy. While it is beyond the scope of this study to address the endogeneity issues of financial literacy, we check whether our central results change significantly once we control for financial literacy. We find that the coefficients for our main column of interest "only secondary formal debt" are not affected by this.

We also address the potential bias resulting from sample selection by repeating estimations for the full sample. We present the results in table A4 in the annex: focusing on the subsample of indebted individuals does not bias results. In contrast to analyses focusing on bank loans only, we do not find a strong selection bias, which is to be expected given that we cover a broad range of debt instruments.

In our baseline specification, we, admittedly, group very different forms of bank debt into one category. In table A5, we define alternative dependent variables – "narrow bank debt," i.e. bank loan and overdraft debt, and "bank loan." We also test different groupings of nonbank debt, for instance summarizing all nonbank debt sources into one category. We do not find that changes in group definitions have a strong effect on the results.

We also repeat estimations, using multivariate probit regressions to confirm that the categorization into two main groups for the bivariate probit does not determine our results.

Ownership can be very low for some forms of debt. Maximum likelihood estimates for these "rare events" are consistent but might be biased. The Firth logit (Firth, 1993) introduces a penalization term that corrects for this bias but ignores

the possible simultaneity in the choice of debt instruments. We repeat estimations, using Firth logit, and conclude that our results are not biased by the low number of observations for some debt instruments.

Overall, we conclude that our baseline results are very robust and consistent across a range of possible specifications and econometric methods.

5.3 Some evidence on debt sustainability

Over the last decade, several studies investigated the welfare consequences of payday lending, particularly in the USA and the UK. The key question in this literature is whether borrowers are ultimately better or worse off if they have this "last-resort-even-though-high-cost" option to borrow. The results are largely mixed, with most, but not all, studies finding negative consequences of payday lending for several variables, e.g. for financials (Skiba and Tobacman, 2009; Melzer, 2011; Melzer, 2018; Campbell et al., 2012) or nonfinancials such as job performance (Carrell and Zinman, 2014). Studies that find no or positive effects are, for instance, Bhutta (2014), Bhutta et al. (2015), Morse (2011) and Dobridge (2018).

Our data do not allow us to make analytical assessments regarding the welfare effects of payday loans or, more broadly, secondary formal loans. However, we can provide some evidence on the sustainability of secondary formal debt based on an additional survey question about arrears. Anybody with a loan is asked to answer this question, which results in a narrower sample than that used in tables 2 to 5. The question reads "Think of all the loans you have, either personally or together with your partner: Have you been in arrears on loan repayments once or more often during the past 12 months?" Based on this question, we construct a dummy variable that takes the value 1 if the borrower was in arrears at least once over the past 12 months. We estimate probit models where the dependent variable is arrears and the explanatory variables include the full set of baseline variables (see section 4).

In addition, we control for the types of debt individuals hold. Model 1 includes a dummy variable that takes the value 1 if individuals have a bank loan and three dummy variables that take the value 1 if individuals hold one, two, or three forms of secondary formal debt (column 1 of table 5). Model 2 includes the same dummy variables for secondary formal debt instruments but replaces the bank loan dummy with a dummy variable for broad bank debt (bank loan, overdraft, store and/or credit card debt; column 2 of table 5). These two models show that having one secondary formal debt instrument ("nof secondary formal = 1") is associated with a 13-percentage-point higher likelihood of being in arrears. This increases to 45 percentage points for three secondary formal debt instruments ("nof secondary formal = 3"). On the other hand, having bank debt is not significantly correlated with a higher likelihood of arrears. Models 3 and 4 include dummy variables for the different forms of secondary formal debt and again include the dummy variables for "bank loan" and "bank loan, overdraft, store and/or credit card debt" (columns 3 and 4 of table 5). The correlation is positive and significant for all types of secondary formal debt, with a particularly strong association evident between pawnshop debt and arrears.

Note that these results do not show a causal relationship. It is possible that individuals first take on debt that is not secondary formal. Having fallen into arrears on the repayment of their primary debt, they then take on secondary formal debt to address these repayment difficulties. It is also possible that individuals

Table 5

Is secondary formal debt correlated with repayment difficulties?

Dependent variable	Arrears			
Sample	Indebted individuals with a loan			
nof secondary formal=1	0.126*** (0.043)	0.109** (0.047)		
nof secondary formal=2	0.263*** (0.087)	0.261*** (0.088)		
nof secondary formal=3	0.452** (0.183)	0.459** (0.184)		
Payday loan			0.150** (0.067)	0.151** (0.068)
Pawnshop			0.199*** (0.065)	0.200*** (0.066)
Owe money to another private lender			0.065** (0.029)	0.065** (0.029)
Internet loan			0.098** (0.043)	0.090** (0.042)
Bank loan	0.013 (0.027)		0.015 (0.026)	
Bank loan, overdraft, credit card, store		0.004 (0.039)		0.012 (0.038)
Further variables: as specified for baseline in section 4 but excluding "other debt"	Yes	Yes	Yes	Yes
Country-wave fixed effects	Yes	Yes	Yes	Yes
Log-L	−2,009	−2,031	−1,971	−1,980
Pseudo-R2	0.17	0.17	0.17	0.17
N	4,259	4,285	4,207	4,215
P(DepVar=1)	0.25	0.26	0.25	0.25

Source: Authors' calculations.

*Note: Marginal effects at the means from probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

run into repayment difficulties because of high installments on secondary formal debt. Our results only show a correlation between loan arrears and secondary formal debt. This correaltion remains significant even when we control for a broad range of individal characteristics. Therefore, it is not a far stretch to infer that secondary formal debt is associated with lower debt sustainability and makes borrowers more vulnerable.

6 Summary and conclusions

Given the limited availability of information on nonbank borrowing in CESEE, we provide evidence on the prevalence of different forms of debt and show how indebtedness differs along sociodemographic lines. We focus on the question why people borrow from secondary formal institutions in addition to, or instead of, borrowing from banks. Overall, our results match those of the existing – US-centric – literature. According to our study, individuals with sociodemographic characteristics that suggest increased vulnerability – e.g. low income, unemployment, not owning one's residence – are more likely to hold secondary formal debt. We also present evidence that people who are credit constrained in the banking sector are more likely to have secondary formal debt, as are individuals with

limited trust in the banking system. The structure of the local banking environment affects borrowing from secondary formal institutions, with the relationship with bank concentration being U-shaped. Finally, we provide some preliminary, noncausal evidence that secondary formal debt is associated with a higher probability of being in arrears.

We consider our study highly policy relevant for central banks for several reasons. First, our analysis shows that a relatively large share of people in the CESEE-10 countries holds some form of nonbank debt. This finding highlights the importance of nonbank debt for any discussion of household indebtedness and vulnerabilities. Second, our analytical results suggest that policymakers should pay due attention to secondary formal debt as borrowers from secondary formal institutions are more vulnerable. With a view to drawing conclusions about the appropriate level of monitoring and regulation, it is important to collect information on the conditions of nonbank borrowing and to analyze the benefits and risks of this debt for borrowers. Third, in this first study on secondary formal lending in the CESEE-10 countries, we present rather general results, which, however, draw attention to open research and policy questions. What are the reasons for nonbank borrowing? Do borrowers opt for nonbank debt based on rational choices, e.g. convenience, or suboptimal choices for lack of other options and/or financial literacy? As to the sequence of borrowing, do individuals use the secondary formal sector to cope with repayment difficulties with bank debt? If so, what does this imply for the usefulness of credit registers and for pockets of vulnerabilities in the financial system? For reasons of scope, we did not discuss informal debt in this study. However, the high prevalence of informal debt suggests that there might be networks of "vulnerability": lack of debt sustainability in the primary and secondary formal sector may well affect more households than just the primary borrowers.

Amid COVID-19, nonbank borrowing is becoming even more relevant, as households' creditworthiness is likely to deteriorate. In the same vein, banks' ability and willingness to lend might decrease, which could cause more households to borrow from nonbanks and worsen debtors' (financial) situation in the medium term. After the global financial crisis, households in transition economies that had been affected by the crisis resorted to informal borrowing much more frequently compared with Western Europe (EBRD, 2011). It remains to be seen how the COVID-19 crisis will affect borrowing decisions and the prevalence of nonbank debt. We plan to conduct some further research, using data from the 2020 OeNB Euro Survey wave.

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Annex

Variable definitions

Variable	Definition
Age	Age in years
Female	Dummy variable that is 1 for female respondents, else 0
Manages household finances	Dummy variable that is 1 for respondents who state they are either personally or together with someone else in charge of managing household finances.
Education secondary/tertiary	Dummy variables that take the value 1 if the respondent has secondary/tertiary education. Omitted category: primary education.
Labor market status (employed, self-employed, unemployed, retired)	Dummy variable coded as 1 if respondent belongs to the selected occupational category. Omitted category: employed. Students are excluded from the sample.
Income (high, medium, low, refused answer)	Dummy variables that take the value 1 for each net household income tercile (high, medium, low). Sample values are used to construct terciles. For those respondents who did not give an answer, an additional dummy variable is defined (income refused).
Income in EUR PPP, equivalence scale	Net household income, converted into EUR PPP.
Own house	Dummy variable that takes the value 1 if the respondent's primary residence is owned by the respondent or someone living in the same household.
Condition of residence poor	Dummy variable defined by interviewer based on the answer to the following question "Could you describe the condition of the dwelling? Excellent and well maintained; good, needs some minor repairs; poor, needs major work; very poor, some walls, ceilings need replacement." Categories "poor, needs major work" and "very poor, some walls, ceilings need replacement" defined as 1, else 0.
Size of household	Number of household members permanently living in the household, including household members that are temporarily absent (e.g. students or persons in military service).
Income shock	Dummy variable based on the following question "Did your household experience an unexpected significant reduction of its income over the past 12 months?" Answers "Yes" coded as 1, else 0.
Income in EUR or remittances	Dummy variable that takes the value 1 if the respondent either receives remittances from abroad or had regular income in euro.
Risk averse	Dummy variable based on the following question "In managing your financial investments, would you say you have a preference for investments that offer: VERY HIGH returns, but with A HIGH risk of losing part of the invested capital, A GOOD return, but also a FAIR degree of protection for the invested capital, A FAIR return, with a GOOD degree of protection for the invested capital, LOW returns, WITH NO RISK of losing the invested capital?" First answer coded as 1, else 0.
Impulsive	Dummy variable that takes the value 1 if the respondent agrees with the following statement "I am impulsive and tend to buy things even when I cannot really afford them."
Time preference – live today	Dummy variable that takes the value 1 if the respondent agrees with the following statement "I tend to live for today and let tomorrow take care of itself."
Applied for bank loan	Dummy variable coded as 1 if the respondent applied for a bank loan as of the year 2000, else 0.
Loan application refused	Dummy variable coded as 1 if the respondent applied for a bank loan as of the year 2000 and the loan application was rejected or he or she was discouraged from applying, 0 if the application was received positively by the bank.
Trust banks, trust central bank	Dummy varaiable based on the following question "Please tell me how much trust you have in the following institutions: (…) domestically owned banks (…) foreign owned banks (...) the central bank. For each of the institutions, please tell me if you tend to trust it or tend not to trust it. 1 means "I trust completely," 2 means "I somewhat trust," 3 means "I neither trust nor distrust," 4 means "I somewhat distrust" and 5 means "I do not trust at all." Answers 1 and 2 are coded as 1, else 0.
Bank account	Dummy variable that takes the value 1 if the respondent has a current account, debit or wage card, 0 otherwise.
Bank perceived as far	Dummy variable that takes the value 1 if the respondent agrees with the following statement "For me, it takes quite a long time to reach the nearest bank branch."
Size of town (log)	Number of inhabitants of the village/town where the respondent lives, in logarithm.
Distance to next bank	Distance in km, obtained by geocoding primary sampling units of the OeNB Euro Survey. Accuracy is at the street level, except for small villages where geocodes show the village center. Distance is calculated by merging OeNB CESEE bank branch data with Beckmann et al. (2018). Bank branch locations are also coded at the street level except for small villages.
Arrears	Dummy variable derived from answers to the question "Has your household been in arrears on loan repayments once or more often during the last 12 months on account of financial difficulties?" Dummy variable coded as 1 for answers "Yes, once" and "Yes, twice or more," else 0; missing for respondents who do not have a loan.
Memory restricted access	Dummy variable that takes the value 1 if the respondent agrees with the following statement "I remember periods during which access to savings deposits was restricted in [MY COUNTRY]."
Banks are stable	Dummy variable that takes the value 1 if the respondent agrees with the following statement "Currently, banks and the financial system are stable in [MY COUNTRY]."
Night light	VIIRS night time lights, calculated for an area of 5 km radius around the PSU. Source: https://payneinstitute.mines.edu/eog/nighttime-lights/
Herfindahl index of bank concentration, 20 km	See description in section 2.

Source: OeNB Euro Survey.

Table A2

Summary statistics

Sociodemographic characteristics

	Full sample	Indebted persons	Bank debt	Secondary formal debt
Age in years	40.10	40.09	40.19	38.33
Female	0.52	0.50	0.51	0.46
Manages household finances	0.82	0.87	0.90	0.80
Education – secondary	0.66	0.66	0.67	0.63
Education – tertiary	0.18	0.22	0.24	0.21
Unemployed	0.15	0.13	0.09	0.19
Self-employed	0.07	0.09	0.09	0.14
Retired	0.23	0.15	0.15	0.11
Household income (EUR PPP)	996	1,166	1,257	1,050
Own house	0.88	0.88	0.89	0.82
Condition of residence poor	0.11	0.12	0.10	0.21
Size of household (persons)	2.95	3.12	3.12	3.44

Other variables of interest

	Full sample	Indebted persons	Bank debt	Secondary formal debt
Risk averse	0.96	0.96	0.97	0.92
Impulsive	0.26	0.29	0.28	0.47
Time preference – live today	0.34	0.35	0.33	0.52
Income shock	0.18	0.23	0.21	0.36
Applied for bank loan		0.61	0.72	0.46
Bank loan refused	0.07	0.12	0.14	0.19
Trust in banks	0.34	0.36	0.39	0.30
Bank account	0.83	0.92	0.96	0.84
Bank perceived as far (0/1)	0.22	0.21	0.19	0.34
Income in EUR or remittances	0.12	0.14	0.12	0.28

Source: OeNB Euro Survey.

Table A3

Who is indebted?

Dependent variable	Has any debt	
Age	−0.001***	−0.001***
	(0.000)	(0.000)
Female	−0.009	−0.015
	(0.021)	(0.020)
Size of household	0.062***	0.069***
	(0.012)	(0.014)
Manages household finances	0.322***	0.276***
	(0.052)	(0.055)
Education – secondary	0.062	−0.029
	(0.042)	(0.043)
Education – tertiary	0.201***	0.064
	(0.067)	(0.060)
Unemployed	−0.270***	−0.256***
	(0.054)	(0.046)
Self-employed	−0.075	−0.097
	(0.077)	(0.062)
Retired	−0.036	−0.017
	(0.043)	(0.050)
Income – refused answer	−0.227***	−0.214***
	(0.054)	(0.057)
Income medium	0.054	0.039
	(0.048)	(0.050)
Income high	0.072*	0.041
	(0.041)	(0.041)
Own house	0.03	0.083
	(0.057)	(0.058)
Condition of residence poor	0.263***	0.251***
	(0.050)	(0.054)
Income in EUR or remittances		0.111*
		(0.059)
Income shock		0.380***
		(0.043)
Risk averse		−0.013
		(0.089)
Impulsive		0.097**
		(0.040)
Time preference – live today		0.091**
		(0.035)
Bank account		0.609***
		(0.087)
Size of town (log)		0.011
		(0.009)
Log-L	−12,281	−10,215
Pseudo-R2	0.1	0.12
Control variables	No	No
Country-wave fixed effects	Yes	Yes
N	19,926	16,906
P(DepVar=1)	0.43	0.44

Source: Authors' calculations.

*Note: Marginal effects at the means from probit regression. Standard errors are clustered at the country-wave
level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

Table A4

Robustness analysis: Baseline "Bank borrowers versus secondary formal borrowers" estimated for all individuals in the sample

Dependent variables	Bank debt vs. secondary formal debt		
Sample	All individuals		
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Age	0	−0.001***	0
	(0.000)	(0.000)	(0.000)
Female	−0.001	0.010*	−0.001
	(0.002)	(0.006)	(0.001)
Manages household finances	0.002	0.058***	−0.002
	(0.003)	(0.010)	(0.002)
Education – secondary	−0.007***	0.019*	−0.005***
	(0.003)	(0.010)	(0.002)
Education – tertiary	−0.004	0.030**	−0.005**
	(0.003)	(0.012)	(0.002)
Unemployed	0	−0.095***	0.006***
	(0.002)	(0.010)	(0.002)
Self-employed	0.001	−0.037***	0.003
	(0.003)	(0.011)	(0.002)
Retired	−0.002	0.001	−0.001
	(0.004)	(0.012)	(0.003)
Own house	−0.008***	0.026***	−0.007***
	(0.002)	(0.009)	(0.002)
Condition of residence poor	0.006**	0.007	0.003*
	(0.002)	(0.010)	(0.002)
Size of household	0.004***	0.007**	0.002***
	(0.001)	(0.003)	(0.001)
Risk averse	−0.010***	0.003	−0.007***
	(0.003)	(0.016)	(0.002)
Impulsive	0.011***	0.004	0.007***
	(0.002)	(0.007)	(0.001)
Time preference – live today	0.005***	0.017**	0.002*
	(0.002)	(0.007)	(0.001)
Debt owed to family, friends or employer	0.026***	0.021**	0.015***
	(0.002)	(0.009)	(0.001)
Debt owed to utility provider	0.021***	0.050***	0.011***
	(0.003)	(0.013)	(0.002)
Income – refused answer	−0.007***	−0.022**	−0.004**
	(0.003)	(0.009)	(0.002)
Income medium	−0.001	0.01	−0.002
	(0.003)	(0.009)	(0.002)
Income high	−0.006**	0.024**	−0.005***
	(0.003)	(0.010)	(0.002)
Income shock	0.008***	0.030***	0.003***
	(0.002)	(0.008)	(0.001)
Income in EUR or remittances	0.010***	−0.007	0.007***
	(0.002)	(0.009)	(0.001)

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

Robustness analysis: Baseline "Bank borrowers versus secondary formal borrowers" estimated for all individuals in the sample

Dependent variables	Bank debt vs. secondary formal debt		
Sample	All individuals		
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Applied for bank loan	0.020***	0.360***	−0.010***
	(0.002)	(0.004)	(0.001)
Bank loan refused	0.010***	−0.050***	0.009***
	(0.003)	(0.011)	(0.002)
Trust banks	−0.007***	0.012**	−0.005***
	(0.002)	(0.006)	(0.001)
Bank account	0.011***	0.169***	−0.004**
	(0.003)	(0.012)	(0.002)
Bank perceived as far	0.006***	−0.015**	0.005***
	(0.002)	(0.008)	(0.001)
Rho	0.305***	0.305***	0.305***
	(0.031)	(0.031)	(0.031)
Country-wave fixed effects	Yes	Yes	Yes
Further control variables	No	No	No
Log-L	−8,906	−8,906	−8,906
N	16,257	16,257	16,257

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.*

Table A5

Results of table 2 when using alternative definitions for bank debt

Dependent variables	Bank loans and overdraft vs. secondary formal debt			Bank loans vs. secondary formal debt		
Sample	Indebted individuals					
Outcome	Both bank and nonbank debt	Only bank debt	Only nonbank debt	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Manages household finances	0.001	0.074***	−0.010**	0.004	0.122***	−0.013*
	(0.008)	(0.011)	(0.005)	(0.006)	(0.015)	(0.007)
Education – secondary	−0.010*	0.053***	−0.014***	−0.008**	0.039***	−0.014***
	(0.005)	(0.014)	(0.004)	(0.004)	(0.015)	(0.005)
Education – tertiary	−0.008	0.034**	−0.010*	−0.006	0.022*	−0.01
	(0.007)	(0.016)	(0.006)	(0.004)	(0.013)	(0.006)
Unemployed	0.008*	−0.068***	0.015***	0.008**	−0.033***	0.013**
	(0.005)	(0.013)	(0.004)	(0.004)	(0.011)	(0.005)
Self-employed	0.012*	−0.01	0.008	0.010**	0.003	0.011
	(0.007)	(0.019)	(0.005)	(0.005)	(0.020)	(0.007)
Income – refused answer	−0.004	0.025**	−0.006	−0.003	0.01	−0.005
	(0.008)	(0.012)	(0.006)	(0.007)	(0.014)	(0.008)
Income medium	0.002	0.024*	−0.003	0	0.02	−0.003
	(0.005)	(0.013)	(0.004)	(0.004)	(0.013)	(0.005)
Income high	−0.006	0.050***	−0.011***	−0.006	0.039**	−0.012**
	(0.006)	(0.011)	(0.004)	(0.005)	(0.017)	(0.005)
Own house	−0.018***	0.037***	−0.016***	−0.012***	0.056***	−0.022***
	(0.006)	(0.013)	(0.004)	(0.004)	(0.016)	(0.005)
Size of household	0.006***	0.001	0.003**	0.004***	0.005	0.004**
	(0.002)	(0.004)	(0.001)	(0.001)	(0.005)	(0.002)
Income shock	0.014***	−0,002	0.009**	0.013***	0.015	0.012**
	(0.005)	(0.011)	(0.004)	(0.004)	(0.015)	(0.005)
Income in EUR or remittances	0.018***	−0.040***	0.016***	0.013***	−0.040**	0.021***
	(0.006)	(0.015)	(0.005)	(0.005)	(0.020)	(0.005)
Risk averse	−0.028***	−0.016	−0.014**	−0.020***	0.006	−0.023***
	(0.007)	(0.022)	(0.005)	(0.006)	(0.028)	(0.007)
Impulsive	0.019***	−0.018	0.014***	0.015***	−0.002	0.017***
	(0.006)	(0.012)	(0.004)	(0.005)	(0.012)	(0.005)
Time preference – live today	0.006	0.005	0.003	0.003	−0.016*	0.006
	(0.006)	(0.011)	(0.004)	(0.004)	(0.009)	(0.005)
Applied for bank loan	0.006	0.248***	−0.033***	0.017***	0.419***	−0.043***
	(0.007)	(0.012)	(0.007)	(0.006)	(0.010)	(0.008)
Loan application refused	0.021**	−0.061***	0.021***	0.015**	−0.082***	0.029***
	(0.009)	(0.014)	(0.006)	(0.006)	(0.014)	(0.007)
Trust banks	−0.009*	0.030***	−0.010***	−0.006*	0.028**	−0.010**
	(0.005)	(0.011)	(0.004)	(0.003)	(0.011)	(0.004)
Bank account	0.005	0.136***	−0.018***	0	0.076***	−0.011*
	(0.007)	(0.022)	(0.004)	(0.005)	(0.027)	(0.006)
Bank perceived as far	0.012**	−0.009	0.008**	0.008**	0.007	0.008**
	(0.006)	(0.011)	(0.004)	(0.004)	(0.010)	(0.004)
Size of town (log)	0.001	−0.006**	0.002	0	−0.005**	0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Debt owed to family, friends or employer	−0.004	−0.203***	0.028***	−0.001	−0.167***	0.023***
	(0.007)	(0.008)	(0.005)	(0.006)	(0.020)	(0.006)
Debt owed to utility provider	0.005	−0.147***	0.025***	0.005	−0.105***	0.021***
	(0.008)	(0.013)	(0.005)	(0.006)	(0.019)	(0.006)
Store credit	0.009	−0.131***	0.025***	0.007	−0.091***	0.021***
	(0.006)	(0.017)	(0.005)	(0.006)	(0.025)	(0.005)
Bank overdraft debt				−0.009**	−0.092***	0.004
				(0.003)	(0.014)	(0.003)

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. The table only includes rows with significant coefficients.*

Results of table 2 when using alternative definitions for bank debt

Dependent variables	Bank loans and overdraft vs. secondary formal debt			Bank loans vs. secondary formal debt		
Sample	Indebted individuals					
Outcome	Both bank and nonbank debt	Only bank debt	Only nonbank debt	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Rho	−0.136**	−0.136**	−0.136**	−0.02	−0.02	−0.02
	(0.068)	(0.068)	(0.068)	(0.069)	(0.069)	(0.069)
Country-wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Further control variables	No	No	No	No	No	No
Log-L	−4,046	−4,046	−4,046	−4,491	−4,491	−4,491
N	7,059	7,059	7,059	7,007	7,007	7,007

Source: Authors' calculations.

*Note: Marginal effects at the means from bivariate probit regression. Standard errors are clustered at the country-wave level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. The table only includes rows with significant coefficients.*

Are CESEE borrowers at risk? COVID-19 implications in a stress test analysis

Aleksandra Riedl[1]

We simulate an increase in the unemployment rate to assess the impact of an income shock on the financial vulnerability of households in ten countries of Central, Eastern and Southeastern Europe (CESEE). According to our definition, a household is financially vulnerable when its debt service-to-income (DSTI) ratio is 40% or more. Using microdata from the 2019 fall wave of the OeNB Euro Survey allows us to calculate the share of vulnerable households in a consistent manner across countries. We use this indicator to analyze the response to various shock scenarios that are based on recent unemployment projections amid the COVID-19 pandemic. Given the unified microsimulation framework, we can provide a comparative assessment of the effects stemming from an increase in the unemployment rate on households' debt service capacity across the ten examined CESEE countries. Our results suggest that the share of vulnerable households increases almost linearly with a rise in the unemployment rate but to a very different extent across countries. We identify several factors for the observed variability, one being the amount of wage replacement rates. In countries where unemployment benefits are comparatively high, adverse effects can be mitigated to a significant degree.

The COVID-19 pandemic has not only caused a global health crisis but also a worldwide economic crisis that is projected to be far deeper than the global financial crisis (IMF, 2020a). For the banking sector, the expected economic contraction constitutes the largest shock since the Great Depression. According to the recent global financial stability report released by the International Monetary Fund (IMF), banks entered the COVID-19 crisis with far higher capital ratios than in 2009 but the sheer size of the shock and the likely increase in defaults from firms and households may still pose substantial challenges to banks' profitability and capital positions (IMF, 2020b). From a financial stability viewpoint, it is of interest to know which and how many debtors will have a high risk of not being able to repay their loans as a result of the crisis in order to evaluate the adverse implications for the banking sector.

Against this background, this paper makes use of survey data to shed light on household debt in ten Central, Eastern and Southeastern European (CESEE) economies[2] from the perspective of the borrower. In particular, the aim is to assess how job losses due to the COVID-19 slump might impact on the debt service capacity of households. We hereby add three new aspects to the literature on stress testing CESEE households. First, by using unique data from the OeNB Euro Survey we are in the position to assess the financial situation of households in a time just

before the COVID-19 crisis hit, namely in fall 2019. The latest available stress test exercise in a CESEE country was performed based on 2014 data (Bańbuła et al., 2016, for Poland).[3] Second, we shed light on the responsiveness of indebted households to unemployment shocks in countries that so far have not been analyzed[4]. Finally, we conduct our stress test analysis based on a harmonized microlevel dataset and impose a unified simulation framework for a broad range of CESEE economies. This allows us to compare the magnitude of the resulting impacts across countries.

So far, the literature on stress test exercises to evaluate the vulnerability of CESEE households to adverse shocks is very rare and almost limited to single-country studies (Room and Merikull, 2017; Bańbuła et al., 2016; Galuščák et al., 2014; Sugawara and Zalduendo, 2011; Holló and Papp, 2007)[5]. We are aware of two papers that present findings on stress tests of indebted households for multiple countries. Ampudia et al. (2016) look at ten euro area countries, among them Slovakia as the only CESEE country, using 2010 data from the Household Finance and Consumption Survey (HFCS). Tiongson et al. (2010) stress test households' debt service capacity in seven countries (including three CESEE countries) based on EU Survey of Income and Living Conditions data from 2007 and Household Budget Survey data from 2006 or earlier. All the mentioned studies include scenarios in which the responsiveness of a debt burden indicator (measured in various ways) to an unemployment shock is assessed. Yet, it is hardly possible to compare the results of single-country studies with respect to the magnitude of the estimated impact. The reason is that the imposed shock scenarios (e.g. by which amount the unemployment rate is increased), the definition of the debt burden indicator, the data source and the time span used are very different. The estimated impacts in Ampudia et al. (2016) are not comparable either; though the authors look at multiple countries within a unified simulation framework, the countries are subject to different unemployment shocks[6].

Therefore, in this paper we consider a scenario in which the unemployment rate is increased stepwise by the same amount in each country. This allows us to compare the magnitude of the adverse impact across countries and to identify those aspects that drive the countries' responsiveness to such shocks. Knowing these determinants can help assess effects from income shocks when microsimulation techniques or specific data are not at hand. However, according to recent unemployment rate projections, labor markets in CESEE countries will be hit to greatly varying degrees by the COVID-19 crisis (IMF, 2020a). In order to assess

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[3] *A recent assessment of the impact of income shocks on households' debt service capacity in eight CESEE countries can be found in Albacete et al. (2020). As evaluating income shock effects is not the central issue in their paper, they do not perform a stress test exercise where macroeconomic shocks are mapped into a microsimulation framework. Instead, based on an ad hoc calculation using 2017 HFCS data, they show how vulnerabilities increase when the total monthly gross income of indebted households is reduced by 10% up to 50% (in steps of 10%).*

[4] *To our knowledge, this includes Albania, Bosnia and Herzegovina, Bulgaria, North Macedonia and Romania.*

[5] *For a broader literature review on the papers that use microlevel survey data to assess vulnerabilities in the household sector see Ampudia et al. (2016).*

[6] *The income shock in Ampudia et al. (2016) is defined based on the variability of unemployment rates within each single country so that the probability of the occurrence of the shock is about the same for all countries. While this is a very reasonable approach that controls for the fact that countries' labor markets might be hit to a very different extent by an economic crisis, it has limitations when it comes to comparing the responsiveness of households to an unemployment shock across countries.*

crisis implications, we include a scenario in which the unemployment rate is increased by individual amounts that correspond to the recent unemployment rate projections for the countries concerned.

Our paper is structured as follows. In section 1 we define the debt burden indicator and the underlying data source. Section 2 describes the simulation setup in detail. The results of our stress test exercise are then outlined in section 3. Finally, section 4 will conclude with a brief summary of the results and some remarks concerning the limitations of our simulation framework.

1 The metric: financially vulnerable households in CESEE

Before describing the debt burden indicator used as the metric in our stress test exercise, we want to devote some space to present the dataset and to discuss the limitations associated with it when analyzing household vulnerabilities.

1.1 Data

We use OeNB Euro Survey data[7] to study the effects of job losses due to the COVID-19 crisis on the debt service capacity of households. The survey is conducted annually in ten CESEE countries in a harmonized way, where around 1,000 respondents are selected randomly and are interviewed (face to face) based on a standard questionnaire in the same reference period. To our knowledge, the OeNB Euro Survey has the highest coverage of CESEE economies (in terms of countries and population) of all data sources that are suitable for performing household stress test exercises in a consistent manner. Moreover, it makes it possible to assess the financial situation of households at a time just before the crisis hit, namely in fall 2019. Although the distribution of debt across households in a country does typically not change rapidly over time, it is very convenient to be able to estimate the adverse implications of projected job losses based on very recent data. This is especially true for periods where macroprudential policies have been implemented more frequently. The most recent example is Romania, where the median debt service-to-income (DSTI) ratio came down significantly in 2019 compared to 2017 according to OeNB Euro Survey data. This is most likely related to the fact that the National Bank of Romania introduced a DSTI limit of 40% in 2019, which was announced already in 2018. As the average loan maturity is around six years in Romania, borrower-based macroprudential measures can show an effect within quite a short period. Hence, the annual frequency of the OeNB Euro Survey is a big advantage in this respect.

Nevertheless, there are some shortcomings in the data, above all the lack of data concerning the wealth situation of households. Unfortunately, it is not possible to account for the financial buffers a household has due to the accumulation of wealth, so that our assessment of the debt service capacity of households relies solely on income streams. Likewise, we have no information on the total debt amount of each household in the 2019 data, which restricts our analysis to an assessment of the probability of default.[8]

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[7] General information regarding the OeNB Euro Survey (e.g. publications or technical details) can be obtained from the OeNB website at: https://www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html

[8] Based on the estimated probability of default, an extension would be to calculate the exposure at default, which is a standard measure of the risk to financial stability (see e.g. Albacete and Lindner, 2013).

As the main objective of the OeNB Euro Survey is to shed light on the financial situation of *individuals,* questions that relate to other household members are less frequent. In particular, socioeconomic characteristics (e.g. income and job situation) of all other household members are not covered. Hence, our micro-simulation allows only for one person per household to become unemployed. The impact from this restriction could change the vulnerability measure in both directions for households with more than one earner.

There is one dataset we are aware of that contains complete information on both households' wealth and income positions and on the socioeconomic characteristics of the individuals living in the household, namely the Household Finance and Consumption Survey (HFCS). The data derived from this survey are very well suited for performing stress test exercises across countries in a consistent manner (so far 20 European countries are covered), and HFCS data are much more comprehensive than the OeNB Euro Survey as far as the balance sheet information of the household is concerned. However, although the latest wave of the HFCS already covers eight CESEE economies[9], the survey has not been conducted in seven out of the ten countries considered in this paper[10]. In terms of population, the HFCS represents 55% of the inhabitants living in the CESEE region compared to 88% covered by the OeNB Euro Survey.[11] Besides, the reference period of the latest HFCS wave is 2017 for most of the covered CESEE economies. Hence, given the different regional focus of both surveys and the different timing of the most recent survey waves, the HFCS is rather a complement than an alternative dataset for the purpose of this paper.

1.2 The vulnerability indicator

Several indicators have been used to assess over-indebtedness in the literature (see Bańbuła et al., 2016, for an overview). Most of the papers performing stress test exercises use either the DSTI ratio (Michelangeli and Pietrunti, 2014; Sugawara and Zalduendo, 2011) or the financial margin (Ampudia et al., 2016; Galuščák et al., 2014; Johansson and Persson, 2006) to measure the vulnerability of households. The main aim is to assess a household's repayment capacity in order to have a proxy for default risk. The financial margin is usually defined as the disposable income of the household minus basic living costs and loan installment payments. A household is typically classified as vulnerable if this indicator is negative. Ampudia et al. (2016) extend the definition of the financial margin by considering the amount of the household's liquid assets (available in the HFCS data). Using information on the wealth position certainly improves the measure of default risk as households that cannot service their debt out of their incomes are likely to withdraw from their savings to meet their debt obligations. At this point we want to highlight a recent paper by Albacete et al. (2020), who analyze a large set of household vulnerability indicators in seven CESEE countries based on the third wave of the HFCS. By looking at the liquid asset positions, they show that, in six

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[9] *The CESEE countries that are covered in the third wave of the HFCS are Estonia, Latvia, Lithuania, Slovenia, Slovakia, Croatia, Poland and Hungary.*

[10] *The overlapping country sample is Croatia, Poland and Hungary.*

[11] *The CESEE region, on which the comparison is based, comprises all countries included in the HFCS and in the OeNB Euro Survey, i.e. in total 15 economies. See footnotes 2 and 9 for the country samples of the respective surveys.*

out of the eight CESEE economies, the median indebted household could service its debt for only less than two months when relying solely on its liquid assets. Only in Poland and Slovakia, the ratio of liquid assets to debt service payments is somewhat higher enabling the median household to service its debt for a longer period, i.e. five and six months, respectively. Overall, this points to little room for maneuver among indebted CESEE households in the presence of an income shock. Yet, as neither data on the wealth position nor on basic living costs[12] are available, we stick to the DSTI ratio as our metric.

The survey unit of the OeNB Euro Survey is the individual. However, some questions are posed to the respondent that concern the entire household, i.e. all people with whom the respondent is permanently living together. In the 2019 fall wave, respondents were asked to report the monthly loan installment payments of the household[13]. Further, a socioeconomic question that is included in the standard questionnaire of the OeNB Euro Survey provides information on the total monthly net income (after taxes) of the household. Based on these questions we construct the DSTI ratio as follows:

$$DSTI = \frac{monthly\ loan\ installment\ payments}{monthly\ net\ income} * 100.$$

In order to identify vulnerable households, we then need to set a threshold above which we classify households as having a high risk of not being able to repay their debt. While this is a rather ad hoc decision in general, there is some literature indicating that measures based on DSTI limits are relatively good indicators of financial stress (e.g. Albacete et al., 2018, and Bańbuła et al., 2016). Bańbuła et al. (2016), who were the first to assess the effectiveness of DSTI limits, use microdata from the study on household wealth in Poland conducted by the National Bank of Poland in cooperation with the Central Statistical Office in 2014 and find that – given a range of plausible preferences with regard to type I and type II errors – the optimal DSTI threshold lies between 30% and 40% for Polish data. In effect, thresholds are typically set within this range in the literature on household vulnerabilities (Michelangeli and Pietrunti, 2014, and Sugawara and Zalduendo, 2011). In some papers the effective threshold is somewhat higher than 40%, as the DSTI ratio is calculated based on gross income (e.g. Albacete et al., 2020, and Fessler et al., 2017).

Following the literature, we define households as vulnerable when their DSTI ratio is equal to or above 40%. The metric used in this paper is the share of vulnerable households in % of all indebted households (with debt service payments). In order to ensure that this indicator is representative for the target population, we

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[12] Basic living expenses are proxied in several ways in the literature, mostly by using different out-of-sample sources that are very country specific (Bilston et al., 2015; Galuščák et al., 2014; Albacete and Fessler, 2010). In contrast, Ampudia et al. (2016) use an in-sample measure and define the basic living costs as 40% of the median household income in the relevant country. Hence, an alternative way of measuring household vulnerability based on OeNB Euro Survey data could be based on the financial margin using an ad hoc measure of basic livings costs.

[13] The question is worded in the following way: "Think of all members in your household that have loans. How much money does your household have to spend per month to service all these loans including interest and principal payments? If you do not know the exact amount, an approximate answer would also be helpful." The answer categories are (1) amount per month, (2) my household does not have a loan, (3) don't know and (4) no answer.

employ household weights using information on the region and the size of the household (i.e. number of household members). We will use this metric in our microsimulation and test its responsiveness to a range of income shocks. The results will reveal to which extent the share of vulnerable households increases (in percentage points) due to these shocks. Given that our focus is on evaluating changes in the vulnerability of households due to increases in the unemployment rate, we do not consider alternative vulnerability measures like household shares based on different DSTI thresholds or financial margins. This would be beyond the scope of this paper. Rather, we vary our model with respect to the ingredients that might influence the responsiveness of the vulnerability indicator to the crisis. Therefore, the paper pays special attention to covering a wide range of potential economic scenarios regarding the unemployment shock and its transmission. The different assumptions regarding these important factors are described in detail in the next section.

2 The stress test scenario

Having established a measure of household vulnerability, we will now outline the main ingredients that must be specified in order to set up the stress test exercise. In this section, we first define the unemployment shocks (2.1) and then discuss how a respondent is selected into unemployment by the model (2.2). Once the pool of new unemployed persons has been determined, it remains to define in which way the personal income of the selected persons is altered in order to recalculate the income of the household subject to the shock (2.3). Finally, we obtain the modified DSTI ratios and the new share of vulnerable households. After repeating the Monte Carlo simulation 1,000 times, we get the result by taking the mean value of the vulnerability indicator over all these draws. Our simulation design is static, i.e. we do not take into account second-round effects. Hence, households are not assumed to adjust their labor supply or financing decisions as a response to the unemployment shock.

2.1 The magnitude of the unemployment shock

Unemployment shocks are defined quite differently across the stress test literature. The simplest approach is to set the magnitude of the shock arbitrarily by increasing the unemployment rate in steps, mostly from 1 to 3 (up to 5) percentage points (e.g. Bilston et al., 2015; Galuščák et al., 2014; Albacete and Fessler, 2010; and Johansson and Persson, 2006). An alternative way is to define it in line with historical experiences of the countries of interest. Sugawara and Zalduendo (2011) for example uses the largest increase in the unemployment rate during a specified time period to define the shock for Croatian data (i.e. 6 percentage points between 2007 and 2010). A similar approach can be found in Bańbuła et al. (2016), who analyze Polish data, basing their unemployment rate scenario on the largest historical growth rate observed over the past 20 years (i.e. 2.7 percentage points). Another way to take into account historical developments is to define the magnitude of the shock based on the standard deviation of the observed unemployment rate (Room and Merikull, 2017, and Ampudia et al., 2016).

In this paper, the selection of the shock scenarios follows two objectives. First, we want to compare the responsiveness of the vulnerability indicator to shocks across countries, which requires a unified shock scenario rather than one where

historical developments of individual countries are considered. Therefore, in the first scenario we increase the unemployment rate in each country by 5 percentage points (in steps of 1 percentage point). At the same time, however, we aim to assess the implications from job losses due to the current crisis. This calls for a scenario with individual shocks as labor markets are supposed to be hit very differently across countries. According to the World Economic Outlook of October 2020 (IMF, 2020a) the unemployment rate is expected to increase by only 0.3 percentage points

Chart 1

Projected increase in the unemployment rate from 2019 to 2020

Percentage points

Source: IMF, October 2020 World Economic Outlook.

in Albania but by 4.0 percentage points in Romania from 2019 to 2020 (see chart 1). Hence, in a second scenario, we will compare the countries' responsiveness to individual unemployment rate shocks, which are based on these projections. Of course, if the fight against the virus proves to be slower than assumed in the baseline scenario of the IMF, economic activity is expected to deteriorate further with more adverse implications for the labor market. Hence, the second scenario might soon be outdated. In this case, one could refer to the first scenario, which includes unemployment shocks of up to 5 percentage points and therefore provides us with results from unemployment paths far worse than projected by the IMF.

2.2 Selection into unemployment

Once the unemployment level is defined, we have to determine how individuals are selected into unemployment in our model. The simplest approach is to assign equal probabilities of becoming unemployed to all individuals (Johansson and Persson, 2006; Herrala and Kauko, 2007; Sugawara and Zalduendo, 2011; Holló and Papp, 2007). In a more advanced setup the selection is based on a probability model of unemployment taking into account that individuals with different personal characteristics have a different likelihood of becoming unemployed (Giordana and Ziegelmeyer, 2020; Room and Merikull, 2017; Bilston et al., 2015; Galuščák et al., 2014; and Albacete and Fessler, 2010).

In this paper we follow both approaches. While it is very likely that individuals are hit differently by an economic crisis in terms of job loss, the assignment of different probabilities to individuals is always based on past data. Hence, the unemployment shock will tend to affect individuals with characteristics that have historically been associated with a higher likelihood of being unemployed. Yet, these characteristics do not necessarily have to be good predictors for the COVID-19 crisis as, this time around, it might be certain sectors that are particularly affected by the economic downturn, like contact-intensive sectors, rendering individual characteristics less meaningful. Unfortunately, it is not possible to assign higher probabilities to individuals working in specific sectors as the corresponding information is not available in the OeNB Euro Survey. Therefore, we will stick to the common approach and estimate unemployment probabilities based on
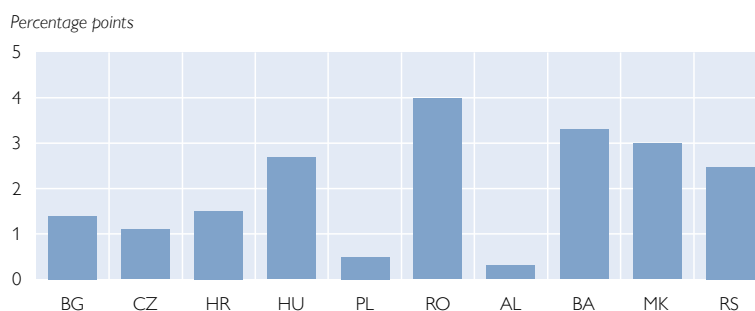
individual characteristics.[14] However, in order to isolate the influence of assuming different probabilities on the simulation outcome, we also consider the less assumption-driven approach, where job loss is equally likely across individuals.

Heterogeneity in unemployment risk is estimated based on a probit model using data from the OeNB Euro Survey rounds of 2017 to 2019. We explain unemployment for each country separately by focusing on those respondents who are active on the labor market, i.e. employed and unemployed persons.[15] The explanatory variables are the same for each country for comparison reasons and include individual and household characteristics (see e.g. Giordana and Ziegelmeyer, 2020)[16]. Based on the estimated parameters, we predict the probability of becoming unemployed for each *employed* individual by varying the constant in the regression equation so that the mean probability (for the pool of employed persons) corresponds to the percentage share of employees transiting into unemployment. This share, let us call it *x*, is set so that the unemployment rate in the sample matches the shock scenario.[17] Based on these estimated probabilities we set up the random selection process by following the approach in Albacete and Fessler (2010). We draw a random real number from a uniform distribution between zero and one for each employee. Whenever the individual probability is equal to or higher than this real number, we classify the working person as unemployed. Repeating this step 1,000 times results in different selections of individuals, where employees with higher unemployment probabilities will be overrepresented on average.

In the case of homogenous unemployment risk, the random selection is conducted in a quite similar way. The only difference is that the individual's probability is set to a value that is equal for all employees. This value corresponds to the targeted mean probability *x* defined above. We again assign a random real number drawn from a uniform distribution (between zero and one) to each individual and classify those employees as unemployed whose real number is below the probability value *x*.

2.3 Effects from a job loss on personal income

The 2019 fall wave of the OeNB Euro Survey provides information on each respondent's individual income as well as on the total income of each household. Hence, it is possible to reduce a household's income by the amount that is lost due

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[14] Note that some papers in the literature also model transitions from unemployment into employment (Galuščák et al., 2014; Bańbuła et al., 2016). In this paper, we assume that persons who are unemployed at the time of the survey stay unemployed after the shock.

[15] Retired persons, students and other individuals outside the labor force (individuals on parental leave, unemployed people who do not seek a job) are excluded from our analysis.

[16] The list of explanatory variables includes gender, education, (previous) profession (i.e. blue collar, white collar), age, the square root of age and the marital status of the respondent. Further we include the number of all household members and adults living in the household, the number of earners (excluding the respondent), homeownership, a dummy if the condition of the building the household lives in is poor and a dummy for big cities. As we estimate unemployment probabilities based on three waves, we also include year dummies.

[17] We obtain x as follows: $x=\varepsilon/(1-u_1)$ where ε is the magnitude of the shock ($\varepsilon=u_2-u_1$), with u_1 being the actual unemployment rate and u_2 the unemployment rate after the shock (in the interval [0,1]). If the magnitude of the shock is set to 2 percentage points and the actual unemployment rate is 7%, we calculate $x=0.02/(1-0.07)\simeq0.022$. Hence, 2.2% of all employed persons have to lose their jobs in order for the unemployment rate to increase by 2 percentage points.

to the income shock of the employee. We will look at two different scenarios. First, we assume that the shocked individual receives an unemployment benefit according to national regulations. In a second scenario, we assume that there are no unemployment benefits, i.e. the personal income of the respondent is set to zero. This scenario will serve as a benchmark in order to assess to which extent unemployment benefits can cushion households against the adverse effects from job losses on their vulnerability. There is one shortcoming with respect to the personal income data. It is not possible to distinguish between income from labor and other forms of income a respondent might receive.[18] Hence, unemployment benefits are calculated based on the overall income of the respondent. Moreover, if the respondent does not receive unemployment benefits (second scenario), the overall amount of the income is set to zero. Hence, we might overestimate the negative impact resulting from a job loss.

The unemployment benefit in our stress test exercise corresponds to the amount of the net wage replacement rate according to national regulations. This rate is available from the OECD for six out of the ten countries under review and represents the share of net income from work that is maintained when people become unemployed. We complement this indicator for the remaining four countries by considering various sources (Council of Europe, ILO). Table 1 provides an overview of the wage replacement rate in the ten countries.

The OECD publishes several indicators of national replacement rates. We choose the replacement rate that applies to the average net wage of a job seeker who has been unemployed for 12 months.[19] Note that the considered replacement rates are subject to a variety of assumptions reflecting the fact that national unemployment benefit regulations vary in terms of a lot of parameters: the employment history of the unemployed, contribution payments, minimum and maximum amounts received, benefit duration, household structure, etc. Hence, a single number reflecting the replacement rate is always a rough approximation of national regulations and can never be fully representative of the actual situation in a country. The assumptions behind the replacement rates offered by the OECD can be regarded as rather favorable for the unemployed person. Specifically, the replacement rates apply to a jobseeker aged 40 with an uninter-

Table 1

Replacement rate

% of net average wage

BG	80.6
CZ	36.1
HR	47.9
HU	24.2
PL	49.5
RO	41.9
AL	30.5[1]
BA	40.0
MK	50.0
RS	50.0

Source: OECD, Council of Europe, ILO.

[1] Please note that Albania provides a flat lump-sum payment of 11,000 lek, which corresponded to 30.5% of the net average wage in 2019.

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[18] The corresponding question in the OeNB Euro Survey says: "What is your personal total monthly income after taxes? If you cannot provide an exact amount, an approximate answer would also be helpful."

[19] See https://www.oecd.org/els/soc/methodology.pdf for a detailed methodological description. As the OECD publishes replacement rates for different family types (e.g. single, couple with and without children, inactive spouse, etc.) we use a weighted average of these rates based on the country's household structure according to the OeNB Euro Survey. Note that we cannot use different replacement rates for different households when shocking a respondent's income, as the required information (e.g. spouse works full-time, is inactive, etc.) is not available in the OeNB Euro Survey.

rupted employment record since the age of 19 until the job loss. Moreover, they also include guaranteed minimum income benefits. Furthermore, if the receipt of benefits is subject to certain conditions, it is assumed that these are all met. Hence, the considered replacement rates in our microsimulation rather underestimate than exaggerate the income loss of the respondent.

In the second scenario, we assume that the respondent does not receive any unemployment benefits, i.e. the personal income is set to zero in the case of an unemployment shock. While in the first scenario the unemployment benefit conditions are rather favorable, this scenario represents the worst case of an income shock and therefore reflects the maximum negative impact on a household's vulnerability due to a job loss of the respondent[20]. We want to highlight at this point that this scenario is not out of reach, as in most countries unemployment benefits are paid only up to a period of 12 months (or shorter) and are subject to fairly tough eligibility criteria (e.g. in North Macedonia a work record of 25 years is required in order to receive unemployment benefits for 12 months). Hence, this scenario can also be interpreted as a medium-term scenario assuming that labor market conditions do not improve after the eligibility for unemployment benefits ends.

After having defined all the important ingredients of the stress test model, it finally remains to reduce the household's income by the applicable amount and recalculate the DSTI ratios of the shocked respondents. The share of vulnerable households might then rise accordingly. Note that we abstract from the individual emergency measures implemented in the CESEE region (due to the COVID-19 pandemic) to protect borrowers through payment moratoria, as these reliefs are supposed to be temporary (Barisitz and Hildebrandt, 2020). Hence, our simulation results reflect the financial situation of households at a point in time when these measures will have expired. For a general discussion of changes in macroprudential measures in CESEE due the COVID-19 pandemic, see also Eller et al. (2021).

3 Results

We first discuss the effects on the vulnerability indicator assuming an increase in the unemployment rate by 5 percentage points in order to compare the countries' responsiveness to a unified shock. By varying the scenario assumptions, we will see which role different unemployment benefit systems and heterogenous unemployment risks in these countries play with respect to the outcome variable. In a second step, we will look at the increase in the vulnerability indicator when countries are hit by different unemployment shocks – set according to recent unemployment rate projections – to assess crisis implications.

3.1 Countries' responsiveness to a unified shock

In chart 2, we start out presenting the results of a 5-percentage point shock in the simplest setting, i.e. we assume that individuals have the same risk of becoming unemployed and receive no unemployment benefits. The blue part of the bar shows

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[20] *Overall, though, the scenarios are rather underestimations of the unemployment impact as our setting does not allow spouses and other household members to become unemployed (at the same time).*

us the actual share of vulnerable house-
holds in fall 2019[21], which unveils a
large heterogeneity across countries
with respect to repayment risks. While
in Hungary only 1% of all indebted
households spend 40% or more of
their incomes on debt service payments,
in Romania nearly one-fourth of all
indebted households have DSTI ratios
equal to or above 40%. The comparably
low share of vulnerable households
in Hungary might be related to the
debt restructuring measures taken by
Hungary's central bank in 2015 to deal
with the high share of nonperforming
loans back then (see also Riedl, 2019)[22].
Based on the actual values in 2019, the

Chart 2

Share of vulnerable households after a 5-percentage point increase in the unemployment rate

% of indebted households

Source: OeNB Euro Survey 2019.

dark red part of the bar shows to which extent the share of vulnerable households
increases due to the unemployment shock. Again, we observe a large heterogeneity.
The amount of the impact varies across countries but seems to be unrelated to the
actual share of vulnerable households, i.e. we do not observe the largest impacts in
countries with the largest actual shares of vulnerable households.

In chart 3, we depict the amount of the impact on a finer scale (dark red bar),
which underlines the variability of countries' responsiveness to the shock. The
highest impact is observed in Bosnia (3.5 percentage points), where the increase is
twice as high as in Romania (1.7 percentage points). This variability is driven by
two very country-specific factors. First, the distribution of DSTI ratios across
households determines how likely it is that the threshold of 40% will be exceeded
after an unemployment shock. In countries where the share of households with
DSTI ratios below but very near to 40% is high, the responsiveness to an unemploy-
ment shock is more pronounced. Second, the household structure has an important
influence on the shock outcome. If the number of income earners in a household is
high, income shocks can be absorbed much more easily. In Bosnia, where the shock
responsiveness is highest, single-earner households are much more frequent than in
the other nine CESEE countries.[23] Also, the share of households with DSTI ratios
between 35% and 40% is highest in Bosnia.

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[21] *Note that the presented results all refer to households where the respondent is active on the labor market (see also section 2.2). However, the indicator does not change significantly when all households are considered and is therefore representative of the whole economy. See also table A1 in the annex for detailed descriptive statistics.*

[22] *Riedl (2019) studies the relationship between household and loan characteristics and the level of DSTI ratios for the ten countries of interest. Note, however, that in general, explaining country heterogeneity would require considering a lot of factors that are potentially relevant for determining household vulnerability, like (macro- prudential) policies, macroeconomic developments or household and financial market characteristics. So far, the literature on the determinants of household vulnerabilities is virtually non-existent and mostly concentrated on single-country studies. Albacete and Lindner (2013), for example, study the relationship between household and loan characteristics and various vulnerability measures for Austria. Albacete et al. (2020) analyze how household characteristics influence the vulnerability measure across countries (Austria and various CESEE economies).*

[23] *The share of single-earner households amounts to 60% in Bosnia, 42% in Macedonia and 30% in Serbia. The country with the lowest share (12%) is Albania (OeNB Euro Survey 2017–2019).*

Chart 3

5-percentage point shock: increase in the share of vulnerable households

Percentage points

Equal risk, no benefits   Unequal risk, no benefits   Unequal risk, benefits
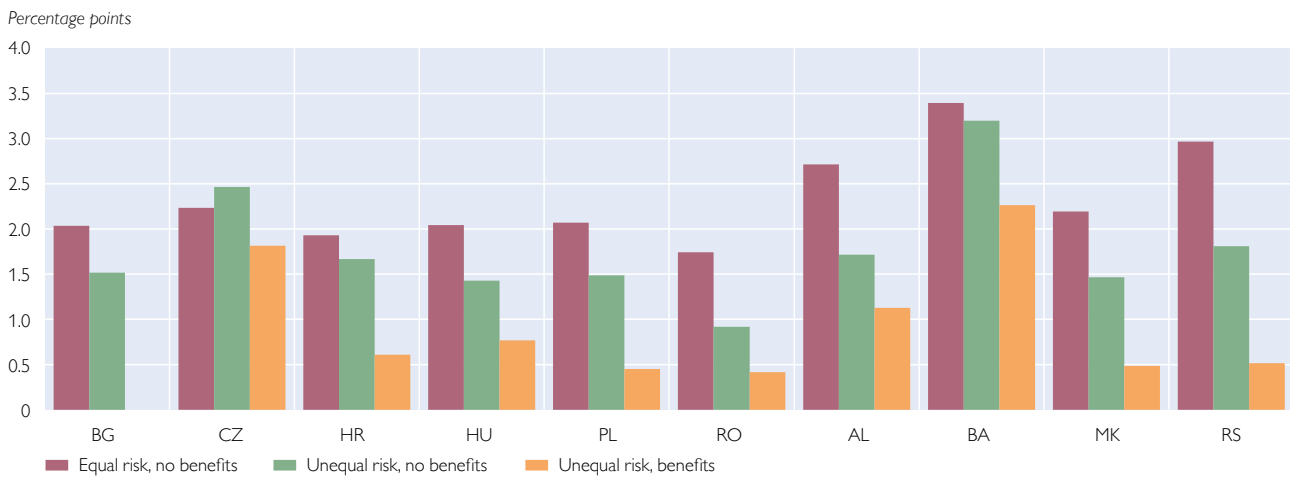
Source: OeNB Euro Survey 2019.

In a next step, we vary the scenario by assigning different unemployment probabilities to respondents. The results are depicted by the green bars in chart 3. Comparing them to the outcome of the previous setting (dark red bars), we observe that in almost all countries the adverse impact is reduced when we assume heterogenous unemployment risk. This result reflects two opposing effects. First, in all countries except in the Czech Republic unemployment rates are lower for indebted households than for households with no debt. Hence, in most countries, the estimated unemployment probabilities are on average lower for respondents in indebted households. Therefore, fewer respondents from indebted households (compared to debt-free households) are selected into unemployment in the first place. This effect dampens the adverse impact resulting from the shock compared to the scenario where every individual was assigned an equal risk of losing their job. On the other hand, if out of the pool of indebted households those with the "bad characteristics" are selected first, the adverse impact of the shock could be reinforced. In the CESEE region, typically higher-educated, white-collar workers have lower DSTI levels and at the same time have a lower probability of becoming unemployed. Hence, assuming heterogenous unemployment risk implies that those respondents are picked first (out of the pool of indebted households) who have higher DSTI levels on average. Depending on which of the both effects dominates, this will either reinforce or dampen the adverse impact. In our setting, heterogenous unemployment risk has a dampening effect in almost all countries. This is in line with Bilston et al. (2015) and Tiongson et al. (2010) who find that assigning equal probabilities of unemployment to all individuals increases the effect of the unemployment rate shock on their vulnerability indicators.

Finally, we alter the stress test scenario by assigning unemployment benefits to individuals who lose their jobs while leaving the remaining assumptions unchanged. The orange bars in chart 3 represent the results from this scenario. While in all countries the adverse impact is reduced, we again observe large heterogeneities across countries. This is quite obviously related to the different national unemploy-

ment benefit regulations. When we recall the different wage replacement rates discussed in section 2.3 (see table 1), we can immediately see the correlation between the generosity of unemployment benefits and the shifts in the outcome compared to the previous setting (green bars). In Bulgaria for example, where unemployed persons receive a benefit of 80% of their net salary, the adverse impact from an unemployment shock vanishes completely. In contrast, in the Czech Republic, in Bosnia or in Albania, for example, where wage replacement rates are among the lowest in the region, the reduction of the adverse impact is least significant. Hence, our results argue in favor of generous allowances as they seem to significantly mitigate adverse outcomes.

Chart 4

Increase in the share of vulnerable households after unemployment shock

Scenario: unequal unemployment risk; positive unemployment benefits

Percentage points

Source: OeNB Euro Survey 2019.

Remaining in this scenario, chart 4 summarizes the results for unemployment rate shocks of 1 up to 5 percentage points. The colored parts in the bars represent the change in the share of vulnerable households after each percentage point increase in the unemployment rate. Thus, by summing up the individual effects, the height of the bars shows the overall impact from a 5-percentage point shock (orange bars in chart 3). For the reasons outlined before, the impact varies largely across countries. Interestingly though, the effect from the income shock seems to increase almost linearly with the unemployment rate in each country.

3.2 Different shock magnitudes based on recent unemployment projections

Finally, we present the results for the different stress test scenarios assuming that unemployment shocks are different across countries. As outlined in section 2.1, IMF projections serve as the macroeconomic input for the shock scenarios (see chart 1) designed to assess crisis implications. For projected increases in the unemployment rate of less than 1 percentage point (like in Poland or Albania) we impose a 1-percentage point shock, for the other countries we round to the nearest whole number.[24] Chart 6 summarizes the results of the individual unemployment shocks. Obviously, crisis implications regarding the vulnerability of households depend on which scenario we assess as the most realistic one. Generally, however, three things stand out. First, irrespectively of the stress test assumptions, the highest impacts can be observed in Bosnia, while Poland seems to be most resilient to income shocks. Second, our results indicate that the crisis will impact the various countries in the CESEE region to a very different extent. So far, we have observed a large country heterogeneity for income shocks of the same magnitude. Now that we assume different unemployment shocks – so that the probability of
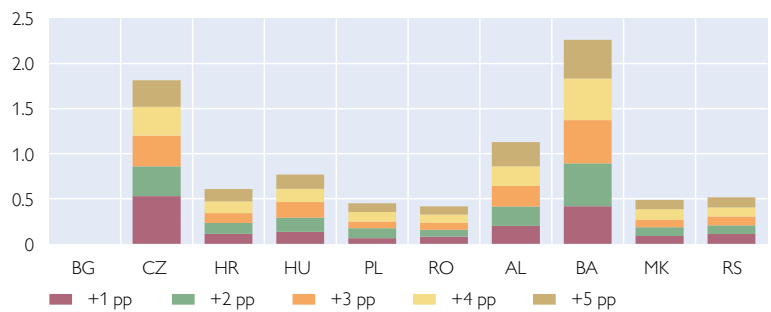
[24] *We assume a 1-percentage point shock for Albania, Poland, the Czech Republic and Bulgaria, a 2-percentage point shock for Croatia, a 3-percentage point shock for Bosnia and Herzegovina, Hungary, North Macedonia and Serbia and a 4-percentage point shock for Romania.*

the occurrence of the shock is about the same for all countries – the ranking of the countries in terms of the size of the impact changes but country heterogeneity still remains very high. Finally, when we compare the estimated crisis impact with the initial (i.e. actual) share of vulnerable households in fall 2019 (see chart 5), we can classify the resulting increases as rather moderate in all countries. Of course, in Hungary, where the actual share of vulnerable households is very low, i.e. not even 1%, the share might double if the unemployment rate follows the projected path. However, the share in Hungary would remain the lowest in the CESEE region, even in terms of 2019 figures. In Romania and North Macedonia, where the share of vulnerable households is highest, the crisis impact amounts to less than one-tenth of the initial level.

At first sight, the relatively modest impacts might seem surprising. However, given the fact that debt participation increases with net income in these countries (Riedl, 2019), indebted households have higher incomes in general, which makes them less vulnerable in case a household member becomes unemployed. (This argument of course does not hold for single-earner households.) Besides, in contrast to interest rate or exchange rate shocks, an unemployment shock hits only a small group of indebted households. If we were to simulate an interest rate shock for example, it is very likely that we would observe much higher impacts across countries, as most household loans in these countries are variable interest rate loans (see e.g. Riedl, 2019). Also, in six out of the ten countries under review, a significant share of household debt is denominated in foreign currency. Hence, an exchange rate shock is likely to affect a much higher share of indebted households than an income shock.[25] A related argument can

Chart 5

Share of vulnerable households in fall 2019

% of all indebted households
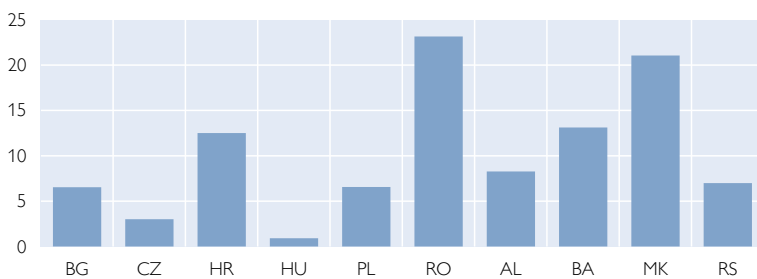
Source: OeNB Euro Survey 2019.

Chart 6

Shock based on unemployment projections: increase in the share of vulnerable households

Percentage points

Equal risk, no benefits   Unequal risk, no benefits   Unequal risk, benefits
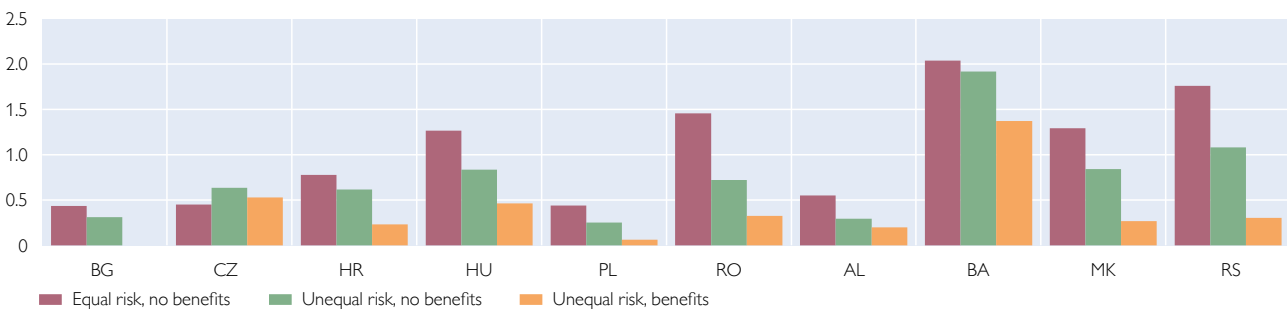
Source: OeNB Euro Survey 2019.

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[25] Given the lack of data we are not able to simulate these kinds of shocks within our framework. Fortunately, the risk of adverse interest rate or exchange rate shocks in these countries is so far rather low.

be found in Albacete and Fessler (2010), who show that the vulnerability of indebted Austrian homeowners is least sensitive to unemployment rate shocks compared to exchange rate and interest rate shocks.

Yet, the presented analysis has shown us by how much a projected income shock impacts on the probability of default. These results, however, must be seen against the background that information about households' total debt holdings did not enter the analysis (due to data limitations). Hence, we cannot estimate the proportion of the total debt that is held by vulnerable households and therefore cannot assess the exposure at default. Should the proportion of the total debt held by vulnerable households vary to a large extent across countries, the risks to financial stability could well be high in countries that have a rather low share of vulnerable households and vice versa. Extending the dataset in this respect would be very important for a deeper evaluation of the risks to financial stability.

4 Summary

We have analyzed the potential impacts from deteriorating labor markets on the financial vulnerability of households in ten CESEE countries. Based on a micro-simulation, we have shown that the effects from the projected increase in unemployment rates in 2020 will hit countries to a very different extent. Overall, though, compared to the initial (i.e. actual) share of vulnerable households in 2019, the impact from the COVID-19 crisis can be classified as rather moderate. This does not imply that CESEE borrowers are not at risk. On the contrary, we have seen that the share of vulnerable households is quite high in some countries. More than 20% of all indebted households in Romania and North Macedonia spend at least 40% of their disposable income to meet debt service payments. This share, however, will not increase significantly according to our stress test results. Even in our worst-case scenario, where we assumed unemployment rates that are higher than the most recent labor market projections (status: January 2021), the share of vulnerable households increases by a maximum of 3.5 percentage points (and by a maximum of around 2 percentage points in the two aforementioned countries). This is related to the fact that indebted households in general have higher incomes (compared to households without debt) as debt participation increases with income in these countries. Also, unemployment rate shocks only hit a relatively small group of indebted households compared to other shocks, like interest rate or exchange rate shocks. This is why effects from unemployment rate shocks are typically found to be modest in the literature.

We have also learned that countries' responsiveness is not only heterogeneous when we assume different unemployment shocks. Assuming income shocks of the same magnitude across countries has shown that the increase in the unemployment rate transmits almost linearly to an increase in the share of vulnerable households but to a very different extent across countries. The size of the impact varies with the distribution of DSTI ratios across households and with the household structure (number of earners per household). The adverse impact decreases in almost all countries under review when unemployment risk is assumed to be heterogenous across individuals and when unemployment benefits are taken into account.

We have also discussed some data limitations we faced when performing our stress test analysis. Two of them are particularly relevant. First, we had to impose the restriction that only one individual per household can become unemployed.

The implications from this assumption are per se not assessable as this restriction could change the vulnerability indicator in both directions for all households with more than one earner. Hence, an interesting extension would be to model both scenarios to gauge whether the imposed restriction significantly alters the results. This could be done by using HFCS data, which so far cover three of the ten countries analyzed in this paper. Second, we have no information on households' overall debt amount. Hence, we cannot assess which proportion of the overall debt would effectively be at risk if all households classified as vulnerable in this paper were to default. This information, however, will be provided by the 2020 fall wave of the OeNB Euro Survey. Evaluating this data would certainly provide interesting insights concerning the adverse implications for the banking sector resulting from the COVID-19 crisis and would therefore be an interesting extension of this paper.

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Annex

Table A1

Descriptive statistics

	All respondents	Active respondents	DSTI ratio, all indebted households			DSTI ratio, indebted households, active respondents		
	Number of observations	Number of observations	Median, %	Households with DSTI≥40%, %	Number of observations	Median, %	Households with DSTI≥40%, %	Number of observations
BG	1,000	735	15.3	6.5	110	15.4	6.5	99
CZ	1,000	712	13.4	3.0	269	13.7	3.0	244
HR	1,031	690	18.8	12.5	225	18.8	12.5	182
HU	1,000	754	11.9	1.5	249	11.7	0.9	218
PL	1,016	637	14.3	6.6	69	14.3	6.6	69
RO	1,039	663	17.5	20.3	129	20.0	23.2	103
AL	1,000	785	21.4	8.5	290	21.5	8.3	272
BA	1,000	564	20.0	16.3	152	20.0	13.1	106
MK	1,006	578	21.3	22.3	182	21.1	21.1	132
RS	1,010	737	16.7	8.2	191	16.0	7.0	170

Source: OeNB Euro Survey 2019.

Note: In Poland, data was used only from interviews that were performed on paper due to an error in the question on loan installment payments in the computer-assisted interviews. This reduced DSTI-related observations from 119 to 69.
Active respondents are employed or unemployed persons. Retired persons, students and other individuals outside the labor force (parental leave, unemployed people who do not seek a job) are classified as inactive.

CESEE's macroprudential policy response in the wake of the COVID-19 crisis

Markus Eller, Reiner Martin, Lukas Vashold[1]

The COVID-19 crisis represents a major shock to the global economy with severe repercussions on financial markets. However, compared to the situation at the start of the global financial crisis (GFC), the banking system is better prepared to withstand the shock. Banks are better capitalized and the regulatory framework, including the macroprudential one, was substantially reinforced in the aftermath of the GFC in many countries across the globe. Hence, national authorities have increased leeway to respond to the recession and market instability caused by the pandemic. In this paper, we assess how EU member states in Central, Eastern and Southeastern Europe (CESEE) have adjusted their macroprudential policies in response to the COVID-19 crisis. To this end, we utilize a recently developed, intensity-adjusted index that tracks a broad set of macroprudential policy instruments. We find that countries responded quickly to the outbreak of the crisis by relaxing capital buffer and liquidity requirements, or at least refraining from previously planned tightening. At the same time, we observe that borrower-based measures and minimum reserve requirements were only rarely relaxed and risk weights were not changed at all.

The economic and financial crisis caused by the outbreak of the COVID-19 pandemic is still unfolding. Although its ultimate severity remains subject to substantial uncertainty, it is already clear that the pandemic has triggered the most severe peacetime economic recession on record. Governments, central banks and other authorities have thus taken unprecedented measures to counteract and dampen the impact of the crisis, using a mixture of fiscal, monetary, supervisory and macroprudential policies, aiming at both the real and the financial sector. As the IMF highlights in its October 2020 World Economic Outlook, the overall policy response in Europe has been extraordinarily strong and multifaceted (IMF, 2020a).

Unlike the global financial crisis (GFC), the COVID-19 shock is exogenous to the financial system, which is also in much better shape in terms of capitalization and liquidity than in 2008. Since the GFC, regulators globally, as well as in the eleven EU member states in Central, Eastern and Southeastern Europe (CESEE-11), have markedly tightened their micro- and macroprudential stance, providing banks with significantly increased buffers to withstand the current crisis.

This paper focuses on the macroprudential response of the CESEE-11 countries. Drawing on a recently developed, intensity-adjusted macroprudential policy index (MPPI) (Eller et al., 2020), we track the macroprudential policy actions taken by the CESEE-11 countries in response to the economic and financial crisis

caused by COVID-19.[2] Specifically, we explore which macroprudential instruments have been adjusted to counteract the adverse effects on financial markets and the real economy induced by the ongoing pandemic and the accompanying lockdown measures imposed by the national governments.

Besides adjusting their macroprudential stance, the CESEE-11 countries have also undertaken major efforts in other policy areas. Notably, the fiscal response to the ongoing crisis has been of a magnitude unlike ever seen before. Within two months after the outbreak of COVID-19, public credit moratoria, state guarantees of bank loans, tax deferrals and other measures were introduced to minimize adverse effects on businesses, especially on small and medium-sized ones. This was often accompanied by furlough schemes, wage compensations or public co-financing of wages in the hardest-hit industries. The size of fiscal support measures varies across countries but mostly amounts to a significant portion of GDP. According to the IMF Fiscal Monitor database (as of October 2020), the average size of COVID-19-related total fiscal support measures[3] adopted until September 2020 in the CESEE EU member states was about 10% of GDP (unweighted average), ranging from 5% in Croatia to even 20% in Czechia. It should be noted that, in several countries, a large part of these fiscal measures consists of indirect measures such as loan guarantees that might not yet have been fully taken up (see Eller and Kinnl, 2020). Loan guarantees make up for about half of total fiscal measures in the region, with up to a share of 75% in Czechia.

Monetary authorities were also actively involved in attempting to stabilize domestic economies. The ECB introduced additional longer-term refinancing operations (LTROs), set up the pandemic emergency purchase programme (PEPP), with an overall envelope of EUR 750 billion, and expanded existing asset purchase programs. It also set up new swap and repo lines with various national central banks of CESEE-11 countries (Bulgaria, Croatia, Hungary and Romania). Central banks in countries outside the euro area also introduced sizable supporting measures, including cuts in policy rates and associated interest rates, the provision of liquidity, asset purchase programs – often for the first time (e.g. in Croatia, Hungary and Poland) –, repurchase transactions, especially for government securities, as well as exchange rate stabilization.

The remainder of the paper is structured as follows: Section 1 provides a brief review of key economic and financial developments in the wake of the crisis and the possible counteracting effects of macroprudential policies. Section 2 provides a description of developments in macroprudential policy in the CESEE EU countries in response to the COVID-19 crisis. Section 3 concludes.

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[2] *For an overview of microprudential measures taken by ECB banking supervision in response to the crisis, see Fernandez-Bollo, 2020.*

[3] *They include above-the-line and liquidity support measures (notably loan guarantees). Moreover, also accelerated spending and deferred revenue measures are included (in our sample, these are only relevant in Bulgaria, Czechia, Lithuania and Slovakia) even though they involve a change of timing only, but they have provided temporary relief.*

1 Effects of the COVID-19 crisis on financial markets in CESEE

According to economic forecasts published at the time of writing, the CESEE region is experiencing the deepest downturn since the transformational recession in the early 1990s (OeNB, 2020b). The projected slump in GDP of about 5% in CESEE in 2020 will be less severe than in Western Europe with 8% (IMF, 2020b), as countries in CESEE withstood the first wave of the pandemic comparatively better. However, also CESEE countries that strongly rely on tourism and foreign trade were hit rather strongly (wiiw, 2020). Moreover, these forecasts are subject to substantial downside risks including a full-blown second wave of the pandemic, which is about to unravel at the time of writing, and renewed turmoil in financial markets.

Understanding and quantifying the economic and financial impact of the pandemic requires more time and research (Goodell, 2020) but the importance of reacting swiftly to prevent large-scale damage to the financial system is undisputed and backed up by theoretical work on pandemics and financial stability (Lagoarde-Segot and Leoni, 2013) as well as on pandemics and fiscal policy (Ashraf, 2020).[4] The onset of the pandemic led to a rapid deterioration of expectations, with a simultaneous tightening in loan supply and a worsening of loan quality (see EIB, 2020). Moreover, global financial market volatility increased substantially during the early phase of the COVID-19 crisis (IMF, 2020c; ECB, 2020a).

There is already a growing literature on the usage of macroprudential policies (MPPs) to combat some of the adverse effects of the pandemic and the accompanying restrictions. Altavilla et al. (2020) gauge the effect of changes in monetary and macroprudential policy made in the euro area due to the COVID-19 pandemic. They show that, without these measures, the ability of banks to supply credit would have been severely constrained and that liquidity conditions were supported by the coordinated policy response. One of the main MPP instruments used by regulators in the CESEE-11 countries in response to the crisis are macroprudential capital buffers. The rationale of these measures is to build up buffers in good times and to use them in a countercyclical fashion in bad times to reduce pressure regarding banks' capitalization levels with a view to enabling them to uphold lending. Borsuk et al. (2020) show, in a counterfactual exercise based on the euro area banking sector stress test model, that the use of capital buffers by banks results in higher lending, positive effects on GDP and lower credit losses, while the system-wide resilience of the banking sector is not compromised. De Nora et al. (2020) largely confirm these findings when discussing the recent release of the counter-cyclical capital buffer (CCyB) in Ireland. However, there can be impediments keeping banks from using their buffers. Uncertainty about supervisory follow-up actions could discourage banks from drawing on their built-up buffers. Furthermore, pressure from market participants, for example in the form of demands for profit distributions, which are restricted when banks tap their buffers, could be detrimental to banks' willingness to use all of their available capital resources to uphold their role as credit suppliers (Andreeva et al., 2020). Clear and convincing communication by policymakers, both with banks and market participants, is

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[4] Lagoarde-Segot and Leoni (2013) focus on pandemics such as AIDS and malaria, which are of course different from the COVID-19 pandemic. Some valuable lessons can nevertheless be drawn from their work.

therefore crucial for letting the regulatory releases of these buffers unfold their full potential and for stabilizing lending conditions (Behn et al., 2020).[5]

The COVID-19 crisis is widely expected to also have adverse effects on the financial systems of the CESEE-11 countries, all of which are still first and foremost bank-based with relatively underdeveloped nonbank financial intermediation. Prior to the pandemic, the banking system of the CESEE region was characterized by solid profitability measures, robust loan growth and ample liquidity. Nonperforming loan (NPL) ratios had declined significantly, returns on assets remained at pre-GFC levels and measures of capital adequacy indicated that the banking sector was more than sufficiently capitalized (see OeNB, 2020a). This may provide a cushion to absorb some of the negative effects as found by Czech et al. (2020) for countries of the Visegrad group. The authors highlight that the spread of COVID-19 significantly depressed local currencies and stock market indices, which could have adverse effects on the broader financial system. However, Topcu and Gulal (2020) find that, compared to other emerging markets, CESEE economies were affected less strongly, and argue that the swift reaction of these countries may have improved the situation.

2 Macroprudential policy responses during the COVID-19 crisis

To describe the macroprudential policy response to COVID-19 taken by countries in the CESEE-11 region, we rely on a recently developed intensity-adjusted index, abbreviated MPPI, tracking such measures. Described in detail by Eller et al. (2020), the MPPI captures not only the occurrence of different types of MPP measures, but also the strength of their adjustment, i.e. the change in their intensity.[6] It covers the eleven CESEE EU member countries on a quarterly basis and starts tracking MPPs from the late nineties. Compared to Eller et al. (2020), where the index covered the period until end-2018, the MPPI was updated to include macroprudential policy measures until Q3 20 in order to capture recent measures taken by countries to combat the adverse effects of the pandemic. An increase in the MPPI and its various subcomponents indicates a net tightening in the macroprudential stance of a country, while a decrease points to macroprudential loosening. Chart A1 in the annex gives an overview of the composition of the MPPI and its various subindices.[7] For countries in the Western Balkans, which are not covered in the MPPI, Barisitz and Hildebrandt (2020) provide an overview of macroprudential measures implemented since 2015 in these countries and their macroprudential response to COVID-19.

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[5] Blank et al. (2020) as well as Borio and Restoy (2020) argue that regulators should try to suspend profit distributions by banks as well as encourage them to raise new equity via secondary offerings. Restrictions on profit distribution are, however, not captured in the MPPI.

[6] The intensity adjustment of the individual MPP instruments was inspired by Vandenbussche et al. (2015), who covered 16 CESEE countries from 1997 to 2010. Compared to these authors' index, our MPPI includes more instruments, distinguishes between announcement and implementation dates of measures and extends the temporal coverage considerably.

[7] For more details about the construction of the MPPI, included instruments and the weighting procedure please see Eller et al. (2020) and the corresponding online supplement. As part of the MPPI update, we have added debt-to-income (DTI) limits. This new instrument was activated in Czechia, Latvia and Slovakia from late 2018 to mid-2020.
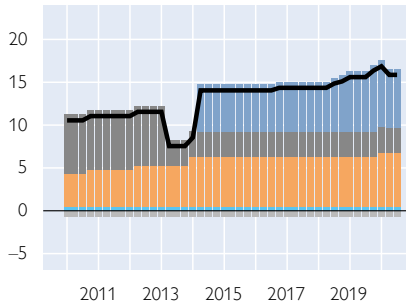
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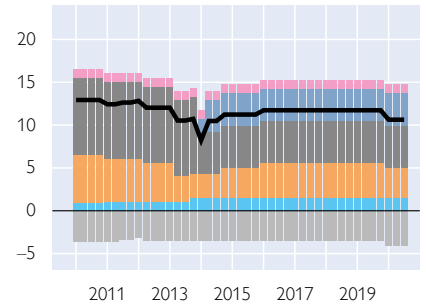
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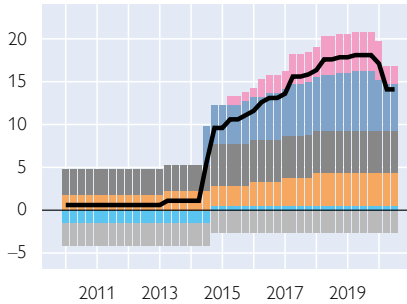
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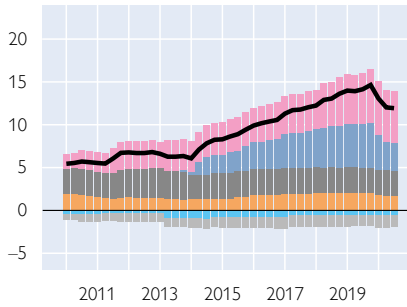
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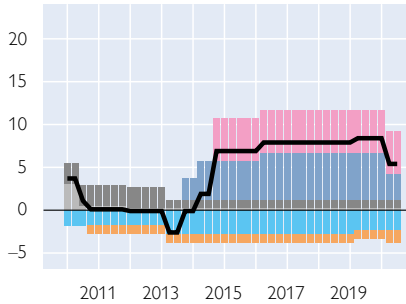
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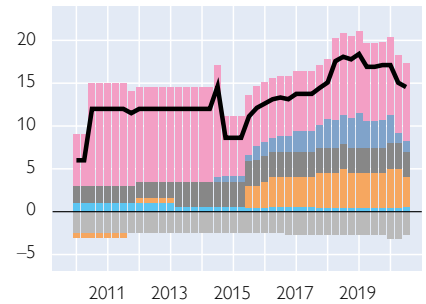
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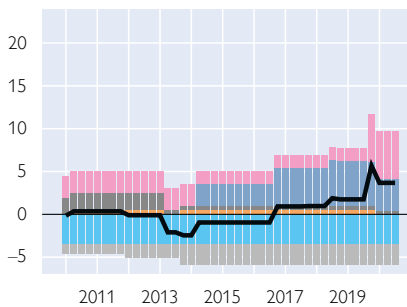
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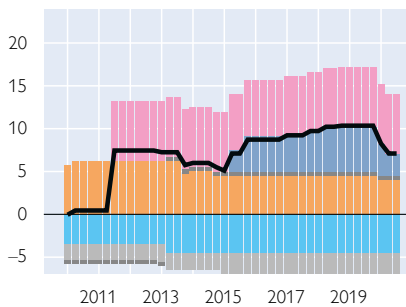
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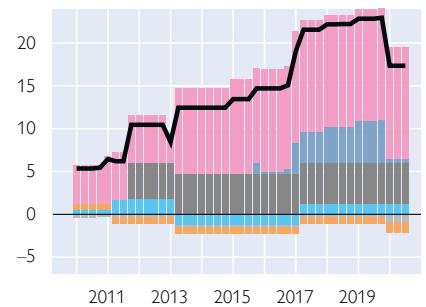
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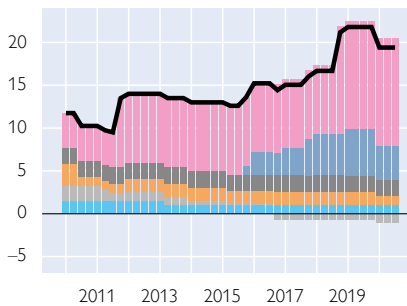
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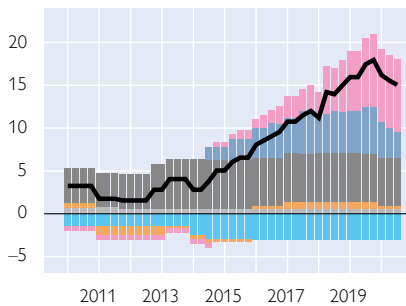
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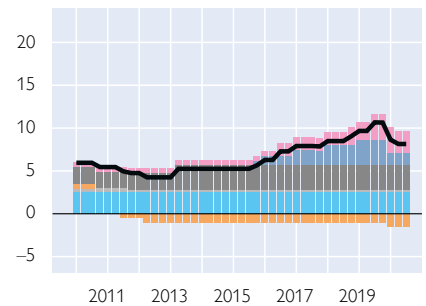
■ Capital requirements ■ Risk weights ■ Reserve requirements ■ Liquidity-based measures ■ Buffer requirements
■ Borrower-based measures — MPPI

Source: Authors' calculations based on Eller et al. (2020).

Note: Data are based on announcement dates of macroprudential measures.

Chart 1 displays the development of the MPPI and its subcomponents for all countries under scrutiny as well as a CESEE-11 aggregate (based on unweighted averages across individual country indices) for the time period since 2010.[8] A relatively steady tightening in the macroprudential stance for CESEE countries occurred in the run-up to the COVID-19 crisis. With the onset of the pandemic at the beginning of 2020, however, the decrease in the MPPI indicates that macroprudential authorities in the CESEE-11 countries reacted swiftly to the crisis, in particular by reducing buffer requirements, either explicitly or by temporarily tolerating banks breaching these requirements. Furthermore, liquidity requirements were loosened in many countries. Other macroprudential instruments applied to mitigate the adverse effects of the pandemic include the easing of lending restrictions and minimum reserve requirements.[9]

If we look first at capital-based macroprudential measures, most countries increased their lenience vis-à-vis banks not fulfilling combined buffer requirements (CBR – the sum of various buffer rates) or capital conservation buffer (CCoB) requirements. A few countries have gone further, by explicitly reducing buffer rates or canceling previously planned increases.[10] Examples are Poland, which fully released the previously applicable systemic risk buffer (SyRB) of 3%, and Estonia, which similarly cut its SyRB. Furthermore, all countries that had already activated the countercyclical capital buffer (CCyB), or had plans to do so in the near future, decided to release them either fully or partly.[11] Regarding the buffer rate for other systemically important institutions (O-SII buffer), the Hungarian central bank decided to suspend the applicable rates for these banks until the end of 2021, and to gradually increase them again starting in 2022 to reach their previous levels by 2024. The Bank of Lithuania postponed the planned increase of the O-SII buffer for Šiaulių Bankas but kept the rates for the other financial institutions at their previous levels. The Slovak central bank also lowered the O-SII capital buffer for one bank (Poštová banka), from 1% to 0.25%. Profit redistribution restrictions for banks could lead to an increased usage of their capital buffers. Behn el al. (2020)

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[8] *In Eller et al. (2020) we showed the MPPI for the period from 1997 to 2018; the index was rescaled to start with a value of zero for each country in 1997. Given that before the mid-1990s most countries in our sample had implemented only few if any MPPs, cross-country differences in the macroprudential policy stance were most likely negligible in 1997, making positions reached by individual countries since 1997 reasonably comparable across countries. Accordingly, chart A1 in the annex shows the evolution of the MPPI for the full sample period from Q1 97 to Q3 20, while chart 1 shows only the corresponding segment since 2010 to make it easier to see the changes during the COVID-19 crisis.*

[9] *For CESEE countries that are part of the euro area, macroprudential policy is a shared responsibility between the national competent authorities (NCAs) and the ECB. Although the NCAs retain the main responsibility for macroprudential policy, the ECB needs to be notified and has the right to top up macroprudential instruments covered by EU law (CRD/CRR IV). At the time of writing, the ECB has never made use of this option. In addition, important macroprudential instruments, notably borrower-based measures are not covered by the CRD/CRR IV. For details see e.g. Constâncio et al. (2019). As of October 1, the same division of responsibility applies to Bulgaria and Croatia, following their entry into close cooperation with the ECB. See: www.bankingsupervision. europa.eu/press/pr/date/2020/html/ssm.pr200710~ae2abe1f23.en.html*

[10] *Note that the index shown in chart 1 is based on announcement dates of measures, i.e. a decrease in the MPPI also reflects the cancelation of tightening measures that had been announced prior to the crisis but had not yet been implemented.*

[11] *These countries were Bulgaria, Czechia, Lithuania and Slovakia.*

recommend that regulators should explicitly communicate such measures and encourage banks to use buffers if necessary.[12]

With regard to liquidity measures, most CESEE-11 countries relaxed their approach toward temporary breaches of the liquidity coverage ratio (LCR).[13] As with the CBR, the ECB announced that it will take a flexible approach for directly supervised banks when approving the plans to re-reach the required LCR (ECB, 2020b). Hungary and Bulgaria also took measures to reduce risks stemming from foreign currency funds or foreign institutions. By introducing limits on certain exposures to foreign institutions and sovereigns, Bulgaria tightened its stance with regard to liquidity-based macroprudential policy measures. Hungary also implemented changes in liquidity requirements by loosening its mortgage funding adequacy ratio, aimed at domestic currency funds, while simultaneously tightening the calculation of the foreign exchange funding adequacy ratio. This tightening was reinforced by a lowering of the maximum value of the foreign currency mismatch between assets and liabilities from 15% to 10%. However, these tightening measures were already repealed again in September 2020.

Borrower-based measures such as loan-to-value (LTV), debt service-to-income (DSTI) and the recently added debt-to-income (DTI) limits were eased only in a few countries, notably in Czechia.[14] Following the onset of the COVID-19 crisis, the Czech National Bank raised the recommended maximum LTV ratio from 80% to 90% and abolished its recommendation for a maximum DTI ratio of nine times the net annual income. Furthermore, it first raised the recommended maximum DSTI limit from 45% to 50% before abolishing it altogether in June 2020. Slovenia was the only other CESEE-11 country to slightly loosen borrower-based measures by allowing banks to exclude months with a temporary decline in income when assessing customers' creditworthiness.[15] Finally, some countries also adjusted their minimum reserve requirements (MRRs).[16] As a direct response to the pandemic, Croatia cut the applicable MRRs from 12% to 9%, while Poland reduced them from 3.5% to 0.5%. Hungary did not directly reduce the applicable MRRs but suspended the sanctions on reserve deficiency, which led to a de facto loosening.[17]

To provide a summary picture of the macroprudential policy response to the COVID-19 shock in the region, chart 2 depicts the overall strength of macroprudential

[12] Several countries have also eased their stance regarding the fulfilment of bank-specific Pillar 2 requirements and Pillar 2 guidance. However, these instruments are not reflected in our index as the MPPI primarily tracks system-wide requirements, apart from the O-SII buffer, for which an average of the rates applied to different institutions is included. (The same holds true for the SyRB if a range applies or the rates are differentiated by institution.)

[13] For coding liquidity requirements in the MPPI we apply, due to their complexity, a conventional dummy approach, assigning a fixed negative value of −0.5 for a loosening incident. As a result, the loosening of any liquidity requirement results in a lowering of the MPPI by 0.5 index points.

[14] The Czech National Bank only has a mandate to issue recommendations but not binding requirements with regard to these instruments; however, banks generally adhere to these recommendations.

[15] In addition, Eesti Pank issued a letter advising banks to apply responsible lending restrictions but simultaneously signaling flexibility with regard to credit exposures. As this represents a rather ambiguous statement, it has not been possible to capture it as an explicit loosening or tightening incident in the MPPI.

[16] Romania decreased MRRs on foreign currency loans from 10% to 6% in the first quarter of 2020, shortly before the onset of the crisis.

[17] Due to the significant expansion in interbank liquidity, this measure was repealed again in October 2020.

easing by country and table 1 offers another view on which MPP instruments have been used more than others for this purpose. Chart 2 underscores that the bulk of stabilizing measures were taken at the end of the first and in the second quarter of 2020 and highlights important cross-country differences in the strength of the overall macroprudential policy response. Poland and Czechia reacted comparatively strongly, though with differing sets of instruments as described above. On the other side of the spectrum, Bulgaria and Croatia took far fewer steps to ease their macroprudential policy stance. The rest of the countries fall somewhere in the middle, with most of them loosening buffer and liquidity requirements. Drawing our attention to the role of different MPP instruments, table 1 shows that crisis-related MPP easing was first and foremost based on the loosening of buffer and liquidity requirements, while minimum reserve requirements and borrower-based measures were eased in only three and two countries, respectively, and risk weights for loans in the residential sector were not changed at all.[18] Depending on the country-specific starting positions as shown in chart 1, loosening borrower-based measures (more strongly) would likely increase lending to more "marginal" borrowers, increasing medium- to long-term risks to financial stability. Moreover, the implementation of borrower-based measures was often politically very difficult, given their direct impact on access to lending. Hence there are good reasons why most CESEE-11 countries initially refrained from loosening borrower-based measures in response to the financial and economic impact of COVID-19. Similar considerations apply to risk weights, for example those attached to residential (or commercial, not covered in the MPPI) real estate exposure of banks. Such risk weights are sometimes used as a politically less problematic alternative to borrower-based measures. Loosening them would also likely increase medium- to long-term risks in real estate markets while providing fewer short-term benefits for banks.

The extent to which MPP measures have been used so far is likely to depend on a range of policy considerations, not least including the overall "macroprudential

<div style="text-align: right">Chart 2</div>

Intensity of MPP loosening in the CESEE-11 in the first quarters of the COVID-19 crisis

Index points

■ MPPI change, Q1 20   ■ MPPI change, Q2 20   ■ MPPI change, Q3 20
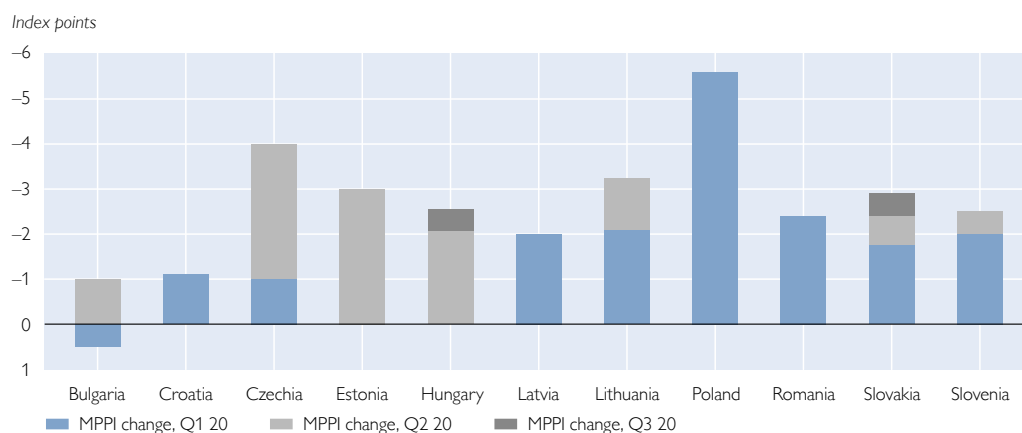
Source: Authors' calculations.

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[18] *In July 2020, Poland recommended lowering the risk weights for exposures on commercial real estate from 100% to 50% in order to strengthen banks' own funds and counteract a credit crunch. This measure is not captured in the MPPI as it only tracks risk weights on loans backed by residential real estate.*

Table 1

Types of macroprudential policy instruments used in the wake of the COVID-19 crisis

	Buffer requirements	Borrower-based measures	Liquidity-based measures	Minimum reserve requirements
Bulgaria	↓		↑	
Croatia			↓	↓
Czechia	↓↓	↓↓↓		
Estonia	↓↓		↓	
Hungary	↓↓		↑↑↓**↓↓**	↓↑
Latvia	↓		↓	
Lithuania	↓↓		↓	
Poland	↓↓		↓	↓
Romania	↓		↓	
Slovakia	↓↓↓↓		↓↓	
Slovenia	↓	↓	↓	

Source: Authors' calculations.

Note: Arrows indicate the number of measures taken by national authorities for a given set of instruments. Arrows pointing downward indicate a loosening in a given category; arrows pointing upward indicate a tightening. Bold arrows indicate measures that were introduced at the beginning of the crisis and that were repealed again.

space" that was created ahead of the pandemic or the intensity of responses in other policy areas as mentioned in the introduction. To put the intensity of macroprudential policy easing into perspective, we show some simple bivariate correlations between the change in the MPPI from Q4 19 to Q3 20 and selected variables of interest in the remainder of this section.[19]

First, chart 3 suggests that CESEE-11 countries that entered the crisis with better capitalized and more profitable banking systems tended to implement less pronounced macroprudential easing by comparison. On the one hand, this might be explained by the fact that the macroprudential authorities in these countries, in the early stages of the pandemic-induced recession, were less concerned about the impact on their banking systems and banks' continued ability to supply loans to the real economy. On the other hand, in countries with lower pre-crisis banking sector profitability, the restriction on dividend payments from 2019 profits resulted in a less strong increase in capital buffers; perhaps this has also motivated some of these countries to reduce a few buffers out of caution, contributing to an overall stronger macroprudential easing.

Second, chart 4 sheds light on the relation between macroprudential easing in response to the pandemic and parallel changes in housing market indicators. Even though borrower-based measures, which often target the housing sector, have been eased only in a few countries as discussed above, countries with a stronger overall macroprudential easing have also been characterized by a weaker decline (or a stronger increase) in the growth of housing prices and – somewhat less clear-cut – housing loans. This positive correlation between the magnitude of macroprudential easing and the tightening of housing market conditions could in some circumstances – especially if there were concerns of overheating housing markets – diminish the leeway for a further easing of MPPs, particularly borrower-based MPPs (in line with multivariate results shown in Eller et al., 2020).

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[19] As a caveat, it should be emphasized that these unconditional correlations do not provide information about causalities and do not control for the simultaneous impact of other driving forces in the sense of a multivariate setting.

Third, chart 5 looks at the link between the size of fiscal policy stimuli and the extent of macroprudential loosening during the crisis. Acknowledging the need for a more detailed analysis of these policy interactions and data limitations[20], the simple scatterplot in chart 5 suggests that fiscal support to the economy and macroprudential loosening to support the banking sector were largely implemented in a complementary manner: countries with relatively large fiscal stimulus packages also tended to loosen their macroprudential stance more substantially.

Fourth and finally, when examining the relation between macroprudential and monetary policy, we must consider that monetary support has taken a variety of forms, as mentioned in the introduction. In those countries in our sample that have the leeway for independent rate cuts (and comparable rates), key policy rates were cut substantially (in Czechia by 200 basis points to 0.25%, in Poland by 140 basis points to 0.1%, in Romania by 100 basis points to 1.5% and in Hungary by 30 basis points to 0.6%). However, these few cases of countries with policy rate changes in our sample do not constitute enough cross-country variation to be linked to changes in the MPPI in a scatterplot. As most other forms of monetary support have affected central banks' balance sheets in one way or the other, we consider, as a (partial) proxy for monetary easing, the change in net domestic assets of a country's central bank. In this case we can resort to data across all the CESEE-11 countries. Chart 6 indicates a negative relation with macroprudential easing for most countries, suggesting a substitutive use of these policies by the respective central banks – apparently, stronger quantitative easing often required less strong macroprudential easing, or vice versa.

Chart 3

Macroprudential policy easing compared to pre-crisis…

Return on assets
Q4 19, %

Capital adequacy ratio
Q4 19, CAR total ratio in %

MPPI change from Q4 19 to Q3 20
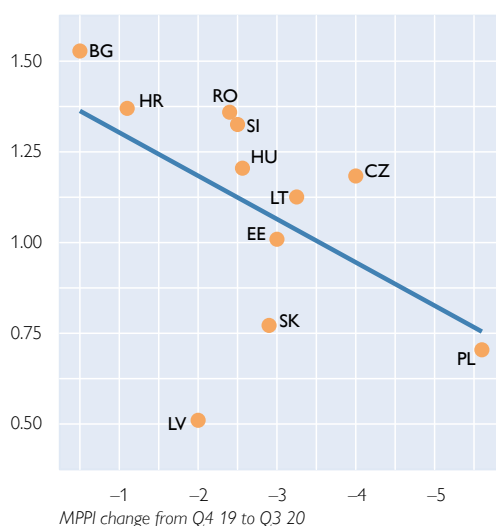
Source: National central banks, authors' calculations.
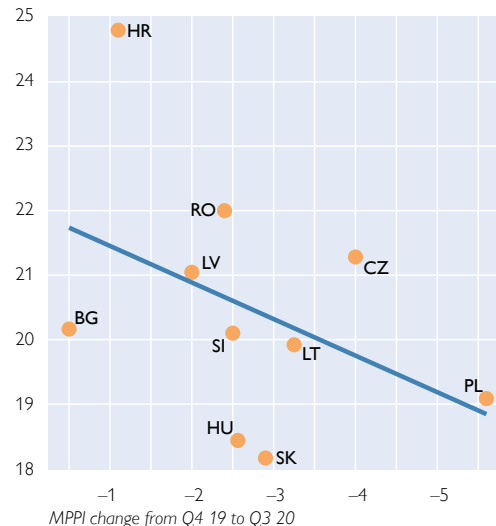
Note: To illustrate the intensity of macroprudential easing in the first quarters of the COVID-19 crisis, the horizontal axis refers to a simple difference between the MPPI index level in the third quarter of 2020 and the fourth quarter of 2019 (corresponding to chart 1). CAR = capital adequacy ratio.

[20] For instance, it is not easy to appropriately quantify the size of fiscal support packages, as discussed in Eller and Kinnl (2020). The IMF Fiscal Monitor database used in this paper allows for reasonable cross-country comparisons, but it comes with the drawback that it does not indicate to which extent announced fiscal measures have also been implemented.

Chart 4

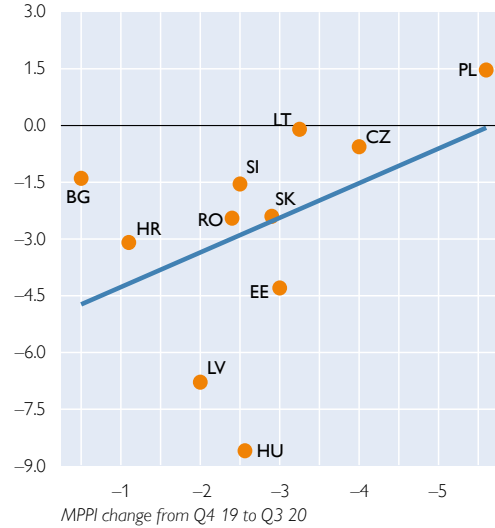## Macroprudential policy easing compared to the change in…

Mortgage loan growth

Change in year-on-year growth, percentage points

MPPI change from Q4 19 to Q3 20
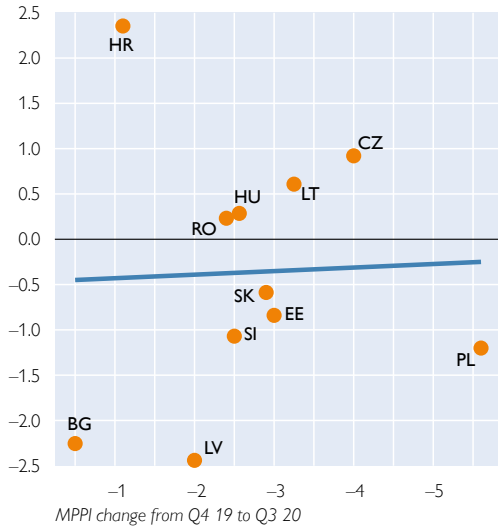
Housing price growth

Change in year-on-year growth, percentage points

MPPI change from Q4 19 to Q3 20

Source: National central banks, ECB, Eurostat, authors' calculations.

Note: The vertical axis represents the difference in percentage points between the year-on-year growth rates in Q3 20 and those in Q4 19. Mortgage loans reflect the notional stock of households' lending for house purchase (source: ECB). Housing prices are based on the quarterly house price index provided by Eurostat (https://ec.europa.eu/eurostat/cache/metadata/en/prc_hpi_inx_esms.htm), capturing price changes of all kinds of residential property purchased by households (flats, detached houses, terraced houses, etc.), both new and existing. The choice of the indicator for measuring housing prices stems from the fact that the MPPI captures only those macroprudential measures that target the residential sector, not the commercial one.

Chart 5

Macroprudential policy easing compared to the strength of…

Fiscal policy stimulus

% of GDP

MPPI change from Q4 19 to Q3 20
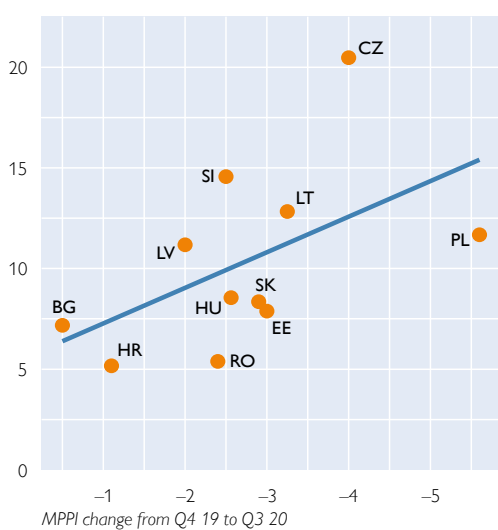
Fiscal policy stimulus without contingent liabilities

% of GDP

MPPI change from Q4 19 to Q3 20
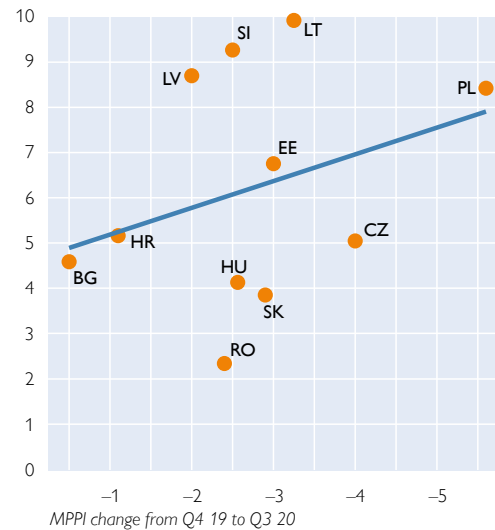
Source: IMF Fiscal Monitor Database as of October 2020 (https://www.imf.org/en/Topics/imf-and-covid19/~/media/Files/Topics/COVID/fiscal-monitor-database-oct-2020-for-webpage.ashx?la=en), authors' calculations.

Note: The left-hand panel includes all fiscal support measures taken in response to the COVID-19 pandemic: above-the-line measures (including additional spending and foregone revenues as well as accelerated spending and deferred revenue) and liquidity support measures (including below-the-line measures and contingent liabilities in the form of guarantees and quasi-fiscal operations). The right-hand panel does not include contingent liabilities.

Chart 6

Macroprudential policy easing compared to the strength of…

Monetary policy stimulus

% of GDP

[Chart: scatter plot with x-axis "MPPI change from Q4 19 to Q3 20" ranging from -1 to -5, and y-axis from -7.5 to 10.0. Data points: LV (~9), SK (~7.5), HR (~5), HU (~5), SI (~3), PL (~2), RO (~1), EE (~1.5), LT (~-1), CZ (~-5), BG (~-5.5)]

MPPI change from Q4 19 to Q3 20
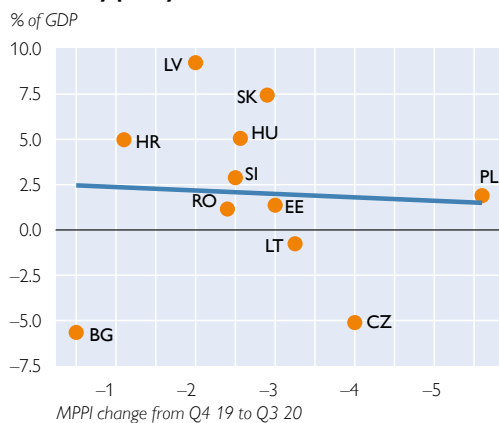
Source: IMF Monetary and Financial Statistics, authors' calculations.

Note: Monetary stimulus measures are calculated as the change in the net domestic assets of national central banks (NCBs) between Q4 19 and Q3 20 in % of GDP. Net domestic assets have been calculated as the difference between the NCB's claims on residents (including the government) and the NCB's liabilities to residents (excluding government deposits). A positive change indicates an increase of NCB net claims vis-à-vis domestic sectors, which is interpreted as monetary easing.

3 Summary

The COVID-19 pandemic has globally triggered the worst peacetime recession on record, which is expected to also have major negative spillovers on financial stability in general and the banking system in particular. EU countries in the CESEE region have taken unprecedented measures to counteract these adverse effects, ranging from monetary, fiscal and supervisory to macroprudential policy responses. This paper has provided an in-depth description of the specific macroprudential measures taken by the CESEE-11 countries until Q3 20, using the MPPI, a novel, intensity-adjusted index tracking such instruments.

Macroprudential authorities in the CESEE-11 countries have already loosened a wide range of macroprudential measures, most notably capital buffers and liquidity requirements. The extent to which the countries have engaged in macroprudential loosening differs across countries, with Poland and Czechia reacting rather strongly whereas Bulgaria and Croatia are on the other side of the spectrum. Such differences are not surprising, given that notable differences between countries can also be seen in other policy areas. In general, it seems that fiscal and macroprudential policy easing went hand in hand in a complementary manner – several countries that were more active in terms of implementing fiscal support measures have also been more active in easing their macroprudential policy stance. At the same time, stronger monetary policy easing was often accompanied by a less pronounced macroprudential loosening, pointing to a substitutive use of these policies by central banks in the region. While we put the intensity of macroprudential policy easing in perspective by comparing it with other policy areas by means of simple bivariate correlations across countries, these policy interactions are much more complex and a further systematic investigation in a multivariate framework is on our future research agenda.

Depending on the respective countries' starting positions, there appears to be further scope for macroprudential loosening in the CESEE region if economic and financial developments in the region become even more adverse. At the same time, a further loosening of (additional) macroprudential policy measures, in particular borrower-based measures and risk weights, could entail medium- to long-term financial stability risks (e.g. with regard to housing markets). In addition, borrower-based measures have often been implemented against considerable opposition by interest groups, and macroprudential authorities are thus unlikely to relax them unless absolutely necessary.

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Annex

Chart A1

Schematic overview of the components of the macroprudential policy index (MPPI)
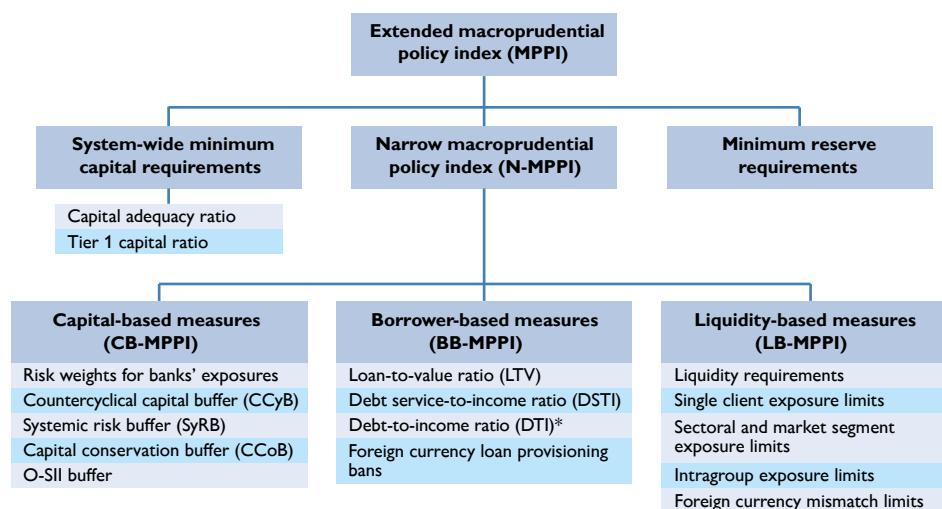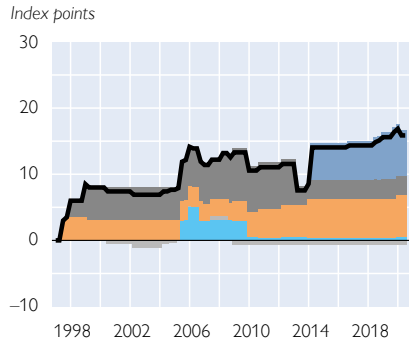

Source: Authors' compilation.

Note: This chart is an updated version of chart 1 in Eller et al. (2020), with new instruments marked by an asterisk.
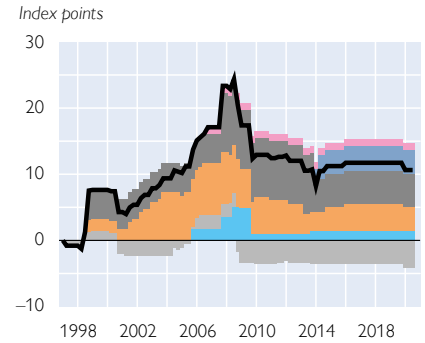
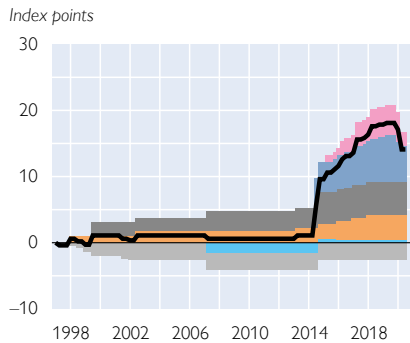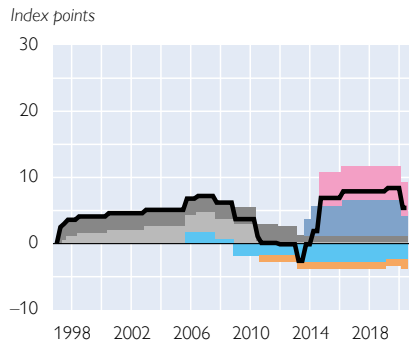## Intensity-adjusted MPPI in the CESEE-11, Q1 97–Q3 20

CESEE-11
Index points
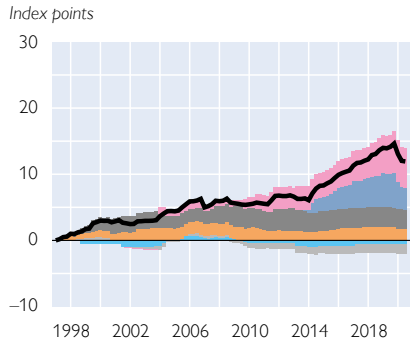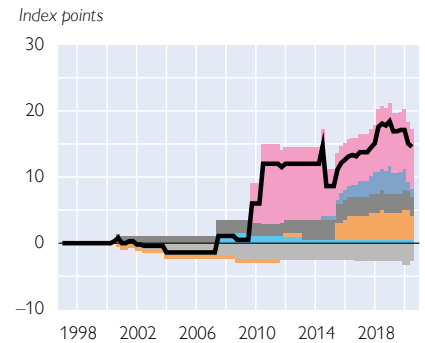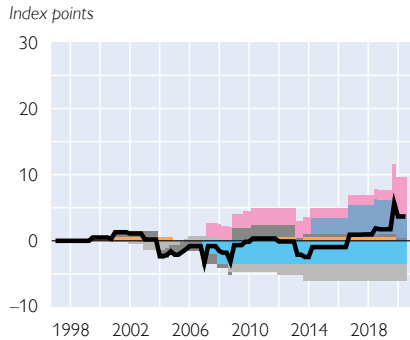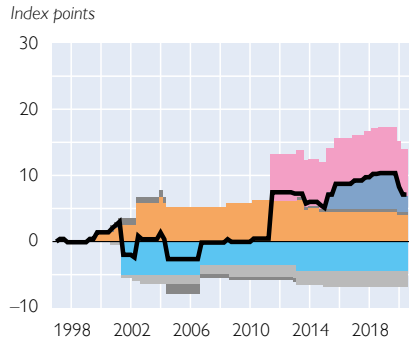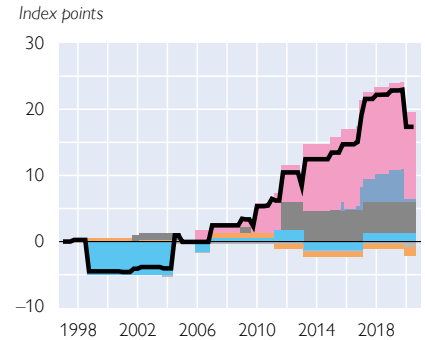
Bulgaria
Index points

Croatia
Index points

Czechia
Index points

Estonia
Index points

Hungary
Index points

Latvia
Index points

Lithuania
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Poland
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Romania
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Slovakia
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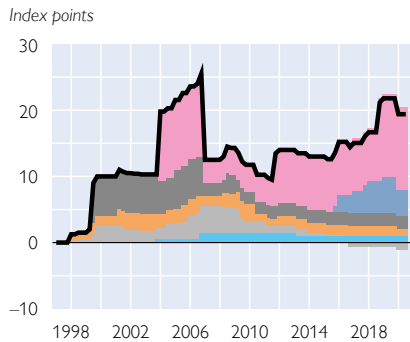
Slovenia
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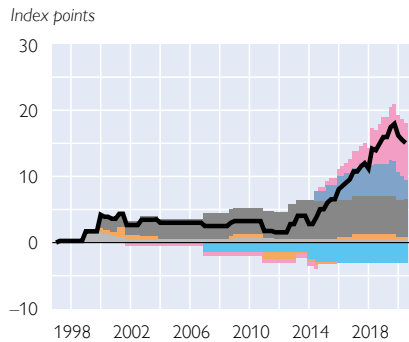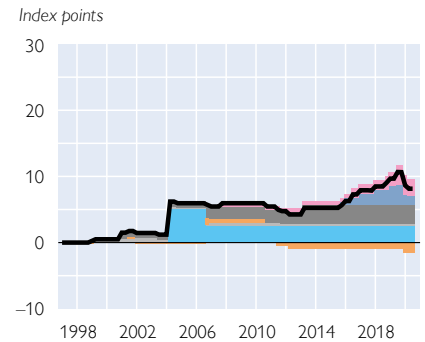
Legend: Capital requirements — Risk weights — Reserve requirements — Liquidity-based measures — Buffer requirements — Borrower-based measures — MPPI

Source: Authors' calculations based on Eller et al. (2020).

Note: Data are based on announcement dates of macroprudential measures.

Event wrap-ups

Conference on European Economic Integration 2020

CESEE in the COVID-19 crisis – the role of the EU and global spillovers

Compiled by Julia Wörz[1]

The Conference on European Economic Integration (CEEI) held in November 2020 was the first fully virtual conference in the longstanding tradition of this OeNB conference series. Around 300 participants from 30 countries took in and discussed the issues and challenges arising from the COVID-19 crisis and the role of EU policies and global spillovers. In his opening remarks, *OeNB Governor Robert Holzmann* recalled the fact that the year 2020 marks the year with the deepest recession in the Central, Eastern and Southeastern European (CESEE) region since the transformation recession almost three decades ago. The truly global nature of the crisis implies that especially small, open and strongly integrated economies – like the CESEE countries – are strongly affected even though they have been able to cushion some of the adverse economic impact thanks to the swift policy reaction in all countries and international support. With respect to the latter, Governor Holzmann referred to liquidity arrangements between the ECB and many CESEE countries, among other factors. Focusing on the role of the EU and the role of global spillovers, he pointed out that the region's deep integration in global value chains has been a stabilizing factor despite initial disruptions in supply chains. The stabilizing effect arises from long-term and highly specialized trade relationships and the important role of FDI financing within international production networks. Tight financial and trade linkages with the euro area have further allowed positive spillovers of ECB monetary policy to the region, as has been demonstrated by recent research. Finally, Governor Holzmann underlined the role of EU funds in the recovery and their role in promoting convergence and growth in CESEE. He concluded by saying that the main near-term challenge will be to use the available policy space in an efficient way that puts quality over quantity. At the same time, he recalled the sizable structural challenges faced by the economies in the region, with special emphasis on the green and digital transformation.

Keynote speech by Marcel Fratzscher: Europe's crisis response and its implications for CESEE countries

In his keynote speech, *Marcel Fratzscher, President of the German Institute for Economic Research (DIW Berlin)*, gave an overview of Europe's crisis response and its implications for CESEE countries. He focused on the mechanisms that explain why specific countries have been more affected by the crisis than others, on risks stemming from the second wave and on policies implemented in response to the crisis. He then went on to address how the structural transformation can be managed after the crisis. Fratzscher pointed out that a social welfare state is a strength in the crisis and that short-time work schemes have been a success. In this respect it is worth

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noting that the highly welcome EU Support to mitigate Unemployment Risks in an Emergency (SURE) supports these schemes. In Fratzscher's view, the monetary policy reaction has been strong, and he emphasized that it was essential that monetary policy continue to respond to extreme market conditions. According to Fratzscher, it is appropriate to allow for rising fiscal deficits and to boost public investment as a prerequisite for private investment. He also explained that both public investment and social policy are key for mastering structural transformation to address climate change. But there is a risk that current stabilization policies will make the transformation more difficult by supporting existing structures and by restricting fiscal policy after the crisis. While inequality and social polarization are rising due to the pandemic, the good news is that trust and support for change have been rising as well. At this point, policy responses to the pandemic have been strong but still insufficient. In the subsequent discussion, the following issues were addressed: the trade-off between a quick and a targeted policy response, the risk that fiscal support measures will be withdrawn too quickly and the procyclicality of EU fiscal rules.

Monetary policy spillovers to CESEE: what do we know and what can we do?

Doris Ritzberger-Grünwald, Director of the OeNB's Economic Analysis and Research Department, opened the first session of the CEEI by saying that euro area monetary spillovers to the CESEE region depend on the degree of regional economic integration in both trade and financial markets but also on country-specific factors, such as exchange rate regime and degree of euroization.

Martin Feldkircher, Vienna School of International Studies, reviewed the theory and existing literature on monetary policy spillovers and presented his own ongoing research on euro area monetary policy spillovers to CESEE countries. In line with previous findings, Feldkircher showed that ECB monetary policy has had positive effects on output, consumer prices and asset prices in the ten CESEE countries he has reviewed. He further noted that the spillover effects are similar in size compared to the domestic effects in the euro area and that interest rates in CESEE countries also tend to follow euro area monetary policy. According to Feldkircher, the main contribution of his research to the existing literature is that it makes it possible to disentangle some of the main transmission channels through which spillovers occur. While the theory predicts the exchange rate channel of monetary policy to cause expenditure switching between domestic and foreign goods, monetary policy also has an effect on domestic demand that affects the amount of imports regardless of currency movements (through the income absorption or demand channel). Since the two mechanisms have opposite effects, it is a priori unclear which one dominates. Moreover, several studies show that expenditure switching might be less important due to a series of factors, e.g. the use of the euro as regionally dominant currency. Martin Feldkircher showed that the positive spillovers of euro area monetary policy to CESEE mainly stem from the income absorption channel and additional second-round effects arising from CESEE trading partners, while the exchange rate channel has a minor role. This is due to, among other factors, the use of the euro as a regionally dominant currency, which dampens expenditure switching. Finally, he also pointed to the existence of spillbacks of monetary policy to the euro area economy from CESEE economies.

Livio Stracca, Deputy Director General, European Central Bank, noted that the interest in monetary policy spillovers had been renewed due to the response to the COVID-19 shock. He presented a comprehensive literature review on spillovers of both conventional and unconventional monetary policy by the ECB and the Federal Reserve (Fed). He argued that not only a sudden (discretionary) monetary policy shock should be considered but also the systematic (endogenous) response of monetary policy to various shocks to the economy. Stracca presented results from a recent ECB discussion paper that compares the spillovers of Fed and ECB monetary policy, showing that both affect foreign activity and prices in the foreign economy, with the Fed's shocks having large effects on euro area financial conditions but not vice versa. Both ECB and Fed monetary policy shocks were found to affect activity in emerging economies, but US monetary policy appeared to cause larger spillovers. Stracca claimed that, when looking at ECB monetary policy spillovers to CESEE economies, results are heterogeneous and model dependent and that, different from Martin Feldkircher's research, there had been little evidence about the relevance of different transmission channels. Stracca showed evidence of spillovers from ECB unconventional monetary policy to CESEE output, inflation and CESEE financial conditions. While CESEE countries are affected by ECB monetary policy measures, they also respond to the economic conditions prompting these monetary policy decisions. Therefore, the underlying economic (demand) shock affecting the euro area might more than offset the positive effect of the ECB's monetary policy, and the ex ante impact of (total) euro area spillovers on CESEE countries is ambiguous. Finally, looking at CESEE bond yields and stock market indicators after the pandemic hit, Stracca showed that ECB monetary policy announcements – especially after the March 18 announcement of the pandemic emergency purchase programme (PEPP) – have had a sizable impact on CESEE financial markets and played a role in stabilizing financial conditions and market sentiments during the first wave of the pandemic.

Monetary policy to the rescue: central bankers' views on the COVID-19 crisis

Robert Holzmann, Governor of the Oesterreichische Nationalbank, chaired the discussion in panel 1 on central bankers' views on the role of monetary policy in the COVID-19 crisis. Governor Holzmann came straight to the point by addressing pertinent questions to his colleagues from several CESEE partner central banks, namely from Estonia, Croatia, North Macedonia and Romania. The questions covered a broad array of topics ranging from spillovers from the ECB's monetary policy to the respective countries (or effects in the case of Estonia), and recent and prospective inflation developments, to the available room for maneuver for monetary, fiscal and macroprudential policies in case of a further deterioration of the pandemic situation, as well as the impact of the EU recovery instrument *Next Generation EU (NGEU)* and the *multiannual financial framework (MFF)*.

Anita Angelovska Bezhoska, Governor of the National Bank of the Republic of North Macedonia, focused on the ECB's accommodative monetary stance. She stated that, amidst comfortable foreign reserves and in the absence of economic imbalances in North Macedonia, the ECB's monetary policy creates space for growth-supporting policy by the North Macedonian central bank. Furthermore, she pointed out that the repo line established with the ECB provides assurance for swift access to foreign

currency liquidity for her country. In her opinion, the repo line is an important signal and might be a tremendously important backstop facility when risks and uncertainty are very high.

The second panelist, *Leonardo Badea, Deputy Governor of the National Bank of Romania*, discussed inflationary developments in Romania. According to the Romanian central bank's inflation forecast, the annual inflation rate in Romania is expected to be around 2.1% at the end of 2020, i.e. a little below the central bank's 2.5% target and well in line with the target corridor. For the first months of 2021, the inflation rate is expected to remain at similar levels. Badea thinks that the NGEU as well as the MFF will have a very positive cumulative effect on economic growth in Romania, amounting to 0.7 percentage points in 2021 and 1.8 percentage points in 2022. However, these figures assume an improved absorption of EU funds compared to previous periods.

In presenting his view on the issue, *Madis Müller, Governor of the Bank of Estonia*, argued that the impact of the ECB's monetary policy can be particularly strong for small European economies with a high degree of trade openness. In that case it is very important to have countercyclical fiscal policy in place. Regarding inflation, Müller argued that inflation in Estonia is expected to be higher than in the euro area due to the country's ongoing convergence process. Turning to the question of policy space in case of a further deterioration of the COVID-19 situation, Müller explained that, thanks to prudent fiscal policies in the past, the country is now able to provide ample support for the economy. He specified, however, that economic support measures have to be well targeted, as efficient public investments are key during the current crisis.

Boris Vujčić, Governor of the Croatian National Bank, stated that he considers the monetary policy of the ECB and of the Croatian National Bank as complements: The ECB has preserved favorable financing conditions in Europe and hence supports national monetary policy that aims at stabilizing domestic markets and supporting the domestic economy. Addressing the question of policy space in case of a worsening of the COVID-19 situation, Vujčić argued that ample international reserves are boosting policy space for the Croatian central bank, allowing it to stabilize domestic markets. In addition, a toolkit of standard as well as nonstandard policy measures is available for continuing to support the Croatian economy.

In the follow-up discussion, panelists were asked whether they considered it better to be inside or outside the euro area. In addressing this question, Müller compared the current COVID-19 crisis with the global financial crisis of 2008 and welcomed being part of the euro area, as the former crisis had put Estonia's currency at risk and had made it more difficult to receive outside payments. Also Vujčić expressed a preference for being part of the euro area in order to be able to fully participate in and benefit from the ECB's monetary policy. Badea pointed out that it would also be an advantage for Romania to be a member of the euro area, but the country needs to be well prepared before entering the currency union. Prompted on the Vienna Initiative, panelists emphasized that the initiative is very important and works well as it brings together various financial market stakeholders. Müller pointed out that Estonia is less involved in the Vienna Initiative but has a forum of its own bringing together Nordic banks.

Keynote speech by Linda Goldberg: global liquidity flows – macro and micro phenomena

Gottfried Haber, Vice Governor of the Oesterreichische Nationalbank, opened the second conference day by highlighting the role of the banking sector as part of the solution in this crisis. He emphasized the stark difference between the banking sector situation in CESEE prior to the global financial crisis and the situation prior to the global COVID-19 crisis: In the years leading up to the global financial crisis, CESEE banking sectors had strongly relied on funding from abroad. Meanwhile, refinancing structures have transformed significantly as indicated by a marked decline in banks' net foreign liabilities in % of GDP in various CESEE countries. This development has been largely driven by rising domestic deposits, inter alia supported by the Austrian banking sector sustainability package aimed at strengthening foreign subsidiaries' local stable funding base and avoiding excessive credit growth.

Linda Goldberg, Senior Vice President of the Federal Reserve Bank of New York, delivered the keynote speech on "Global liquidity flows: macro and micro phenomena." With regard to cross-border flows, Goldberg highlighted the shift away from bank-based finance toward more market-based finance and the shift from more weakly capitalized toward better-capitalized global banks prior to COVID-19 crisis. She stressed that global liquidity flows are driven by macro factors like monetary policy and risk sentiment, including safe haven perceptions; but also bank characteristics such as cross-border liabilities, affiliates abroad and bank capitalization influence the extent of flows. Faced with an adverse funding or balance sheet shock, banks tend to contract lending, with cross-border direct lending reacting in a more volatile way than lending via foreign branches and subsidiaries. Yet, foreign affiliates that are less important to parent banks are usually confronted with sharper adjustments. During the COVID-19 crisis, better bank capitalization and liquidity facilities, including central bank swap lines, reduced the contraction of global bank lending to small advanced and emerging market economies. Moreover, US Fed swap lines with other central banks also helped the US economy. It is worth noting that foreign parent banks' USD funding strains stemmed also from their US branches facing corporate credit draws. Thus, these banks sent a large share of swap dollars obtained to their US branches, with branches meeting committed credit draws without an excessive tightening of new credit. The general discussion following the keynote speech centered on issues such as the importance of swap lines, the role of macroprudential policies in attenuating capital flow dynamics, different patterns of capital flows in the COVID-19 crisis compared to the global financial crisis, lasting effects of the COVID-19 crisis on capital flows and the necessity to bolster financial institutions' resilience.

European production chains under the strain of COVID-19: what is the impact on CESEE?

The second session of the conference provided an opportunity to discuss the impact of COVID-19 on production chains in CESEE. The session's chair *Reinhilde Veugelers, KU Leuven*, started out by stressing that it is important to look beyond the emergency support in the current crisis. This implies, inter alia, the need to find the right mixture between the preservation of old economic structures and creative

destruction, as well as answers to questions about strategic autonomy, (de)globalization and the role of European firms in global value chains. *Carlo Altomonte, Bocconi University*, argued that global value chains (GVCs) had been under scrutiny for a while even before the COVID-19 shock. This is because GVC integration did not recover to previous levels after the global financial crisis. Altomonte postulated that while trade tensions do not significantly affect global production patterns, new technologies do. Yet their impact on GVCs is ambiguous. When it comes to the current crisis, Altomonte expects it to cause a (temporary) negative shock for GVCs as it has interrupted supply chains and increased costs of physical meetings. Nonetheless, Altomonte's research suggests that the longer-term impact on CESEE might end up being relatively benign since CESEE countries are mostly integrated in European value chains. Their exposure to non-EU shocks is limited, even when controlling for their production structure. Picking up where Altomonte had left off, *Robert Stehrer, Scientific Director at The Vienna Institute for International Economic Studies*, warned that despite the so far less severe impact of the pandemic on CESEE economies (as compared to many Western European countries) and their deep integration in GVCs there are other looming long-term challenges. In particular, the GVC integration of CESEE – strongly related to FDI flows – seems to have lost steam. In addition, many countries and industries in the region are locked in activities that generate relatively low value added, such as production rather than higher-value added R&D, logistics, headquarters or support services. That is, CESEE countries serve primarily as "factory economies" while Western countries take the role of "headquarter economies." Such a specialization is a drag on economic growth and is tightly connected to the notion of a functional middle-income trap. However, Stehrer closed the session on a positive note by voicing hopes that structural changes in specific, particularly automotive, industries might break up patterns of functional specialization and spark new FDI boosted by European green deal and investment funds.

How has CESEE navigated the crisis from a global perspective? Which lessons can emerging Europe draw from other emerging economies?

The final panel of the CEEI 2020 was also chaired by OeNB Governor Holzmann. By way of introduction, Governor Holzmann highlighted the main differences between the global financial crisis (GFC) and the COVID-19 crisis: In contrast to the run-up to the GFC, when many countries in the region had reported twin deficits in the external and public sector accounts, the CESEE countries entered the COVID-19 crisis with overall strong economic fundamentals and a generally low level of macrofinancial risks. However, the GFC hit the CESEE economies in varying degrees and the same can be expected for the current crisis.

Cristian Popa, Senior Advisor of the Vienna Initiative Steering Committee, confirmed that the CESEE economies entered the COVID-19 pandemic with lower levels of macroeconomic vulnerabilities than observed prior to the GFC. He also emphasized that when the pandemic hit, CESEE banking systems were in better shape, and highlighted that central banks in emerging economies have implemented monetary policy instruments that provided ample liquidity and positively influenced investor sentiment. However, challenges are now rising with increasing nonperforming loans. Referring to the Vienna Initiative, he concluded that participation

in the Vienna Initiative is more broad-based compared to the previous crisis, i.e. more market participants are involved, but that a better understanding of capital flows is urgently needed.

Adam Tooze, Columbia University, focused on political and geopolitical aspects of recent crises. Tooze referred to the 2020 crisis as an exogenous shock and argued that the ability to react to the COVID-19 crisis is dependent on preexisting conditions and previous crises in the CESEE countries. In this regard, he reviewed critical events such as the GFC and the diplomatic crisis between Georgia and Russia in 2008. But also since the GFC, the EU has faced additional profound geopolitical and political challenges such as politics in Hungary under Viktor Orbán, Ukraine struggling with economic problems, the Russian-Ukrainian war, the Greek financial crisis or the refugee crisis starting in 2013. Tooze spoke of a polycrisis that challenged the EU to a large extent but also resulted in some coordinated action. He mentioned the Vienna Initiative (where the OeNB has played a key role) as an outcome of the coordination work. Tooze noted the benefits of integration in terms of economic convergence but questioned if convergence will be delivered to all parts of Europe. Turning to the current crisis, he pointed out that the EU had navigated the first coronavirus wave quite well but that all countries were seeing a strong economic slump. However, compared to the GFC, the financial systems are more robust, and the structure of funding and macroprudential measures implemented after the GFC have helped to manage the current crisis quite well in terms of financial flows. Also, the ECB with its swap and repo lines and with the provision of extra liquidity as well as a historic fiscal deal (which he called Marshall Plan Plus) have the potential to combat the crisis. Tooze called the negotiations painful. They were surrounded by the discussion about the rule of law and revealed substantial disagreements between individual countries on this issue. He also mentioned major political disruptions within countries, for instance in Bulgaria, Serbia or Belarus, which flag the dissatisfaction with the political elites. Tooze concluded that, overall, the COVID-19 crisis is characterized by financial de-risking compared to the GFC but persistent political risks.

The last speaker, *Petia Topalova, Deputy Division Chief at the IMF*, recalled the latest World Economic Outlook of the IMF for the CESEE region. Economic activity is projected to contract strongly in 2020 with a partial rebound in 2021. However, the outlook may already have been rendered somewhat obsolete by the second wave of COVID-19 infections. She discussed the automotive sector in greater detail, as it plays a significant role in many CESEE countries, explaining that this sector was not only hit by the lockdown but moreover suffered from negative spillovers due to the disruption of supply chains. Topalova then discussed policy responses in the CESEE region. Fiscal policy has prevented large-scale bankruptcies and job dislocations so far, and monetary policy and macroprudential policies have supported favorable funding conditions. She called for a continuation of strong policy support to minimize immediate damages from the pandemic but polices should also focus on long-term challenges in the post-pandemic world.

The discussion that followed centered around the interconnectedness of politics and economics. In this respect, Adam Tooze raised the question if and how political factors of concern, in particular the issue of corruption, are part of economic analyses. Cristian Popa highlighted that the Vienna Initiative certainly has

to deal with issues of political economy as well and that the fight against corruption is gaining more and more attention. Petia Topalova added that the IMF takes good governance and the fight against corruption very seriously.

Summing up, many speakers agreed that the relatively good starting position at the outset of the COVID-19 crisis, the swift and decisive policy response and international support have helped the CESEE countries to master the first wave of the pandemic relatively well. Yet, as the crisis is unfolding, risks are mounting in many areas, and the focus will have to shift from immediate crisis response to addressing long-term challenges. Technological progress, changes in global production chains and negative lock-in effects from functional specialization patterns within these production chains were prominently mentioned in the discussion. But also the future role and scope of fiscal and monetary policy were subject to a lively discussion, along with the importance of good governance, rule of law and political stability.

25th Global Economy Lecture:
Pol Antràs on "Globalization and Pandemics"

Compiled by Maria Silgoner[1]

On November 26, 2020, the Oesterreichische Nationalbank (OeNB) hosted the 25th Global Economy Lecture[2], which was delivered by *Pol Antràs,* Robert G. Ory Professor of Economics at Harvard University. Renowned for his research in the fields of international economics and applied theory, Pol Antràs focused on the relationship between globalization and pandemics, investigating both directions of the link.

In his introductory remarks, OeNB Governor *Robert Holzmann* raised the question whether the world is undergoing a period of de-globalization and whether the COVID-19 pandemic may reinforce this trend. While the current crisis will not be a game changer, it may well alter our views on how to position our economies within global value chains. To prevent supply bottlenecks, future strategic decisions may be guided by safety and resilience considerations rather than being solely based on efficiency grounds.

Antràs started out by describing recent trends in world trade. Since the global financial crisis, world trade in percent of global GDP has remained broadly stable, having discontinued the steep upward trend of the preceding decades. While some analysts refer to this development as "de-globalization," Pol Antràs would rather describe it as "slowbalization." According to him, world trade was set to decelerate at some point given that the fast pace of growth seen in the past would be unsustainable in the longer term.

The period of "hyper-globalization" from the second half of the 1980s to the beginning of the new century had three main drivers: (1) *technology,* with the information and communication technology (ICT) revolution facilitating outsourcing to lower-wage countries; (2) *policy,* with the acceleration in multilateral and regional trade liberalization making offshoring cheaper; and (3) *politics,* with the opening-up of Central and Eastern Europe, China and India substantially increasing the labor supply at the global level.

The first factor, technology, will, according to Antràs, continue to foster trade: New technologies such as industrial robots, 3D printing or distributed ledgers often require input components that are not locally produced and that will therefore need to be imported, with positive effects on trade. What may, however, be a threat to globalization is growing protectionism, which has its roots in mounting income inequalities. Digitalization and offshoring reduce local labor demand – at least in the short term. So far, redistributive efforts aimed at compensating the losers from globalization have been rare. We can thus expect continued trade-induced inequality and therefore growing support for protectionist policies. Ambitious redistributive policies would provide a way out.

As to the current COVID-19 pandemic, Antràs's own research finds that globalization increases the likelihood and severity of pandemics if countries are

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sufficiently symmetric. Deepening global integration can lead to multiple waves of infections – even in the absence of lockdowns or social distancing. The pandemic itself is most likely to have only temporary effects on trade and global value chains, as shown by the fast trade recovery over the summer months, but it will not lead to de-globalization. This is due to the fact that the offshoring of production comes with substantial initial fixed costs, such as looking for alternative suppliers and learning about the rules and culture of partner countries. These costs are usually sunk costs and generate scale economies, so that a reversal of past offshoring decisions, i.e. a re-shoring, is often not worthwhile. As changing supply chains is costly, only persistent shocks would generate large relocations.

A policy or health shock, such as the COVID-19 pandemic, would not provoke such a global shift but bring about a swift recovery of trade instead. The ongoing decline in face-to-face interactions is likely to persist, with technical change helping improve virtual ways of interacting and thus replacing face-to-face communication. The main challenge for the future of globalization is institutional and political in nature rather than technological. If the current health crisis aggravates policy tensions across countries, it may darken the prospects of globalization.

The discussion following the Global Economy Lecture focused inter alia on the environmental aspects of globalization. According to Pol Antràs, globalization has certainly overshot its optimal level, but the optimal level itself may increase if policymakers set the right incentives, e.g. via taxation. Globalization does not necessarily have to have a negative impact on the environment, as is, for instance, illustrated by China's increasing interest in a clean environment, as the country grows richer. Antràs moreover believes that the potential in services trade is underestimated. He expects to see a rise in the remote provision of health and entertainment services. And last, but not least, he pointed out that traded goods often entail additional services, such as maintenance or training.

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