

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

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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 vulnerability – 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.

JEL classification: G21, G23, G51, D12, D18

Keywords: household debt, nonbank borrowing

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

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² CESEE-10 comprises CESEE-EU: Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania; and Western Balkan countries: Albania, Bosnia and Herzegovina, North Macedonia and Serbia.

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 (Demirgüç-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)

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 Survey⁵ – 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,

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 debt	Narrow bank debt	Bank debt
Bank loan			
Credit card debt		Consumer credit	
Installment credit at store or company			
Internet loan	Secondary formal debt	Secondary formal debt	Nonbank debt
Payday loan			
Pawnshop credit			
Debt owed to another private lender			
Debt owed to family or friends	Informal debt	Informal debt	
Debt owed to employer			
Other			
Delayed payment of bills to utility provider	Utility debt	Utility 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 groups⁸ 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 km¹⁰ around each PSU:

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

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

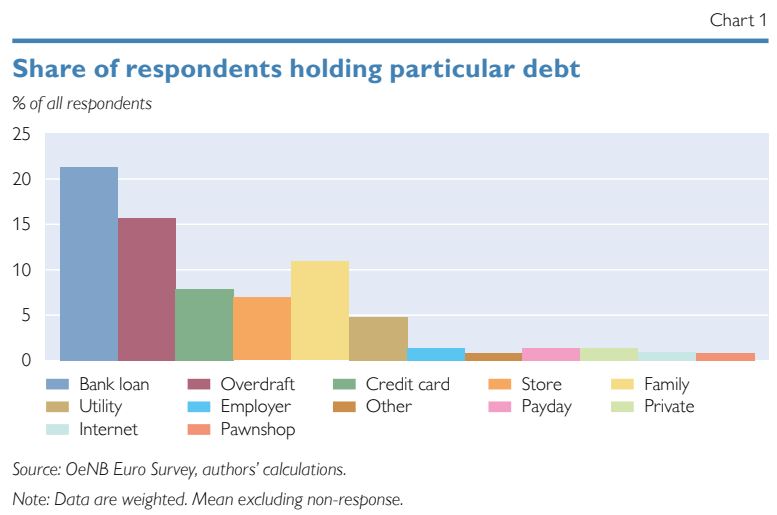
3 Descriptive results on debt instruments

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.



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.

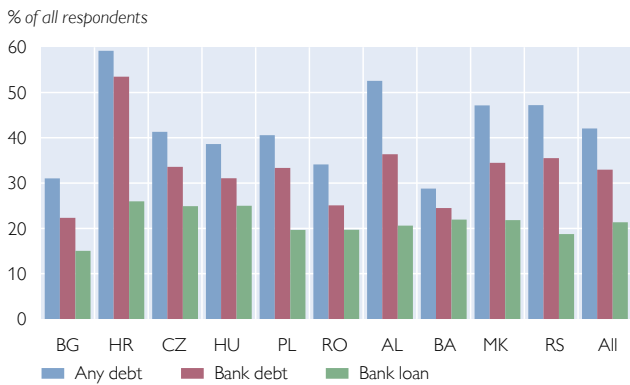
¹² To analyze the heterogeneities between countries, one could collect indicators about regulation or credit registry coverage and study how these interact with individual characteristics in influencing the choice of debt. As the empirical analysis will still include country and wave fixed effects, the insights from such an analysis are likely to be limited.

¹³ The differences across waves are small, so we pooled both waves.

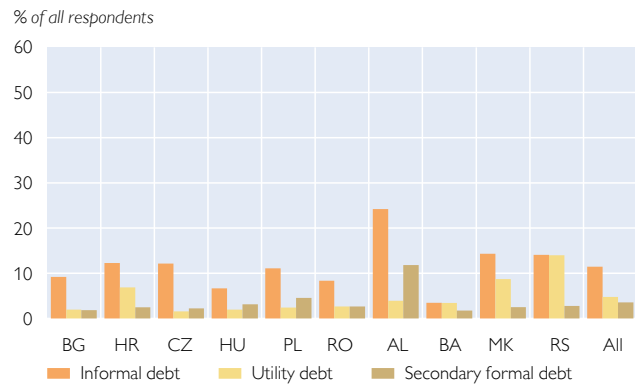
Chart 2

Country comparison: share of respondents holding particular types of debt

Debt overall and bank debt



Informal, utility and secondary formal debt



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:

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

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

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

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 preference – 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 variables¹⁴ 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.

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		
	Indebted individuals		
Sample			
Outcome	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Age	0.00 (0.000)	0.00 (0.000)	0.00 (0.000)
Female	-0.004 (0.004)	0.007 (0.007)	-0.002 (0.002)
Manages household finances	-0.001 (0.006)	0.039*** (0.011)	-0.007** (0.003)
Education – secondary	-0.011* (0.006)	0.047*** (0.012)	-0.012*** (0.004)
Education – tertiary	-0.005 (0.008)	0.053*** (0.014)	-0.011*** (0.004)
Income – refused answer	-0.011 (0.007)	0.022* (0.012)	-0.008** (0.004)
Income medium	-0.002 (0.006)	0.020* (0.011)	-0.005 (0.003)
Income high	-0.009 (0.007)	0.052*** (0.012)	-0.012*** (0.003)
Income shock	0.015*** (0.005)	-0.002 (0.008)	0.005** (0.002)
Income in EUR or remittances	0.023*** (0.005)	-0.031*** (0.010)	0.013*** (0.003)
Unemployed	0.008 (0.006)	-0.066*** (0.011)	0.015*** (0.003)
Self-employed	0.008 (0.007)	-0.015 (0.013)	0.005 (0.004)
Retired	-0.007 (0.010)	0.016 (0.016)	-0.005 (0.005)
Own house	-0.024*** (0.006)	0.028** (0.011)	-0.013*** (0.003)
Condition of residence poor	0.005 (0.006)	-0.017 (0.011)	0.005 (0.003)
Size of household	0.007*** (0.002)	-0.003 (0.003)	0.003*** (0.001)
Risk averse	-0.031*** (0.008)	0.007 (0.016)	-0.011** (0.005)
Impulsive	0.027*** (0.005)	-0.026*** (0.009)	0.013*** (0.003)
Time preference – live today	0.008* (0.005)	-0.005 (0.008)	0.003 (0.002)
Trust in banks	-0.014*** (0.005)	0.038*** (0.008)	-0.011*** (0.003)
Debt owed to family, friends or employer	-0.006 (0.004)	-0.214*** (0.006)	0.037*** (0.003)
Debt owed to utility provider	0.011* (0.005)	-0.144*** (0.009)	0.030*** (0.003)
Rho	-0.202*** (0.035)	-0.202*** (0.035)	-0.202*** (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

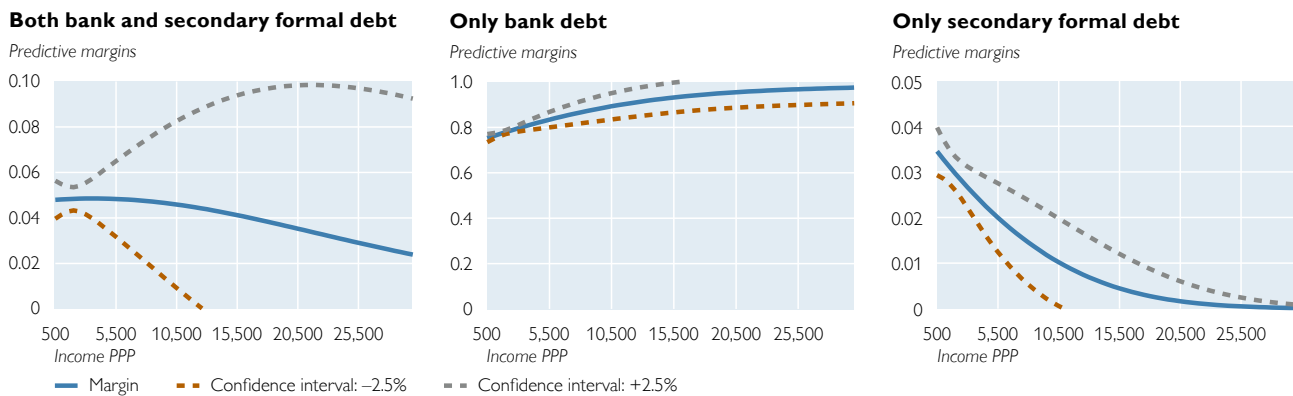
We hypothesize that bank borrowers have higher income than borrowers of secondary formal debt. Table 2 shows that holders of secondary formal debt are less likely to belong to the highest income category, and the opposite is true for those holding only bank debt. People are more likely to have secondary 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.

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.

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



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

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.

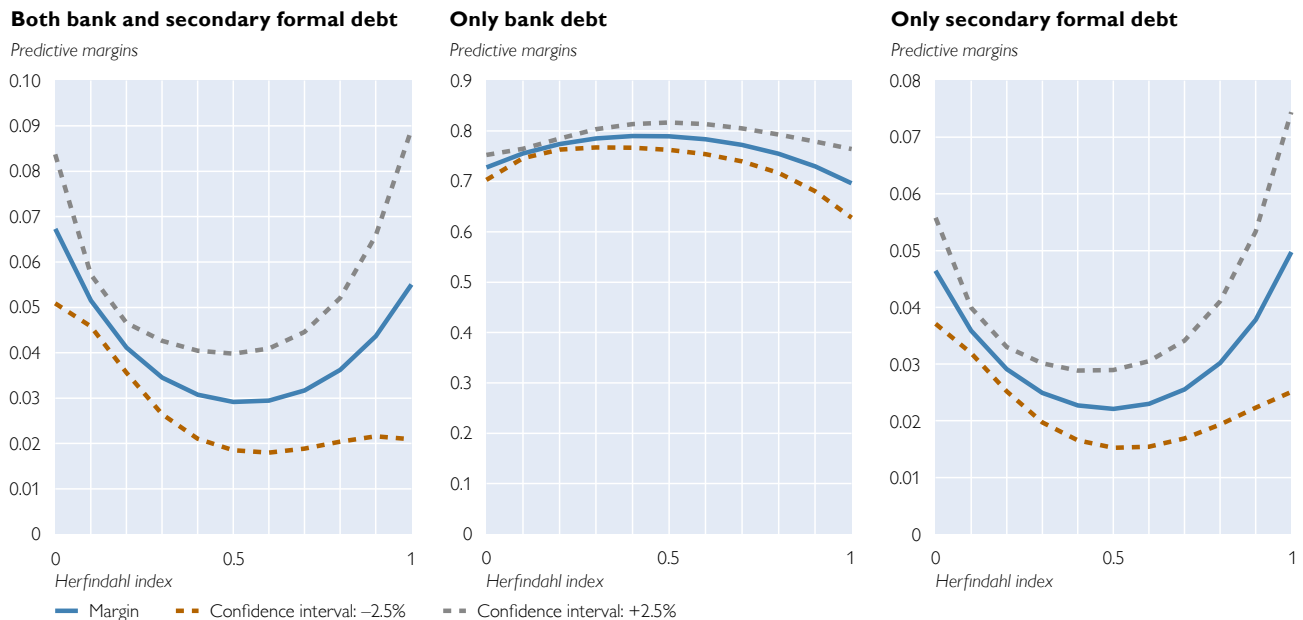
5.2 Robustness analyses

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



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"				
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 correlation remains significant even when we control for a broad range of individual 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

Table A1

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 variable 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*** (0.000)	-0.001*** (0.000)
Female	-0.009 (0.021)	-0.015 (0.020)
Size of household	0.062*** (0.012)	0.069*** (0.014)
Manages household finances	0.322*** (0.052)	0.276*** (0.055)
Education – secondary	0.062 (0.042)	-0.029 (0.043)
Education – tertiary	0.201*** (0.067)	0.064 (0.060)
Unemployed	-0.270*** (0.054)	-0.256*** (0.046)
Self-employed	-0.075 (0.077)	-0.097 (0.062)
Retired	-0.036 (0.043)	-0.017 (0.050)
Income – refused answer	-0.227*** (0.054)	-0.214*** (0.057)
Income medium	0.054 (0.048)	0.039 (0.050)
Income high	0.072* (0.041)	0.041 (0.041)
Own house	0.03 (0.057)	0.083 (0.058)
Condition of residence poor	0.263*** (0.050)	0.251*** (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 (0.000)	-0.001*** (0.000)	0 (0.000)
Female	-0.001 (0.002)	0.010* (0.006)	-0.001 (0.001)
Manages household finances	0.002 (0.003)	0.058*** (0.010)	-0.002 (0.002)
Education – secondary	-0.007*** (0.003)	0.019* (0.010)	-0.005*** (0.002)
Education – tertiary	-0.004 (0.003)	0.030** (0.012)	-0.005** (0.002)
Unemployed	0 (0.002)	-0.095*** (0.010)	0.006*** (0.002)
Self-employed	0.001 (0.003)	-0.037*** (0.011)	0.003 (0.002)
Retired	-0.002 (0.004)	0.001 (0.012)	-0.001 (0.003)
Own house	-0.008*** (0.002)	0.026*** (0.009)	-0.007*** (0.002)
Condition of residence poor	0.006** (0.002)	0.007 (0.010)	0.003* (0.002)
Size of household	0.004*** (0.001)	0.007** (0.003)	0.002*** (0.001)
Risk averse	-0.010*** (0.003)	0.003 (0.016)	-0.007*** (0.002)
Impulsive	0.011*** (0.002)	0.004 (0.007)	0.007*** (0.001)
Time preference – live today	0.005*** (0.002)	0.017** (0.007)	0.002* (0.001)
Debt owed to family, friends or employer	0.026*** (0.002)	0.021** (0.009)	0.015*** (0.001)
Debt owed to utility provider	0.021*** (0.003)	0.050*** (0.013)	0.011*** (0.002)
Income – refused answer	-0.007*** (0.003)	-0.022** (0.009)	-0.004** (0.002)
Income medium	-0.001 (0.003)	0.01 (0.009)	-0.002 (0.002)
Income high	-0.006** (0.003)	0.024** (0.010)	-0.005*** (0.002)
Income shock	0.008*** (0.002)	0.030*** (0.008)	0.003*** (0.001)
Income in EUR or remittances	0.010*** (0.002)	-0.007 (0.009)	0.007*** (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.

Table A4 continued

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*** (0.002)	0.360*** (0.004)	-0.010*** (0.001)
Bank loan refused	0.010*** (0.003)	-0.050*** (0.011)	0.009*** (0.002)
Trust banks	-0.007*** (0.002)	0.012** (0.006)	-0.005*** (0.001)
Bank account	0.011*** (0.003)	0.169*** (0.012)	-0.004** (0.002)
Bank perceived as far	0.006*** (0.002)	-0.015** (0.008)	0.005*** (0.001)
Rho	0.305*** (0.031)	0.305*** (0.031)	0.305*** (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		
	Both bank and nonbank debt	Only bank debt	Only nonbank debt	Both bank and secondary formal debt	Only bank debt	Only secondary formal debt
Sample	Indebted individuals					
Outcome						
Manages household finances	0.001 (0.008)	0.074*** (0.011)	-0.010** (0.005)	0.004 (0.006)	0.122*** (0.015)	-0.013* (0.007)
Education – secondary	-0.010* (0.005)	0.053*** (0.014)	-0.014*** (0.004)	-0.008** (0.004)	0.039*** (0.015)	-0.014*** (0.005)
Education – tertiary	-0.008 (0.007)	0.034** (0.016)	-0.010* (0.006)	-0.006 (0.004)	0.022* (0.013)	-0.01 (0.006)
Unemployed	0.008* (0.005)	-0.068*** (0.013)	0.015*** (0.004)	0.008** (0.004)	-0.033*** (0.011)	0.013** (0.005)
Self-employed	0.012* (0.007)	-0.01 (0.019)	0.008 (0.005)	0.010** (0.005)	0.003 (0.020)	0.011 (0.007)
Income – refused answer	-0.004 (0.008)	0.025** (0.012)	-0.006 (0.006)	-0.003 (0.007)	0.01 (0.014)	-0.005 (0.008)
Income medium	0.002 (0.005)	0.024* (0.013)	-0.003 (0.004)	0 (0.004)	0.02 (0.013)	-0.003 (0.005)
Income high	-0.006 (0.006)	0.050*** (0.011)	-0.011*** (0.004)	-0.006 (0.005)	0.039** (0.017)	-0.012** (0.005)
Own house	-0.018*** (0.006)	0.037*** (0.013)	-0.016*** (0.004)	-0.012*** (0.004)	0.056*** (0.016)	-0.022*** (0.005)
Size of household	0.006*** (0.002)	0.001 (0.004)	0.003** (0.001)	0.004*** (0.001)	0.005 (0.005)	0.004** (0.002)
Income shock	0.014*** (0.005)	-0.002 (0.011)	0.009** (0.004)	0.013*** (0.004)	0.015 (0.015)	0.012** (0.005)
Income in EUR or remittances	0.018*** (0.006)	-0.040*** (0.015)	0.016*** (0.005)	0.013*** (0.005)	-0.040** (0.020)	0.021*** (0.005)
Risk averse	-0.028*** (0.007)	-0.016 (0.022)	-0.014** (0.005)	-0.020*** (0.006)	0.006 (0.028)	-0.023*** (0.007)
Impulsive	0.019*** (0.006)	-0.018 (0.012)	0.014*** (0.004)	0.015*** (0.005)	-0.002 (0.012)	0.017*** (0.005)
Time preference – live today	0.006 (0.006)	0.005 (0.011)	0.003 (0.004)	0.003 (0.004)	-0.016* (0.009)	0.006 (0.005)
Applied for bank loan	0.006 (0.007)	0.248*** (0.012)	-0.033*** (0.007)	0.017*** (0.006)	0.419*** (0.010)	-0.043*** (0.008)
Loan application refused	0.021** (0.009)	-0.061*** (0.014)	0.021*** (0.006)	0.015** (0.006)	-0.082*** (0.014)	0.029*** (0.007)
Trust banks	-0.009* (0.005)	0.030*** (0.011)	-0.010*** (0.004)	-0.006* (0.003)	0.028** (0.011)	-0.010** (0.004)
Bank account	0.005 (0.007)	0.136*** (0.022)	-0.018*** (0.004)	0 (0.005)	0.076*** (0.027)	-0.011* (0.006)
Bank perceived as far	0.012** (0.006)	-0.009 (0.011)	0.008** (0.004)	0.008** (0.004)	0.007 (0.010)	0.008** (0.004)
Size of town (log)	0.001 (0.001)	-0.006** (0.002)	0.002 (0.001)	0 (0.001)	-0.005** (0.002)	0.001 (0.001)
Debt owed to family, friends or employer	-0.004 (0.007)	-0.203*** (0.008)	0.028*** (0.005)	-0.001 (0.006)	-0.167*** (0.020)	0.023*** (0.006)
Debt owed to utility provider	0.005 (0.008)	-0.147*** (0.013)	0.025*** (0.005)	0.005 (0.006)	-0.105*** (0.019)	0.021*** (0.006)
Store credit	0.009 (0.006)	-0.131*** (0.017)	0.025*** (0.005)	0.007 (0.006)	-0.091*** (0.025)	0.021*** (0.005)
Bank overdraft debt				-0.009** (0.003)	-0.092*** (0.014)	0.004 (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.

Table A5 continued

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** (0.068)	-0.136** (0.068)	-0.136** (0.068)	-0.02 (0.069)	-0.02 (0.069)	-0.02 (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.