Household loans in CESEE from a new perspective: the role of income distribution

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This paper constitutes a first attempt to shed light on the role of income distribution in household debt, macrofinancial stability and financial market access in Central, Eastern and Southeastern Europe (CESEE). This issue has not been adequately addressed so far. Using data from the OeNB Euro Survey for the period from 2009 to 2017, we explore the question whether interpersonal comparisons affect a household's probability of having a loan. We use multilevel probit modeling to take into account the hierarchical structure of the data. Our results support the notion that the relative income position, along with absolute income, has an impact on households' likelihood of having a loan, but this is valid mainly for households above the median of the income distribution. We show this impact for almost all components of household debt, but evidence is strongest for mortgage and car loans. Interpersonal comparisons turn out to be a weaker predictor of a household's propensity to have a loan in CESEE countries with a more equal income distribution.

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The global financial crisis (GFC) that started in 2008/2009 has increasingly drawn attention to the importance of, and the threats arising from, household sector debt for macroeconomic stability and GDP growth (IMF, 2017). Prior to the GFC, the accumulation of debt in the household sector was mainly thought of as an intrinsic part of the economic convergence process of the Central, Eastern and Southeastern European (CESEE) countries. With the benefit of hindsight, a consensus has emerged that credit growth was on an excessive path before the GFC, although CESEE credit levels still remained well below levels observed in advanced economies. The onset of the GFC in 2008/2009 also started a trend toward lower and partly negative credit growth rates in some CESEE countries (Comunale et al., 2018), while the level of household debt decreased somewhat in most CESEE countries. Given robust demand but also the favorable liquidity situation in the banking sector, household lending in the CESEE countries started to increase again in the past years; however, this development varied across individual countries (see Riedl, 2019, for an overview of recent household credit developments in CESEE).

However, the still relatively low levels of household debt in CESEE (the unweighted CESEE[2] average stood at 26% of GDP in 2017) do not necessarily imply lower risks to macrofinancial stability. In fact, recent evidence (IMF, 2017; Voinea et al., 2016) has shown that household debt levels of above 30% of GDP could threaten macrofinancial stability and increase the likelihood of a financial crisis.

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[2] *In this study, the country aggregate CESEE includes the same countries as the OeNB Euro Survey: EU Member States (Bulgaria, Croatia, the Czech Republic, Hungary, Poland and Romania) and (potential) EU candidate countries (Albania, Bosnia and Herzegovina, North Macedonia and Serbia).*

Against this background, it is of crucial importance to understand the drivers of household credit in CESEE better.

So far, hardly any studies have explored the link between income distribution and household debt in CESEE. Descriptive evidence suggests that distributional effects might be in place in the CESEE region which might be relevant for household debt as rising gross household disposable income between 2009 and 2017 went hand in hand with a declining household savings rate and increasing household debt in most of the CESEE countries. The interaction between income inequality and household indebtedness is relevant for policymakers with respect to both financial stability and financial inclusion. While it might be desirable from a financial stability perspective that, ceteris paribus, households at the bottom of the income distribution would hold less debt against the background of higher default rates, this would somewhat contradict a financial inclusion view. Therefore, our results may contribute to both strands of the debate as our survey data provide information on the likelihood of having a loan but not on the amount of this loan.

The relevance of income inequality for household debt can be analyzed from both a supply- and a demand-side perspective.[3] From a demand-side perspective, a mechanism through which income distribution could affect household borrowing is provided by the relative income theory of consumption (Veblen, 1899; Duesenberry, 1949). Accordingly, an individual's utility function depends on the ratio of his or her consumption or income to a weighted average of the consumption or incomes of other persons (i.e. a reference group); more frequent interaction with relatively more affluent individuals would drive up a person's spending when income inequality increases ("keeping up with the Joneses" effect). In addition, a habit formation effect would prompt an increase in consumer spending, and thus borrowing, when individuals try to avoid cutting down on the level of consumption already attained. From a supply-side perspective, banks use income distribution data next to information on a household's income to assess borrowers' creditworthiness, especially in countries with low credit register coverage[4] (as is the case in some of the CESEE countries in our sample). Coibion et al. (2014) refer to this finding as the "signaling channel" and show that as banks cannot observe to a sufficient extent a borrower's ability to meet debt obligations, they consider the observed respondent's income together with income inequality. However, with OeNB Euro Survey data at hand, our aim is not to clearly distinguish between supply and demand effects of income inequality but to focus on an "equilibrium" transaction, i.e. on whether a respondent has a loan or not, and on the loan's purpose. As shown by Bazillier and Hericourt (2017), the two channels are usually activated simultaneously, and the prevailing net effect could be either of the two. In addition, we believe that differentiating the effects of income inequality on household debt by respondents' position in the country's income distribution

[3] *According to the most recent results from bank lending surveys (e.g. European Investment Bank, 2018), the importance of demand factors such as housing market prospects and consumer confidence prevailed in CESEE in the past years. On the other hand, while supply-side factors had gained importance in the aftermath of the watershed year of 2008, their role declined in recent years in line with the introduction of regulatory and resolution measures.*

[4] *According to the World Bank's Doing Business survey, in economies where credit registers cover a larger share of the adult population, more adults have a credit card, borrow from a bank or other financial institution, and formal private sector lending is higher (World Bank, 2016).*

would allow for a disaggregated view and hint at a prevalence of either supply or demand factors without, however, excluding the impact of one or the other.

Going further, an extensive body of literature has turned attention to exploring the hypothesis that individuals derive utility from status, which in turn depends on what others believe about people's income (Ireland, 1994; Charles et al., 2009). Although income is not observable, visible consumption is. Therefore, the level of individuals' conspicuous consumption (i.e. consumption that displays social status) can be expected to depend on the income distribution of the entire sample of individuals under observation. Against this background, some goods and loans, respectively, would be driven by conspicuous motives. Therefore, the impact of the income distribution on the likelihood of having a loan and on the loan's purpose (consumption, car, mortgage and loans for other purposes) will enable us to make inferences about the existence and magnitude of such motives.

On the empirical front, papers only recently started to account for the distribution of income as a driver of household debt, focusing mainly on the OECD countries and the U.S.A. in particular. For instance, Kumhof et al. (2015) show that in the U.S.A., the surge in the income share of the top deciles could largely explain the buildup of leverage among households at the bottom of the income distribution. Building on the central assumption that income shocks are of a permanent nature (and that a change in income distribution is therefore understood as a permanent shock), the authors present a model that shows that higher leverage and financial crises are the endogenous result of a growing income share of high-income households. Coibion et al. (2014) show that in the United States in the period from 2001 to 2012, low-income households in high-inequality regions accumulated less debt relative to income than their counterparts in regions with lower income inequality. For Italy, Loschiavo (2016) shows that richer households living in regions with higher income inequality are more likely to be indebted than similarly rich households residing in regions with low income inequality (and vice versa for poorer households).

So far, the CESEE countries have hardly received attention in the literature in this respect. A wide range of papers on CESEE household debt developments based on survey data (and often on OeNB Euro Survey data) have focused on determinants of foreign currency loans by accounting for the level of household income only (e.g. Fidrmuc et al, 2013; Beckmann et al., 2012). André (2016) is one of the few papers to offer a discussion on the role of income distribution in CESEE, pointing out that debt is unevenly distributed among households, which makes low-income households with debt service-to-income (DSTI) ratios of more than 40% particularly exposed to income and unemployment shocks. Most recently, Riedl (2019), using OeNB Euro Survey data, has explored in greater detail the role of income in household debt. Focusing on DSTI ratios in the CESEE countries of our sample, her paper found that households' DSTI ratios are negatively correlated to median income and that they are higher for the lower-income group of households but that the differences are not statistically significant.

To our knowledge, this paper is the first to relate income distribution at the country level to the likelihood of CESEE households having a loan. We enter uncharted waters as we relate the aspect of relative reference income (i.e. income relative to that of other households above an individual household's income position in the same country) to the likelihood of holding debt and test whether – and if so,

which – households strive to lift their relative consumption standards and take out loans. In addition, we take a more granular approach and focus on different loans according to their purpose. Finally, we apply a methodological framework that accounts for the different levels of data included (i.e. individual or household, country) and the possible correlations among them.

This paper is structured as follows: Section 1 explains the construction of the income distribution measure based on OeNB Euro Survey data, introduces the dependent variable and presents some descriptive evidence. Sections 2 explains the empirical methodology before the results are discussed in sections 3 and 4. Section 5 concludes.

1 Income, income inequality and household debt in CESEE

This paper is based on data compiled in the OeNB Euro Survey, which is a household survey performed in ten CESEE countries.[5] In each country and per each survey wave, the target population comprises around 1,000 respondents that are representative of the respective country's population aged 14+. Respondents are selected via a multi-stage stratified random sampling procedure. For the nine-year observation period analyzed in this paper (2009 to 2017), this corresponds to a total number of individual observations of about 110,000. While we have two levels of data (i.e. individuals or households, countries), the data structure is cross-sectional at the individual (i.e. household) level and a panel at the country level.

Building on Belabed and Hake (2018), one major contribution of this paper is the use of newly computed annual income inequality (i.e. distribution) measures that are comparable over time (i.e. for 2009 to 2017) and across the ten CESEE countries. The income distributional measures are based on the OeNB Euro Survey question, "What is the total monthly income of the household after taxes?" Between 2009 and 2016, survey respondents were asked to place their income in one of 20 categories, which were defined in a way that a maximum of 10% of respondents fall into each category. Subsequently, the ranges of categories were harmonized across the different countries and over the years, amounts were transformed into euro and into purchasing power units (to capture exchange rate and inflation differences) to ensure cross-country comparability. We then took the average of each income category to compute the equivalized household income.[6] In the 2017 survey wave, respondents were asked to report the amount of their household income (or at least the approximate). Finally, we must note that the income data derived from the OeNB Euro Survey refer to net household income

[5] *The OeNB Euro Survey focuses on the degree of euroization in CESEE and thus comprises only EU countries that do not have the euro as their legal tender (Bulgaria, Croatia, the Czech Republic, Hungary, Poland and Romania) as well as four non-EU countries (Albania, Bosnia and Herzegovina, North Macedonia, and Serbia). For more information, see www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html.*

[6] *As individual respondents were asked about the income of their household, we applied OECD standards to calculate weighted household incomes to account for household structure (i.e. a weight of 1.0 was assigned to the first adult; 0.5 to the second and each subsequent person aged 14+; 0.3 to each child aged under 14).*

and not to households' disposable income[7] as the corresponding question referred to households' income after taxes without explicitly mentioning social transfers.[8]

1.1 Measures of income distribution based on OeNB Euro Survey data

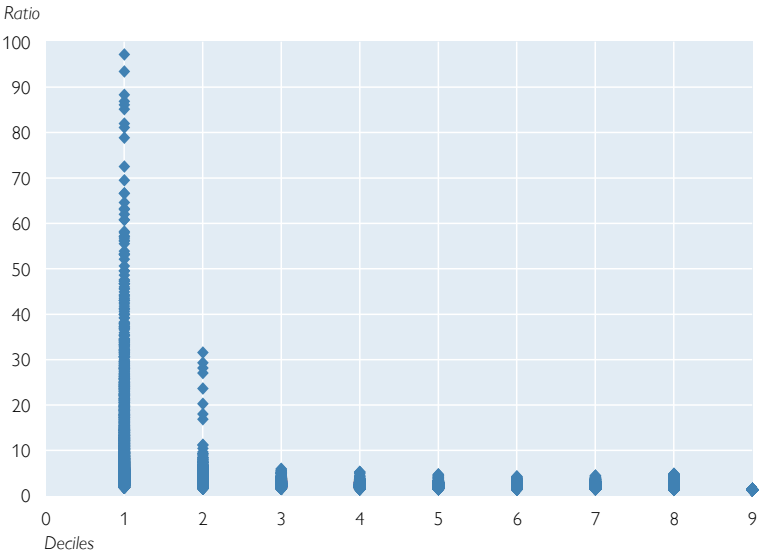
The most widely-used measure of income and wealth inequality is the Gini coefficient, which varies between 0 (fully equal) and 1 (completely unequal). However, this measure of income inequality comes at a cost: It does not provide enough information about which part of the distribution drives the aggregate outcome. For instance, an increase in the Gini coefficient per se does not reveal whether it was driven by a decrease in income shares at the bottom of the distribution or by an increase in income shares at the top of the distribution. Furthermore, different distributions may yield the same Gini coefficient, so it is impossible to judge which distribution to prefer. Finally, due to its construction, the Gini coefficient is particularly sensitive to changes in the middle of the distribution and less so to changes near its tails.

Against this background, we follow Drechsel-Grau and Schmid (2014) instead and opt for using households' relative reference income ratio, which is defined as the ratio between the mean income of all households in the income deciles above a household's own income decile relative to the respective household's own income. The higher this ratio, the lower the share of the household's own income in the country distribution and the higher income inequality at the country level. We consider this measure particularly fitting to our analysis as interpersonal comparisons tend to be directed "upward"[9] (Ferrer-i-Carbonell, 2005). In addition, it combines both the impact of income and its distribution, thus alleviating omitted variable bias problems.

Chart 1 shows the distribution of households' reference income as compared with the respective country's income distribution. Intuitively speaking, respondents in the lowest income

Chart 1

Reference income ratio according to income deciles per country



Source: Authors' estimates based on OeNB Euro Survey data for the period from 2009 to 2017.

Note: Ratios represent averages for the observation period.

[7] *Eurostat defines a household's disposable income as the equivalized disposable income i.e. the total income of a household (including social benefits) after tax and other deductions.*

[8] *The exclusion of transfers from our income variable would cause a bias in our estimations only if social transfers and our relative income variable defined below were correlated. However, this is unlikely to be the case for transfers provided by the public sector as these are independent of the income levels of other households. For private social transfers, such as remittances to the household from family members, there might be a correlation – but only if the remittance sender resides in the same country and is in a higher income decile. Given that most remittances come from family members abroad, we are confident that the bias is small or negligible.*

[9] *A number of both theoretical and empirical contributions, including the relative income hypothesis by Duesenberry (1949), confirm that income status comparisons are directed "upward," i.e. refer to individuals at the higher end of the income distribution above a household's own income.*

deciles (first and second) have the highest ratio (up to 98), implying that the income of a household in the first decile could be up to 98 times lower than the average income in all deciles above the first decile. For the whole sample, the median of the reference income ratio for all deciles is 2.3, while 99% of all observations are below 15.[10] The correlation between the reference income measure and the country Gini coefficient is 0.28, which indicates that roughly one-third of the change in income inequality was attributable to the households below the top of the distribution.

1.2 Evidence on household debt derived from OeNB Euro Survey data

The OeNB Euro Survey provides information on whether households in our CESEE sample have a loan. Moreover, it also contains information on the loan's purpose (i.e. consumer loan, mortgage loan, car loan or loan for other purposes)[11]. Therefore, we construct a dummy variable that is 1 if a household has a loan (and, in a subsequent step, if it belongs to a certain category) and 0 otherwise, which is our dependent variable. Chart 2 compares the share of individuals with loans immediately after the outbreak of the GFC in CESEE in 2009 with those in 2017. All countries in the sample except Albania and North Macedonia have seen a decline in the share of respondents with loans. This finding matches the information derived from macroeconomic data in most of the CESEE countries. In fact, according to recent Eurostat data, the relation of household sector loans to GDP has increased only in the Czech Republic, Poland and Serbia, hinting at a higher average amount of loans per person. According to the OeNB Euro Survey data, in the period from 2009 to 2017 respondents with consumption loans accounted, on average, for the largest share in total respondents: 21% of respondents in CESEE, on average, had a consumption loan, while 19% of respondents had a mortgage loan and 11% had a car loan.

Chart 2

Share of respondents having a loan

Source: OeNB Euro Survey, authors' calculations.

[10] *Please note that, by definition, there is no reference income ratio for the tenth decile of the income distribution.*

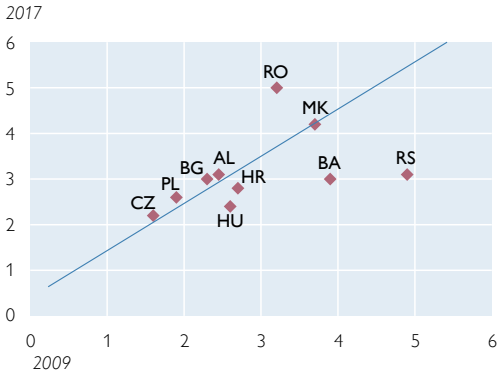
[11] *The loan question in the survey is asked in the following way, "Do you, either personally or together with your partner, currently have any loans that you are still paying off?" If respondents have a loan, they are asked to specify the purpose of the loan as follows: "to finance a house or apartment," "for consumption goods (furniture, travelling, household appliances, etc.)," "to finance a car" or "for other purposes."*

1.3 Descriptive evidence of trends in income distribution and household loans in CESEE

Conventional distributional measures such as the Gini coefficient could be less sensitive to changes in the income distribution at the very bottom or at the very top (Salverda et al., 2009). Against this background, the relative income measure would, on the one hand, overcome the weaknesses of the Gini coefficient (see section 1.1) and, on the other hand – as it is available on the individual level – also put households' income position into a country or regional perspective.

Chart 3

Correlation between relative income ratios in 2009 and 2017



Source: OeNB Euro Survey, authors' calculations.

Chart 3 compares the average relative household income ratios at the country level in 2009 and in 2017. In the majority of the CESEE countries surveyed, the relative income ratio increased, i.e. distributions of net household income became more unequal (as shown by a position above the 45 degree line) over time. By contrast, average household incomes in Hungary, Bosnia and Herzegovina, and Serbia were more equally distributed in 2017 than in 2009. In 2017, income inequality continued to be lowest in the Czech Republic, Hungary and Poland – a finding confirmed by widely-used data sources (e.g. Eurostat) based on the Gini coefficient income inequality measure. Of the countries in our sample, the most unequal average household income distribution was found in some of the Western Balkan countries (i.e. Bosnia and Herzegovina, North Macedonia, and Serbia) and Romania. Overall, a comparison with other income inequality measures is possible to a limited extent only as our measure is based on net income while Eurostat, for instance, uses disposable income. In addition, not all of the countries of our sample and not the entire time range are covered by alternative data sources. However, a comparison, to the extent possible, yields similar results.

2 Empirical strategy

The present study includes individual but also country-level characteristics (i.e. two hierarchical levels of data), all of which are potentially correlated with the probability of a household in CESEE having a loan or having a certain type of loan. We consider it key for our analysis to account for these different data layers as households within the same region or country tend to be more similar and interrelated than households in different regions or countries. Disregarding this interdependency would violate the "no autocorrelation" assumption, which in turn would result in a downward-biased estimator and induce spurious "significant" coefficients of the included variables (Rabe-Hesketh and Skrondal, 2012).

2.1 Multilevel models

We apply multilevel probit models, which account for the nested structure of the data. A large set of possible covariates can influence the probability of having a loan, many of which are covered by the OeNB Euro Survey. As there are two levels

of nested data clusters in our dataset, we allocate all explanatory variables to one of the following categories: the income distribution measure, sociodemographic characteristics, individual sentiments and characteristics (e.g. availability of savings, property), and country-level economic factors (see table A1 in the annex). In addition, we assume random effects at the higher levels of clusters.[12] The suitability of using the multilevel approach for our data and research question has been confirmed by Bryan et al. (2013), who claim that standard multilevel estimators are consistent only when both the number and size of the clusters are large, with the minimum number of groups (i.e. countries in our setting) being at least 10.

2.2 Empirical specification

For the observation period from 2009 to 2017, an individual's probability of having a loan (or a certain type of a loan) is given by

$$\Pr(loan_{ikt}) = \beta_0 + \sum_{k=1}^{K} Rel\ income_{ikt} * decile_{ikt}\beta_k^{RI} + \sum_{k=1}^{K} X_{ikt}^{S}\beta_k^{S} + \sum_{m=1}^{M} X_{kt}^{C}\beta_{kt}^{C} + \omega_{ikt}$$

where $k=1,\ldots,10$ represents clusters at the level of two (i.e. countries), and $i=1,\ldots,110.000$ representing level one (individual observations) and t=2009,…,2017. $loan_{ijkt}$ is a binary variable that takes a value of 1 if an individual has a loan and, respectively, if an individual has a loan of a certain category in year t. It must be noted that OeNB Euro Survey data about the purpose of loans are available only for the period from 2010 to 2014. We test the effect of income inequality in a first specification by including the level of reference income (*Rel income*) for each individual, and in the following specifications by including interaction terms with the individual's position in the country income distribution in every year. We opted for calculating the reference income at the country level, as the regional within variance of the income distribution happens to be low in most regions surveyed.[13, 14]

Besides considering the important link between income inequality and the likelihood of a household having a loan, we included other variables the empirical literature has found to be correlated with household debt. In line with similar studies (e.g. Crook (2006), Beer and Schürz (2007)) and based on the availability of data from the OeNB Euro Survey, we also test for the impact of relevant sociodemographics on borrowing behavior (X_{ikt}^{s}). In particular, we include the level of a household's income to control for the descriptive finding that more affluent individuals are more likely to have a loan. The relevance of income for taking up a loan has been widely recognized in the literature although the direction of impact has been found to be less clear-cut. Higher income tends to enable people to self-finance their needs without resorting to borrowing. This suggests a lower demand

[12] *Random effects are composed of "between variance" (i.e. variance between regions in a country and individuals in a region) and "within variance" (i.e. variance within the observations in one and the same cluster, i.e. country) parts.*

[13] *Several regions in Bosnia and Herzegovina and in North Macedonia are an exception in this context.*

[14] *Here, our household reference group comprises households in the same country. However, if the reference group is considered at the regional level instead of the country level, the point estimation results remain virtually unchanged but standard errors increase slightly. This could suggest that a household reference group is better captured at the country level than at the regional level. One possible explanation for this phenomenon could be that due to modern communication technologies, people are better connected across distances and, therefore, the reference population may go beyond households' immediate vicinity.*

for lending in high-income households. When it comes to consumer credit, however, the level of income is less relevant than an expected change in income (which itself also depends on income distribution). In some of the CESEE countries in our sample (e.g. Bosnia and Herzegovina, Serbia), the consumer loan segment still accounts for the major share of household loans (Riedl, 2019).

In addition, a higher probability of having a loan could be expected for individuals that are young and establishing a household (Fidrmuc et al., 2013). On the other hand, the great uncertainty of very young households concerning their future income may lead to lower demand and/or supply of mortgages in this segment. Also, the occupational status (e.g. employed, student, retired, etc.) of a household allows us to draw conclusions about their income security, as does the number of children in the household (Albacete and Lindner, 2013). Moreover, households' higher wealth might imply less need for borrowing. However, certain undertakings, such as the purchase of real estate, require borrowers to contribute their own funds, which may result in an increase in the demand for lending among wealthier households. As the OeNB Euro Survey provides information on household wealth only for the period from 2010 to 2014, we included information on household wealth (e.g. their own car and/or house) only as a robustness check. Similar to Fidrmuc at al. (2013), who have shown that sentiments about current and future developments correlate with the likelihood of having a foreign currency loan, we also included sentiments about the financial situation of the household, the economic situation of the country as well as trust in both domestic and foreign-owned banks as control variables. In line with the life-cycle hypothesis, we also controlled for the availability of savings to respondents. Finally, X^{C}_{kt} accounts for country-level macroeconomic developments (e.g. GDP per capita, unemployment rate, financial development index).

A constant and a full set of yearly dummies, denoted in the equation by a time-specific constant π_t, is included in all specifications. The time dummies control for all factors that are common for all individuals in all countries in a specific year. ω_{ikt} is a random error term; in contrast to a level regression, it consists of two error terms: one at the individual level (i.e. for the i-th respondent within the k-th country) and one at the country level. Separating variance groups in this manner defines a measure to test the suitability of multilevel modeling, namely the intraclass variance coefficient (ICC or ρ). The higher this coefficient (i.e. in any case significantly different from zero), the more suitable is the application of multilevel modeling, i.e. the more important it is to take into account the effects of factors on a higher level.

3 Results

3.1 Probability of having a loan

Table 1 shows the multilevel probit estimations of households' probability of having a loan in dependence of different group variables. Column 1 shows the results of testing for the effects of the sociodemographic characteristics of the surveyed individuals and the income distribution measure. In this case, the coefficient of the relative income ratio expresses the average effect of income inequality. Columns 2 and 3 show the results of testing for possibly different effects with respect to households' position in the income distribution. The results confirm the insights from the literature (i.e. Loschiavo, 2016) and the descriptive analysis: the higher the

relative income ratio, i.e. the more unequally household income is distributed in a country, the less likely it would be for a respondent to have a loan. However, the results presented in column 2 show that the effect of the relative income ratio changes depending on the individual's position in the country (or regional) distribution. Accordingly, respondents with an income above the median of the country's income distribution are more likely to have a loan. As we control, at the same time, for the level of households' income, the interaction terms express only the impact of the income distribution. Interestingly, the opposite is found for the first and second deciles: Higher reference income is associated with a significant decrease in the likelihood of having a loan. As we can only draw conclusions about an "equilibrium" transaction, a possible inference from these results is in line with the "habit formation" motive of the relative income hypothesis: Individuals above the median of the country's income distribution are more likely to take out a loan as income inequality increases as they try to maintain their own relative consumption levels or to keep up with the richer reference group. At the same time, the negative effect observed for the first two deciles hints at the "signaling" function of the income distribution (e.g Coibion et al., 2014) as banks increasingly use additional information besides borrowers' income when macroeconomic uncertainty is elevated, and become more restrictive in their loan supply. It should be stressed at this point that the interpretations put forward for the coefficients' signs are not the only possible explanations for these effects. However, keeping in mind the findings of the literature on these topics, we are confident that the suggested mechanisms offer a plausible explanation for the correlation between income distribution and a household's probability of having a loan. Moreover, in CESEE, respondents' likelihood of having a loan first increases with age, peaks when middle-aged, and then declines, i.e. older respondents are less likely to be indebted. Women or respondents having children are more likely to be indebted. The level of education and the occupational status have the intuitively expected effect on indebtedness.

In addition, in column 3 of table 1 we include respondents' sentiments with respect to various current and future developments, their trust in the banking system as covered in the OeNB Euro Survey as well as macroeconomic developments, which have been found to be related with indebtedness. Expectations of a good future economic situation of a country and a better financial position of the respective household correlate positively with a household's likelihood of having a loan, which is most likely due to expected future income inflows. In line with Fidrmuc et al. (2013), we show that higher trust in the banking system on average increases households' access to finance. At the country level, household indebtedness goes hand in hand with the level of GDP per capita and the improvement of the country's ranking in the financial development index. On the other hand, the unemployment rate proves to be insignificant, probably because it is already captured by the effect of income distribution.

In line with Coibion et al. (2014), in columns 4 and 5 we test whether income inequality has a threshold effect, i.e. we distinguish between CESEE regions where income is very unequally distributed and CESEE regions with a rather homogeneous income distribution. For this purpose, we split the sample into regions with a relative income ratio above the median of 2.3, and below. While we can confirm the baseline results of column 1 for the more unequal regions (column 4), the "upward-looking" comparison does not seem to play a role at all in the more equal

regions (column 5). Interestingly, from column 5 we see that in regions with less income inequality, respondents in the first and second income deciles are less likely to be indebted. This finding contradicts Coibion et al. (2014), who find such a result for U.S. households in high-inequality regions and explained it with supply effects that are prevalent when income inequality increases. In our case, this result might be due to CESEE households' relatively good financial position and the less pronounced country disparities, which reduce the "upward" comparison of low-income households. The existence of savings[15] increases the likelihood of a household having a loan. Finally, we test whether wealthier individuals (i.e. those having a house in which they live, or a car) are more likely to have a loan (column 6). Generally, our estimations show that debt participation increases with wealth but only as measured by car ownership. Real estate ownership has only a marginal effect, presumably due to the overall high home ownership rates in CESEE (Hegedus et al., 2013).

As mentioned in section 2, the suitability of the multilevel approach is measured by the intraclass coefficient (ICC). An ICC of zero would indicate that the respondents (i.e. observations) within a given group (e.g. country or region) do not differ from the respondents (i.e. observations) within other groups. In such a case, multilevel analysis would be redundant. An ICC that varies between 6.2% and 7.5%, as shown in our results, confirms the importance of accounting for correlation among all levels of OeNB Euro Survey data.

[15] *The OeNB Euro Survey does not include information on the amount of households' savings.*

Table 1

Country reference income and the probability of households having a loan (country deciles)

Variables	1 Rel income level	2 Interaction of rel income with income decile	3 Sentiments	4 Regions with higher income inequality	5 Regions with lower income inequality	6 Wealth
Rel income	−0.012*** (0.004)					
1st decile country*Rel income		−0.007* (0.004)	−0.011* (0.006)	−0.005 (0.005)	−0.028*** (0.005)	−0.006 (0.006)
2nd decile country*Rel income		−0.010 (0.008)	−0.024* (0.013)	−0.005 (0.013)	−0.035** (0.015)	−0.010 (0.008)
3rd decile country*Rel income		0.010 (0.014)	−0.006 (0.015)	0.013 (0.016)	−0.013* (0.020)	0.010 (0.014)
4th decile country*Rel income		0.017 (0.013)	−0.002 (0.011)	0.020 (0.013)	−0.012 (0.022)	0.017 (0.013)
5th decile country*Rel income		0.031** (0.015)	0.007 (0.017)	0.033 (0.021)	0.002 (0.029)	0.049** (0.015)
6th decile country*Rel income		0.045*** (0.011)	0.035*** (0.012)	0.056*** (0.009)	0.025 (0.020)	0.058*** (0.011)
7th decile country*Rel income		0.051*** (0.015)	0.036** (0.015)	0.069*** (0.016)	0.015 (0.020)	0.051*** (0.015)
8th decile country*Rel income		0.065*** (0.017)	0.048** (0.019)	0.081*** (0.015)	0.025 (0.027)	0.070*** (0.017)
9th decile country*Rel income		0.064*** (0.019)	0.048** (0.019)	0.078*** (0.017)	0.023 (0.017)	0.066*** (0.019)
Female	0.025* (0.013)	0.025* (0.013)	0.028** (0.014)	0.038*** (0.015)	0.025 (0.021)	0.016 (0.019)
Age	0.101*** (0.007)	0.101*** (0.007)	0.101*** (0.007)	0.109*** (0.007)	0.095*** (0.009)	0.093*** (0.009)
Age squared	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)
Children	0.267*** (0.032)	0.274*** (0.032)	0.270*** (0.031)	0.287*** (0.045)	0.266*** (0.033)	0.266*** (0.031)
Head of household	0.011 (0.024)	0.015 (0.023)	0.011 (0.026)	0.010 (0.024)	0.021 (0.032)	0.015 (0.030)
Secondary education	0.207*** (0.023)	0.187*** (0.021)	0.181*** (0.017)	0.210*** (0.022)	0.163*** (0.028)	0.187*** (0.017)
High education	0.308*** (0.057)	0.271*** (0.053)	0.249*** (0.052)	0.293*** (0.082)	0.226*** (0.046)	0.264*** (0.049)
Unemployed	−0.305*** (0.063)	−0.276*** (0.062)	−0.266*** (0.061)	−0.340*** (0.056)	−0.204*** (0.071)	−0.292*** (0.063)
Self-employed	0.030 (0.052)	0.026 (0.051)	0.020 (0.042)	−0.072 (0.072)	0.073*** (0.028)	0.014 (0.040)
Student	−0.717*** (0.114)	−0.705*** (0.115)	−0.704*** (0.113)	−0.706*** (0.094)	−0.714*** (0.158)	−0.716*** (0.102)
Retired	−0.104*** (0.029)	−0.090*** (0.028)	−0.083*** (0.027)	−0.090*** (0.032)	−0.126*** (0.040)	−0.099*** (0.026)
Savings	0.548*** (0.039)	0.541*** (0.040)	0.543*** (0.040)	0.572*** (0.051)	0.508*** (0.054)	0.483*** (0.041)
Income	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)

Source: Authors' estimations.

*Note: * p < 0.1, ** p < 0.05, *** p < 0.01. The dependent variable is binary and takes the value of 1 if an individual has a loan. "Decile country" denotes the respective income decile in a country's income distribution. All specifications include a full set of annual dummies. The intraclass correlation coefficient "region" denotes the variation explained by the variables at the regional level. The intraclass correlation coefficient "country" denotes the variation explained by the variables at the country level. Robust standard errors are given in parentheses. Variables are defined in the annex.*

Table 1 continued

Country reference income and the probability of households having a loan (country deciles)

Variables	1 Rel income level	2 Interaction of rel income with income decile	3 Sentiments	4 Regions with higher income inequality	5 Regions with lower income inequality	6 Wealth
Has a house						0.038[1]
						(0.049)
Has a car						0.1543
						(0.034)
Future economic situation better			0.025	0.023	0.045***	0.036*
			(0.017)	(0.037)	(0.017)	(0.020)
Current economic situation better			−0.114***	−0.099***	−0.129***	−0.114***
			(0.018)	(0.019)	(0.019)	(0.016)
Future financial situation better			0.044**	0.072**	0.023	0.038**
			(0.021)	(0.030)	(0.023)	(0.018)
Trust in banks			0.061***	0.108***	0.051***	0.070***
			(0.019)	(0.023)	(0.018)	(0.018)
GDP per capita			0.000***	0.000***	0.000***	0.000***
			(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate			0.003	0.003	0.003	0.003
			(0.007)	(0.007)	(0.007)	(0.007)
Financial development index			1.531***			1.412*
			(0.287)			(0.752)
Intraclass correlation coefficient "region"	0.044*	0.045*	0.041*	0.023*	0.051	0.041*
Intraclass correlation coefficient "country"	0.019***	0.018***	0.019***	0.038***	0.024***	0.024***
Number of observations	98,771	98,771	75,481	32,730	41,912	40,734

Source: Authors' estimations.

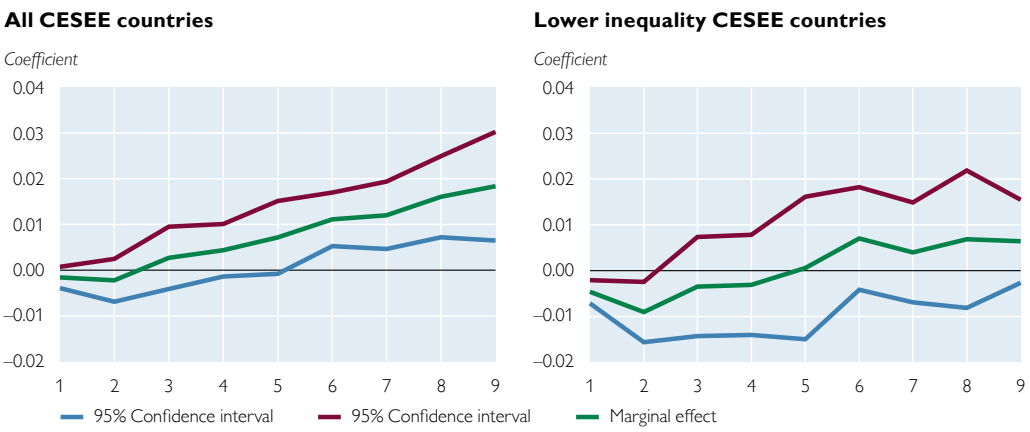
*Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is binary and takes the value of 1 if an individual has a loan. "Decile country" denotes the respective income decile in a country's income distribution. All specifications include a full set of annual dummies. The intraclass correlation coefficient "region" denotes the variation explained by the variables at the regional level. The intraclass correlation coefficient "country" denotes the variation explained by the variables at the country level. Robust standard errors are given in parentheses. Variables are defined in the annex.*

3.2 Marginal effects

While the coefficients listed in table 1 only express qualitative effects, i.e. the sign of the coefficient, chart 4 shows the average marginal effects, which makes it possible to draw conclusions on the size of the effects the income distribution has on households' likelihood of having a loan. We opted for showing the marginal effects for the whole sample on the one hand, and for low income inequality regions only on the other hand, as there are discernible differences in the latter case. For instance, the average marginal effect of respondents' income ratio in the ninth income decile is 0.017 (see chart 4, left-hand panel), which means that an increase of the relative income ratio in this decile by 1 unit (i.e. for instance, from 2 to 3) would increase the likelihood of a household in this decile having a loan by 1.7 percentage points. Considering that the share of indebted households in the upper deciles is higher than in the rest of the income distribution (see section 2), the overall effect of the relative income ratio on household indebtedness would be non-negligible. For CESEE regions with lower income inequality (i.e. with a relative income ratio lower than 2.3), the effects in the first two deciles remain significant and negative, while for the remainder of the income distribution, they are insignificant.

Chart 4

Average marginal effect of relative income ratio per country



Source: Authors' estimates.

4 Heterogeneity of effects: loans according to purpose

For the period from 2010 to 2014, the OeNB Euro Survey gathered information also on the purpose of households' loans, splitting the general category of loans into mortgage, consumer, car and other loans.

In CESEE, the share of homeowners without a mortgage is very high, as after the fall of the iron curtain tenants in most CESEE countries were offered to buy the homes they lived in at a low price (Hegedus et al., 2013). Moreover, in these countries, the share of homeowner households has been shown to vary least with households' income position, thereby reflecting people's higher preference for buying a home, which is above that observed in other EU countries. At the same time, the increased availability of housing and the low interest rate environment in recent years have supported the rise of the share of mortgage loans in total loans. Therefore, given favorable credit supply conditions, higher income inequality might result in higher demand for mortgage-financed housing.

Indeed, in line with these CESEE-specific features, the results presented in column 1 of table 2 show that the effects are sizeably stronger for mortgage loans than for all loans (see table 1) and extend to households from the third decile onward as well. Similar effects are shown for car loans (column 3), presumably reflecting the perception of a car as a "status good" (i.e. conspicuous consumption). Interestingly, the relative income comparison seems to be valid for consumer loans only for the most affluent households in our sample. Finally, the category of "other loans" shows no significant effects mainly because this category would consider loan types (e.g. cash loans, loans for education, etc.) for which a relative comparison would not play much of a role.

Table 2

Country reference income and the probability of households having different loans for different purposes

Variables	1 Mortgage loans	2 Consumption loans	3 Car loans	4 Loans for other purposes
1st decile country*Rel income	0.004	−0.004	−0.001	−0.003
	(0.005)	(0.005)	(0.008)	(0.009)
2nd decile country*Rel income	−0.006	−0.008	0.001	−0.016
	(0.014)	(0.020)	(0.018)	(0.019)
3rd decile country*Rel income	0.044***	−0.008	0.020	0.007
	(0.016)	(0.011)	(0.033)	(0.024)
4th decile country*Rel income	0.036*	0.023*	0.033	−0.037
	(0.021)	(0.013)	(0.032)	(0.035)
5th decile country*Rel income	0.031	0.030**	0.059**	−0.013
	(0.023)	(0.013)	(0.027)	(0.036)
6th decile country*Rel income	0.085***	0.048**	0.055*	−0.004
	(0.020)	(0.021)	(0.029)	(0.032)
7th decile country*Rel income	0.074***	0.046**	0.064***	−0.027
	(0.020)	(0.021)	(0.016)	(0.032)
8th decile country*Rel income	0.079***	0.064**	0.095***	−0.015
	(0.027)	(0.016)	(0.020)	(0.033)
9th decile country*Rel income	0.110***	0.077**	0.115***	−0.009
	(0.033)	(0.031)	(0.034)	(0.040)
Female	0.026	0.079***	−0.105***	0.036*
	(0.035)	(0.025)	(0.027)	(0.020)
Age	0.077***	0.077***	0.064***	0.077***
	(0.014)	(0.005)	(0.008)	(0.011)
Age squared	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Children	0.334***	0.134***	0.198***	0.099***
	(0.063)	(0.037)	(0.032)	(0.027)
Head of household	0.030	0.035	−0.046	0.002
	(0.035)	(0.023)	(0.033)	(0.020)
Secondary education	0.127***	0.133***	0.156***	0.108***
	(0.027)	(0.044)	(0.051)	(0.026)
High education	0.287***	0.066	0.240***	0.085*
	(0.054)	(0.064)	(0.082)	(0.048)
Unemployed	−0.128**	−0.227***	−0.211***	−0.103**
	(0.057)	(0.067)	(0.055) *	(0.042)
Self-employed	−0.006	−0.150***	0.043	0.268***
	(0.059)	(0.030)	(0.060)	(0.053)
Student	−0.593***	−0.621***	−0.608***	−0.220***
	(0.117)	(0.123)	(0.143)	(0.064)
Retired	−0.053	−0.001	−0.130***	0.098*
	(0.068)	(0.066)	(0.047)	(0.054)
Savings	0.414***	0.434**	0.397***	0.327***
	(0.064)	(0.048)	(0.046)	(0.041)
Income	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)

Source: Authors' estimations.

*Note: * p < 0.1, ** p < 0.05, *** p < 0.01. The dependent variable is binary and takes a value of 1 if an individual has a mortgage/consumer/car loan or loans for other purposes. "Decile country" denotes the respective income decile in a country's income distribution. All specifications include a full set of annual dummies. The intraclass correlation coefficient "region" denotes the variation explained by the variables at the regional level. The intraclass correlation coefficient "country" denotes the variation explained by the variables at the country level. Robust standard errors are given in parentheses. Variables are defined in the annex.*

Table 2 continued

Country reference income and the probability of households having different loans for different purposes

Variables	1 Mortgage loans	2 Consumption loans	3 Car loans	4 Loans for other purposes
Future economic situation better	0.006	0.019	–0.004	–0.001
	(0.022)	(0.021)	(0.023)	(0.026)
Current economic situation better	0.001	–0.182***	–0.010	–0.123***
	(0.028)	(0.036)	(0.044)	(0.031)
Future financial situation better	0.024	0.025	0.063***	0.083***
	(0.028)	(0.026)	(0.016)	(0.021)
Trust in banks	0.073**	–0.000	0.044	0.004
	(0.032)	(0.026)	(0.029)	(0.029)
GDP per capita	–0.000*	–0.000	0.000**	–0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate	0.007	0.003	0.014**	0.006
	(0.009)	(0.009)	(0.007)	(0.008)
Financial development index	2.352***	0.529	1.072***	0.955*
	(0.507)	(0.516)	(0.264)	(0.504)
Intraclass correlation coefficient "region"	0.044*	0.045*	0.041*	0.021*
Intraclass correlation coefficient "country"	0.019***	0.018***	0.019***	0.023***
Number of observations	47,819	47,819	47,819	47,819

Source: Authors' estimations.

*Note: * p < 0.1, ** p < 0.05, *** p < 0.01. The dependent variable is binary and takes a value of 1 if an individual has a mortgage/consumer/car loan or loans for other purposes. "Decile country" denotes the respective income decile in a country's income distribution. All specifications include a full set of annual dummies. The intraclass correlation coefficient "region" denotes the variation explained by the variables at the regional level. The intraclass correlation coefficient "country" denotes the variation explained by the variables at the country level. Robust standard errors are given in parentheses. Variables are defined in the annex.*

5 Summary and conclusions

This study is a first-step analysis of the link between the level of household income inequality in CESEE and the probability of CESEE households having a loan. For this purpose, we use unique household survey data from the OeNB Euro Survey for the period from 2009 to 2017 and compute income inequality measures that are comparable across countries and over time – a first-time endeavor for some of the CESEE countries of our sample. We then address the question whether interpersonal comparisons affect households' probability of having a loan. We apply multilevel modeling to account for the hierarchical structure of the data and the possible correlation between data from the same level.

Our results support the notion that a household's relative income position along with its absolute income matters for the incidence of having a loan, and that this is valid mainly for households above the median. In addition, a key result of our study is that income inequality could be seen as both a supply-side and a demand-side driver of household debt in CESEE. The former effect (i.e. influence through the signaling channel) is present among low-income cohorts of households. On the other hand, "upward" comparisons tend to play a role for the probability of more affluent household cohorts having a loan. The effects of income distribution on the likelihood of having a loan are nonnegligible. For instance, the average effect on respondents in the ninth income decile is 0.017, which means that an increase of

respondents' relative income by 1 unit (i.e. for instance, from 2 to 3) would raise their likelihood of having a loan by 1.7 percentage points. Taking a more granular approach, in regions with lower income inequality we find no impact of income inequality on households' probability of having a loan in any deciles except the first three, where the effect is negative. By contrast, when income inequality increases in regions where income inequality levels are already high (i.e. above the median), the probability of having a loan of more affluent cohorts edges up. Our results also prove that income distribution in the CESEE countries matters for almost all components of household debt but that effects are strongest for mortgage and car loans.

There are several takeaways for policymakers from our analysis. First, the fact that income distribution has an effect on the likelihood of CESEE households having a loan highlights the implications of fiscal measures for financial stability. Second, a more unequal income distribution limits access to finance for low-income households, which runs counter policies intended to increase financial inclusion in CESEE. Of course, this should be regarded against the background of risks to financial stability, and even more so as our results apply to households' probability of having a loan and not to the amount of the loan. Finally, our analysis should be seen as an initial step toward shedding more light on the interaction between income distribution and household debt in CESEE. Future research will expand the framework at hand and turn attention to the impact of income distribution on foreign-currency household debt, given its relevance for the CESEE region. Moreover, more attention should be drawn to distinguishing between supply and demand effects (e.g. by looking also into households' intentions to take out a loan).

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Annex

Variables used in the multilevel probit estimations

Table A1

List of variables used in the multilevel probit estimations

Variable	Description
Dependent variable	
Loan	Dummy variable that takes a value of 1 if a respondent has a loan; respondents answering "don't know" or "no answer" are excluded from the analysis
Mortgage/consumer/car/other	Dummy variables that take a value of 1 if a respondent has one of these loan categories; respondents answering "don't know" or "no answer" are excluded from the analysis
Income variable	
Rel income	The ratio of the average income of all i. e. in a country who are above an individual's income decile to the specific individual's income. No value can be defined for the highest income decile
Sociodemographic factors	
Age (and age squared)	Age of respondent in years (i.e. respondents aged 14+)
Secondary education	Dummy variable that takes a value of 1 if respondent has medium education (i.e. lower and upper secondary, post-secondary but nontertiary)
High education	Dummy variable that takes a value of 1 if respondent has high education (i.e. first and second stage of tertiary)
Female	Dummy variable that takes a value of 1 if respondent is female
Children	Dummy variable that takes a value of 1 if respondent has children
Head of household	Dummy variable that takes a value of 1 if respondent is head of household
Unemployed	Dummy variable that takes a value of 1 if respondent is unemployed
Self-employed	Dummy variable that takes a value of 1 if respondent is self-employed
Student	Dummy variable that takes a value of 1 if respondent is student
Retired	Dummy variable that takes a value of 1 if respondent is retired
Has a house	Dummy variable that takes a value of 1 if respondent has a house he or she lives in
Has a car	Dummy variable that takes a value of 1 if respondent has a car
Savings	Dummy variable that takes a value of 1 if respondent has a deposit
Income	Household equivalence income in euro and PPP
Sentiments	
Current economic situation better	Dummy variable that takes a value of 1 if respondent states to (strongly) agree to "Currently the economic situation of my country is very good"
Future economic situation better	Dummy variable that takes a value of 1 if respondent states to (strongly) agree to "Over the next five years, the economic situation of my country will improve"
Future financial situation better	Dummy variable that takes a value of 1 if respondent states to (strongly) agree to "Over the next 12 months, I expect the financial situation of my household to get better"
Trust in banks	Dummy variable that takes a value of 1 if respondents state they "completely trust" or "somewhat trust" domestically- and/or foreign-owned banks
Country-level variables	
GDP per capita	GDP per capita, PPP (constant 2011 prices); source: World Bank
Unemployment rate	The share of the labor force that is without work but available for and seeking employment; source: International Labour Organization
Financial development index	Composite index varying between 0 and 1 and consisting of nine subindices covering financial access, depth and efficiency; source: IMF