

Household debt in CESEE economies: a joint look at macro- and micro-level data

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Household debt can constitute a major risk to macrofinancial stability. This paper presents an overview of potential vulnerabilities stemming from household debt in ten Central, Eastern and Southeastern European (CESEE) economies, using the most recently available data. Unlike other papers that only evaluate macrofinancial risks, we take a complementary view on household debt. First, we provide several indicators based on macro-level data that are frequently used to assess macrofinancial risks. Second, we employ unique and newly available data from the OeNB Euro Survey conducted in fall 2017 to arrive at several vulnerability indicators that have not been available for most of the CESEE economies so far. Our analysis does not aim to provide a final risk assessment by evaluating all indicators within an elaborated analytical framework but to highlight the advantages of jointly looking at macro- and microlevel indicators when assessing macrofinancial risks.

JEL classification: E43, E44, G01

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The European debt crisis reminded policymakers about the potential threats to macroeconomic and financial stability stemming from household debt. While, in the long term, higher private sector credit can support economic growth (Beck et al., 2000), the relationship between household debt and long-term growth is not that clear-cut (Beck et al., 2012). Even if long-term effects were positive, the global financial crisis has highlighted that high levels of household indebtedness can lead to prolonged recessions (Mian and Sufi, 2011).

Yet, strong credit growth before the crisis had not only led to unsustainable levels in some advanced but also in some emerging European countries, where household debt levels were comparably low (Chmeler, 2013; André, 2016). However, the still relatively low levels of debt in Central, Eastern and Southeastern European (CESEE) countries do not necessarily imply that credit risks are less pronounced. In fact, Voinea et al. (2016), who empirically analyze the impact of debt on economic growth in Eastern Europe, find that household debt can become a threat to macroeconomic stability already at quite low levels, namely at credit-to-GDP ratios exceeding a threshold of 30%. Moreover, they show that the probability of a recession event increases more rapidly with a rise in household debt than it does when other debt categories are considered. Hence, compared to other sectors, like the public and the corporate sector, developments in the household sector need to be monitored with particular care and require a swift policy response when there is any indication of unsustainable debt increases.

So far, there have been relatively few studies analyzing household debt in Eastern Europe in the context of macrofinancial vulnerabilities (e.g. Fessler et al., 2017; Lahnsteiner, 2012; Beckmann et al., 2012).² Some of these studies look at household

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² Note that there are far more studies assessing credit developments in CESEE that do not distinguish between household and corporate debt (e.g. Comunale et al., 2018).

debt from the borrower perspective by using microdata, while others consider macrodata to explore credit developments in the household sector. In this paper, we take a combined look at the most recent macro- and micro-level data to provide a more complete picture of the potential vulnerabilities stemming from household debt in ten CESEE countries (CESEE-10).³ While we do not aim to argue in favor of either of the two approaches, we want to stress that both data sources together may enrich the assessment of potential risks stemming from households' indebtedness in CESEE countries.

We will start by presenting indicators based on macro-level data that are often used in policy papers to assess macrofinancial risk, like debt-to-GDP ratios, credit growth and the composition of household debt with respect to the currency and interest rate structure (IMF, 2017; Zabai, 2017; Fiorante, 2011; various financial stability reports⁴). We will look at all indicators separately and highlight cross-country differences (section 1).

In the second part of the paper, we will employ unique micro-level data obtained from the OeNB Euro Survey⁵ conducted in fall 2017, which contains new information on household indebtedness. Survey data can be very useful to complement analysis based on macroeconomic data, as they make it possible to look at the distribution of debt across households. If two countries show the same debt characteristics in terms of all available macrodata indicators, the implications for macrofinancial stability can still be very different depending – among others – on (1) the share of households that are indebted in each country, (2) how the share of indebted households varies across the wealth and income distribution⁶ and (3) the share of indebted households that are potentially vulnerable (i.e. have a higher default probability). We will assess the implied country risks across these three dimensions in the sections to follow.

In section 2, we will estimate the share of households that hold debt (as well as their net income) based on microdata and relate this information to the amount of outstanding debt available from macrodata. This makes it possible to compare debt levels across countries based on units that better reflect the debt-servicing capacity of a country (as opposed to GDP for example). In section 3, we will solely look at microdata to gain information on the characteristics of households that participate in the debt market and to explore the relationship between indebtedness and income (or wealth). In section 4, we will concentrate on those households that hold debt and try to assess the share of borrowers that are potentially vulnerable. Among others, we will present consistent information on the distribution of the debt service-to-income ratio (DSTI), which is a frequently used indicator of financial vulnerability in the literature (Fessler et al., 2017; Albacete and Lindner, 2013; Costa and Farinha, 2012). While the literature exploring microdata is increasing, the presented estimates are a novelty for most of the CESEE

³ The group includes only countries that have not introduced the euro, among them are the six EU Member States Bulgaria, the Czech Republic, Croatia, Hungary, Poland and Romania, as well as the four Western Balkan countries Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia (FYR Macedonia) and the Republic of Serbia.

⁴ See for example the financial stability reports (FSRs) by the central banks of Serbia (2017), FYR Macedonia (2016) or Bosnia and Herzegovina (2017).

⁵ For detailed information on the OeNB Euro Survey, see <https://www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html>.

⁶ A higher share of indebted households in higher income categories would be regarded as more favorable (all else being equal).

countries. Especially for the Western Balkan countries, but also for Bulgaria and Croatia, evidence based on these indicators has been absent so far.

Finally, in the last section we present a short summary of our results, highlighting that some countries that ranked high according to macro-level indicators did not feature prominently when vulnerability measures were considered based on micro-data, and vice versa. This strongly suggests looking both ways when analyzing potential risks stemming from households' indebtedness in CESEE countries.

1 Some stylized facts from macro-level data

To compare household debt levels across the CESEE-10 countries we use data on bank loans granted to households and nonprofit institutions serving households (NPISH)⁷, relying on data provided by the countries' central banks. While it certainly would be more advantageous to use financial accounts data (as provided by Eurostat), which contain information on all loans and securities provided to households, we must restrict ourselves to bank loans as non-European countries are not included in the aforementioned database.⁸

1.1 Levels and trends in household debt

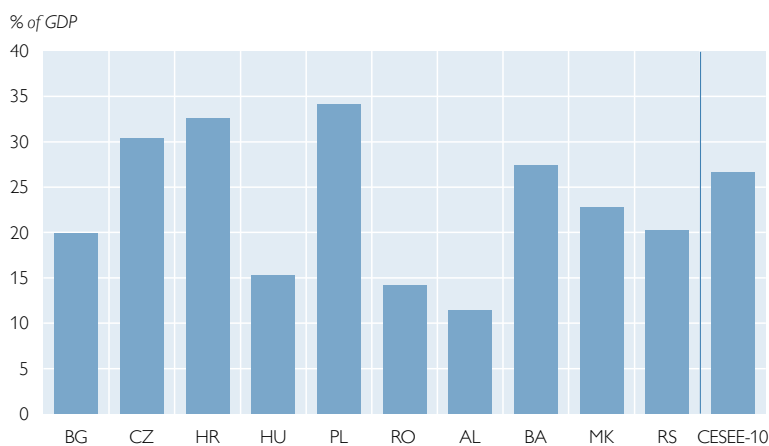
The debt-to-GDP ratio is certainly one of the most frequently monitored indicators because it is readily available for most countries, e.g. as provided by the European Commission (2017) or the European Systemic Risk Board (ESRB, 2018a)⁹. Chart 1

shows household debt in % of GDP for our countries of interest for the latest available year, i.e. 2017. The first thing to mention is that debt levels are quite heterogeneous across CESEE countries. While loans to households amount to only 11% of GDP in Albania, their share is three times higher in Poland, namely 34%. Looking at the (weighted) country aggregate, debt in the CESEE-10 region reached 26% of GDP in 2017.

Yet, a well-established fact is that credit-to-GDP ratios rise with the level of economic development, reflecting differences in financial depth and inclusion (IMF, 2017; Terrones and Mendoza, 2004, or Rajan and Zingales, 2001).

Chart 1

Household debt in 2017



Source: National central banks.

⁷ In the context of national accounts, NPISH make up an institutional sector consisting of nonprofit institutions which are not mainly financed and controlled by government and which provide goods or services to households for free or at prices that are not economically significant (churches, sports, etc.).

⁸ However, comparing both datasets for CESEE countries inside the European Union (EU), we see that, on average, more than 90% of all loans are bank loans. Only Hungary seems to be an exception, where loans from "other financial corporations" make up 20% of all loans. Hence, we must keep in mind that we slightly underestimate the actual debt burden of households in Hungary when looking at bank loans only. Also, for the sake of completeness, we want to mention at this point that loans provided by family or friends are not included in either of the two databases.

⁹ Note that the European Commission does not distinguish between household debt and corporate debt in the Alert Mechanism Reports but reports debt-to-GDP ratios based on the total private sector.

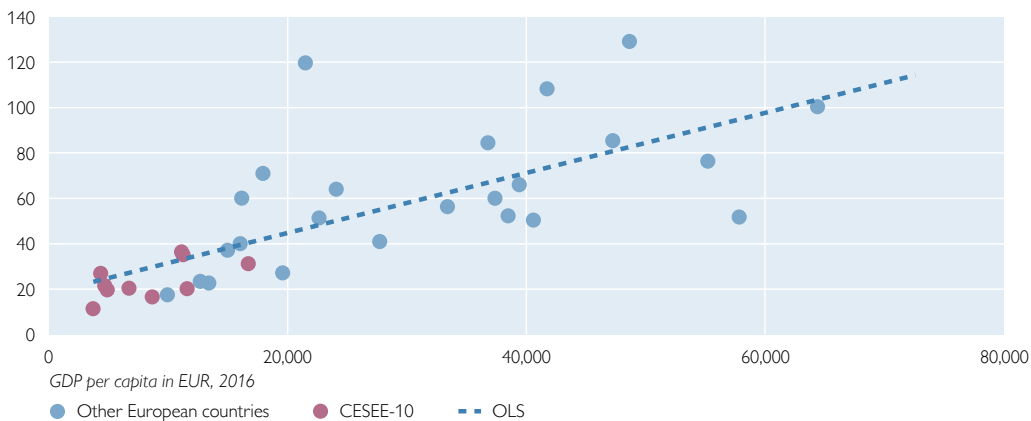
Therefore, in chart 2 we compare debt levels of CESEE countries (in red) with those of other European countries (in blue) by relating them to the level of GDP per capita. By the same line of argument, chart 3 shows debt levels in relation to the financial development index constructed by Svirydzienka (2016), which measures how financially developed a country is. Both charts reveal the same message, namely that debt levels in CESEE-10 are clearly below the European average when we control for the degree of economic and financial development.

Another way to look at household debt at the macro-level is to monitor its development over time. This might be a good indicator of a country's macrofinancial vulnerabilities, as higher growth in household debt has been found to be associated with a greater probability of the occurrence of a banking crisis (IMF, 2017). In the CESEE region, the recent financial and economic crisis has revealed that high private sector credit growth in the years prior to the crisis led to high indebtedness and

Chart 2

GDP per capita and household debt in Europe

Household debt in % of GDP, 2016

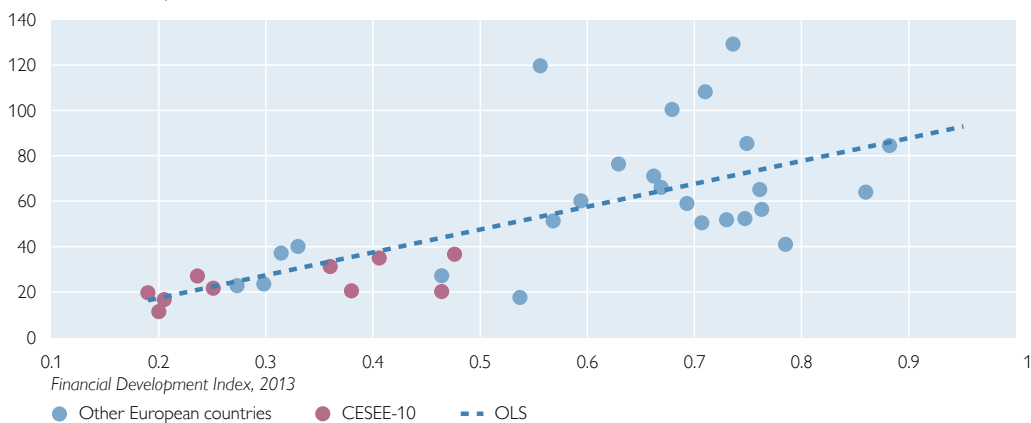


Source: Eurostat, national central banks.

Chart 3

Financial development and household debt in Europe

Household debt in % of GDP, 2016

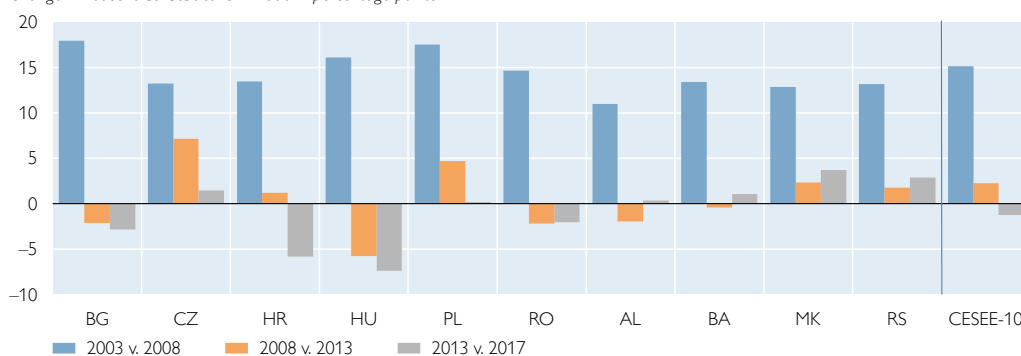


Source: Svirydzienka (2016), Eurostat, national central banks.

Chart 4

Credit growth

Change in households' debt-to-GDP ratio in percentage points



Source: National central banks.

the buildup of risks that materialized in the form of sharply rising nonperforming loans (Klein, 2013; Barisitz, 2011).

This development is depicted in chart 4, which shows that the debt-to-GDP ratio had increased by 15 percentage points in the CESEE-10 region during the five years prior to the crisis (to reach 25.6% in 2008). Yet, since 2008 the debt-to-GDP ratio remained nearly constant (+1 percentage point until 2017). From a cross-country perspective, the Czech Republic and FYR Macedonia have experienced the highest increase in household indebtedness of 8.6 percentage points and 6.0 percentage points, respectively, followed by Poland (+4.9 percentage points), while the debt-to-GDP ratio decreased considerably in Hungary (–13.2 percentage points).¹⁰ The development in Hungary mostly reflects measures taken by the Hungarian authorities to alleviate the financial situation of households that had taken out loans denominated in foreign currency. For further details on the measures taken in 2011 (early repayment scheme) and 2014, see MNB (2012) and Beckmann (2017). Overall, we need to keep in mind that regarding the level and trend of household debt, Poland and the Czech Republic stand out in the CESEE-10 region.

1.2 Debt composition by purpose

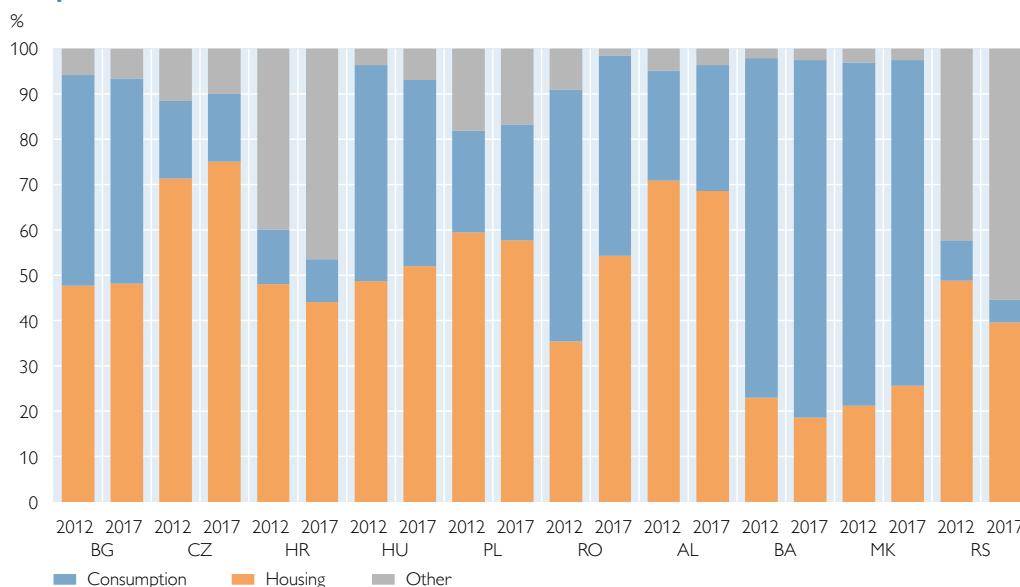
Let us now turn to the purpose of household loans, as this might have important implications for macrofinancial stability. In its Economic Outlook, the OECD (2017) points to potential risks stemming from an increase in consumer loans. Such an increase might expose lenders to nonrepayment risks, as consumer credit typically consists of unsecured products. Yet, in the CESEE region the share of consumer loans has always been higher than in advanced economies, which is consistent with the stylized fact that the share of housing loans in total loans is typically lower in emerging markets than in advanced economies. According to the IMF (2017), the respective shares amounted to 40% in emerging and to nearly 80% in advanced economies¹¹. In the CESEE-10 region the share of housing loans in total loans amounts to roughly 60% (weighted) in 2017 and hence lies somewhere in between the two

¹⁰ Note that the cross-country picture does not change much if we control for exchange rate fluctuations by holding exchange rates fixed in a base year.

¹¹ Figures are from 2016.

Chart 5

Purpose of household loans



Source: ECB, national central banks.

Note: RS: 2014 instead of 2012 data due to a change in definition in 2013.

country aggregates. Remarkably though, there are sizable differences across the CESEE countries. Bosnia, Macedonia and Serbia show very low shares of housing loans, while in the Czech Republic and in Albania the respective shares are close to advanced economies' values. More importantly though, the trend in almost all CESEE economies is characterized by a decreasing share of consumer loans. In chart 5, we present the development of loan purpose only from 2012 for data consistency reasons. However, we want to highlight that the drop in the share of consumer loans is a trend that already began in the 2000s. A notable observation is that, in Croatia as well as in Serbia, the share of "other loans" has increased remarkably in recent years. This is owed to a rise in so called cash loans, which are not directly attributable to a special purpose (see e.g. Ljubaj and Petrović, 2016). Hence, these loans could have been taken out both predominately for housing or for consumption purposes, which to some extent blurs the picture in terms of classification.

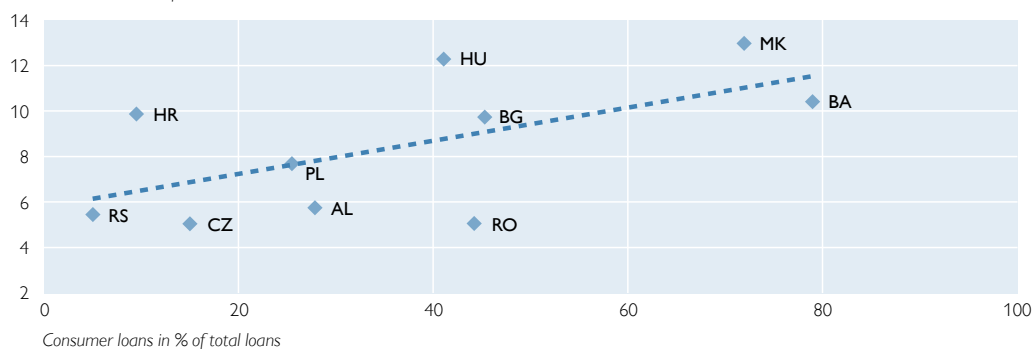
The trend of decreasing consumer loans in the CESEE region is consistent with the observed developments in the term structure of household loans. Already before the financial crisis, the share of short-term loans (with a maturity of up to one year) came down significantly in most countries. After the crisis, this share also went down in FYR Macedonia, where it amounted to more than 25% of all loans in 2009. Chart 6 shows the current share of short-term loans across the CESEE region, which have come down to values below 14%. Moreover, the chart highlights the relationship between the share of short-term loans and the share of consumer loans in total loans. This is due to the fact that short-term loans are mostly granted for consumption purposes.

From a macrofinancial point of view, a higher share of short-term consumer loans can be regarded as risky if these loans are not backed by secured products.

Chart 6

Maturity and purpose of household loans, 2017

Short-term loans in % of total loans



Source: National central banks.

Note: BG and HR: Maturity based on 2016 instead of 2017 data.

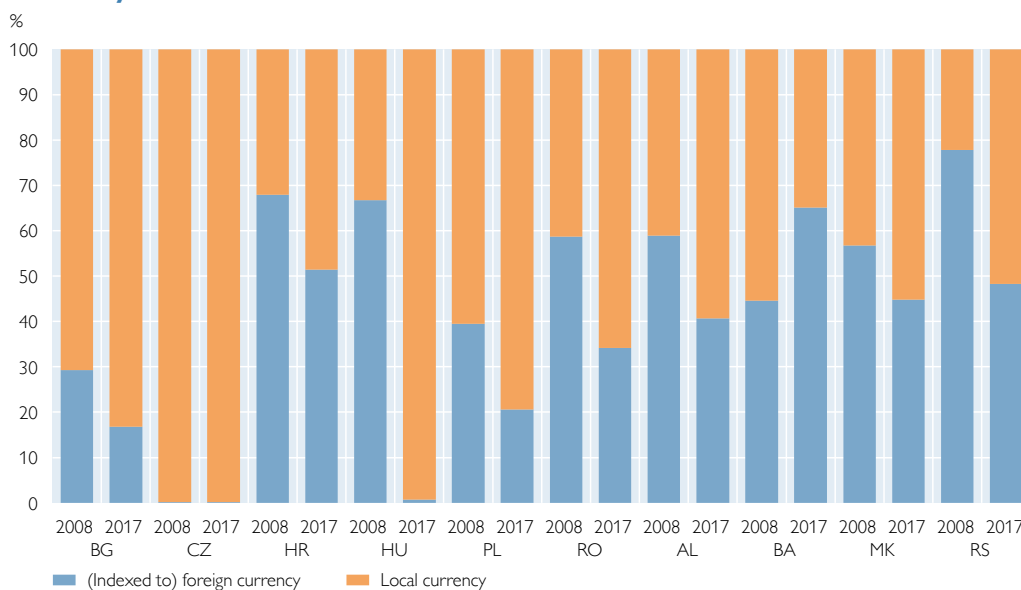
Yet, information on the share of unsecured lending in the CESEE region is not available. Even if it was, housing loans that typically have higher maturities also bear risks when compared to short-term consumer loans as they increase households' sensitivity to interest rate risk and currency risk. The significance of such risks of course depends on the type of interest rate arrangement and the currency structure of the loan. Hence, based on the debt composition by purpose, no further risk assessment can be made at this point.

1.3 Debt composition by currency

Lending in foreign currency might expose households to the risk of a lasting depreciation of the home currency and an increase in the foreign interest rate. In

Chart 7

Currency structure of household loans



Source: ECB, national central banks.

turn, this translates into an increase in the local-currency value of outstanding debt and leads to rising servicing costs for the borrower. Yet, when borrowers are unhedged (e.g. their earnings are in local currency), their monthly burden in relation to income might become unmanageable. Hence, a high fraction of foreign currency loans might pose a significant threat to a country's financial stability. A subsequent decrease in banks' capital levels might create refinancing problems and can thus lead to a banking crisis. In addition, higher servicing costs can cause borrowers to reduce consumption, which in turn negatively impacts on aggregate demand (Zabai, 2017; ECB 2010a).

As chart 7 illustrates, CESEE countries exhibited a high share of foreign currency-denominated loans in the household sector before the crisis. Out of ten countries, seven had a foreign currency share of above 50%. In 2008, when the crisis hit, the high exposure to exchange rate movements implied major balance sheet risks for borrowers in some CESEE countries (see e.g. ECB, 2010a and 2010b). Also, in 2015 when the Swiss National Bank announced that it would give up its peg to the euro, CESEE countries' currencies depreciated against the Swiss franc and borrowers with Swiss franc loans came massively under pressure. In countries where a significant share of foreign currency loans was denominated in Swiss franc, most notably in Hungary (but also in Poland, Bosnia and Herzegovina, Serbia, Croatia and Romania), national authorities had to take measures to alleviate the financial situation of households (Fischer and Yesin, 2017; Beckmann, 2017).¹² These developments have prominently highlighted the potential vulnerability of households holding foreign currency debt.

Until recently, all countries apart from Bosnia and Herzegovina reduced the share of foreign currency loans in total loans. In Hungary, foreign currency loans are practically non-existent at this point. Out of the remaining foreign currency loans in CESEE, the major share is denominated in euro. Only Poland and Serbia have a significant share of foreign currency loans that are not denominated in euro. Out of all outstanding foreign currency loans in Poland in 2017, 81% are denominated in Swiss franc. In Serbia, the share of Swiss franc loans in total foreign currency loans amounts to only 16% (the remaining part is denominated in euro).

Although the share of foreign currency loans has come down significantly in the past decade, it is far from being negligibly small, especially in the Western Balkan countries, where shares range from 40% to 70%, and in Croatia where foreign currency loans are still predominant.

1.4 Debt composition by interest rate arrangement

Another debt characteristic that is relevant in the light of households' financial vulnerability is the interest rate arrangement under which they take out loans. A rise in interest rates can significantly increase debt service costs and hence trigger repayment difficulties. Therefore, in countries where debt is predominantly issued at variable interest rates, highly indebted households are more vulnerable to negative shocks compared to borrowers in fixed-rate countries. Unfortunately, we are not aware of any data source providing consistent information on the prevailing interest rate arrangements for all outstanding loans in the CESEE-10 countries. However, for the six EU countries, we can assess the interest rate structure of the outstanding

¹² For a brief and very clear overview of measures in these countries, see Beckmann (2017).

Chart 8

Interest rate arrangements for household loans

Source: ECB, national central banks.

Note: Average of newly approved loans since 2007. HR: Average since 2012 only. AL and RS: Data not available. Variable interest rate loans can be fixed up to one year. A detailed fixation period is not available for BA and MK.

stock by looking at the interest rate type for newly granted loans to households since 2007 (ECB Data Warehouse)¹³. Moreover, for Bosnia and Herzegovina and FYR Macedonia, this kind of information is available from 2012 onward, i.e. from the financial stability reports provided by these countries' central banks (National Bank of the Republic of Macedonia, 2017; Central Bank of Bosnia and Herzegovina, 2018).

Chart 8 summarizes the results for the respective countries. What stands out immediately is the predominance of variable interest rate loans (defined as fixed up to one year) in the CESEE region¹⁴. Except in the Czech Republic, the major share of household loans is characterized by variable interest rates, i.e. banks seem to transfer interest rate risks toward borrowers. Even in the case of the Czech Republic, where the share

of variable interest rate loans is certainly low, most debt holdings have a fixation period of up to only 5 years. This period is quite low given the fact that housing loans, which are predominant in the Czech Republic, have much longer maturities. Note also that in Croatia outstanding loans with a variable interest rate arrangement make up the majority, although – as depicted in chart 8 – the average share of newly granted loans with variable interest rates is lower. This is because newly granted loans with a fixed interest arrangement have been rising recently. In fact, according to the Croatian National Bank (2017a), the outstanding stock of household loans with a variable interest rate amounted to roughly 67% in March 2016.

It is noteworthy that central banks in CESEE are aware of the risks associated with the high share of variable interest loans (see e.g. NBR, 2017; National Bank of Serbia, 2018; MNB, 2018a). Moreover, some authorities have already taken efforts to mitigate interest rate risks, for example in the Czech Republic, Croatia or Hungary (CNB, 2018; Croatian National Bank, 2017b; MNB, 2018b).

Hence, given the current interest rate structure depicted in chart 8, it can be said that a shift in the interest rate environment in the CESEE-10 region could significantly affect the costs of household financing. A change in the direction of the ECB's monetary policy stance, for example, could pose a threat to indebted households in CESEE, especially to households that are less wealthy and already have high instalment payments compared to income. Yet, at this point, we reach the limits of what can be done with macrodata as they do not contain information

¹³ For Croatia, these data are available only from 2012.

¹⁴ Note also that in Serbia – one of the two countries for which comparable data are not available – the central bank assesses that a significant part of outstanding household loans is exposed to interest rate risk: "Interest rate risk, associated with the potential increase in leading central banks' reference rates, remains a source of risk to the household sector when borrowing at a variable interest rate in the medium run." (National Bank of Serbia, 2018, p. 3).

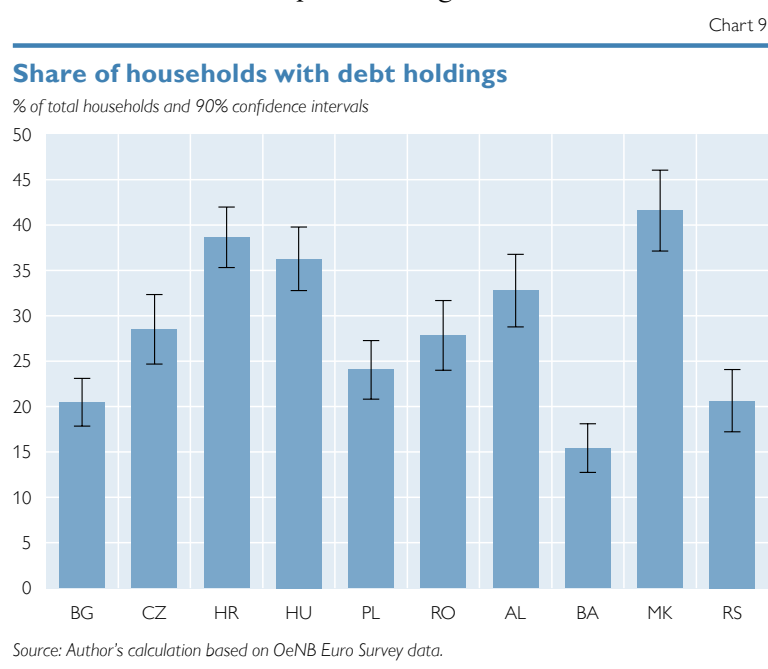
on the distribution of debt across e.g. wealth or income. Hence, in the next two sections we will rely on micro-based evidence to shed some more light on the distribution of household debt in order to assess more accurately the potential risks inherent in households' indebtedness across CESEE-10 countries.

2 The share of indebted households – a synthesis of macro- and microdata

In this section, we will use microdata to estimate the share of households that hold debt and relate these estimates to the amount of outstanding debt available from macrodata. Hence, by combining macro- with microdata we can assess debt levels per indebted household in each country. Following the same logic, we will also relate debt amounts to the average net income of indebted households. The resulting indicators will be expressed in units that better reflect the debt-servicing capacity of a country (as opposed to GDP for example).

In the OeNB Euro Survey wave conducted in fall 2017, respondents were asked about the amount of their households' monthly loan instalment payments.¹⁵ We relate the number of those respondents who reported a positive amount¹⁶ to the overall number of respondents, which – by applying survey weights – yields an estimate of the share of indebted households in each country¹⁷. Note that we always perform a robustness check when presenting mean estimates that relate to questions regarding a household's financial situation. More precisely, we restrict the sample to those respondents who state that they manage household finances. If estimates turn out to be different, we opt to present the results on the restricted sample, as they might represent the more trustworthy and reliable answers, well aware that this leads to a lack in statistical precision (i.e. higher confidence intervals).

Chart 9 depicts the estimated share of indebted households with the corresponding 90% confidence intervals¹⁸. Interestingly, the share of households holding debt is quite heterogenous across countries. While it is particularly high in FYR Macedonia and Croatia, with a share of around 40%, it is only 15% in



¹⁵ The questions that is asked by the interviewer reads: "Think of all members in your household that have loans. How much money does your household have to spend per month to service all these loans including interest and principal payments? If you do not know the exact amount, an approximate answer would also be helpful." The response categories are: (1) amount in currency of the country, (2) my household does not have a loan (3) don't know and (4) no answer.

¹⁶ Including those that state that they do not know the amount.

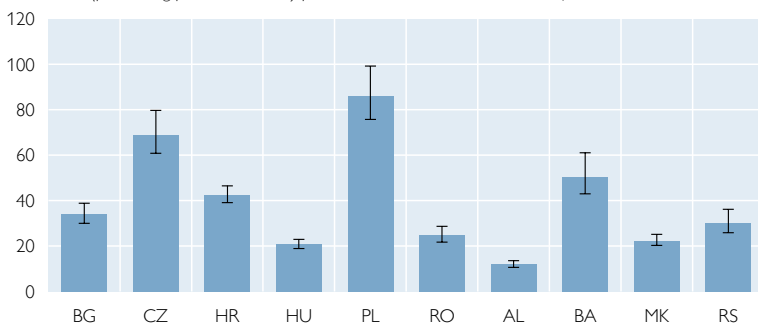
¹⁷ Note that we employ household weights to arrive at the final share of indebted households. These weights are based on at least two dimensions, namely the size and region of the household the respondent lives in. Proportions are in accordance with national statistics data. Note that we will use these weights throughout the paper.

¹⁸ The values shown in chart 10 are based on the restricted sample, as estimates turned out to be different in the case of Poland when the respondent was in charge of managing household finances.

Chart 10

Household debt in 2017

EUR 1,000 (purchasing power standards) per indebted household and 90% confidence intervals

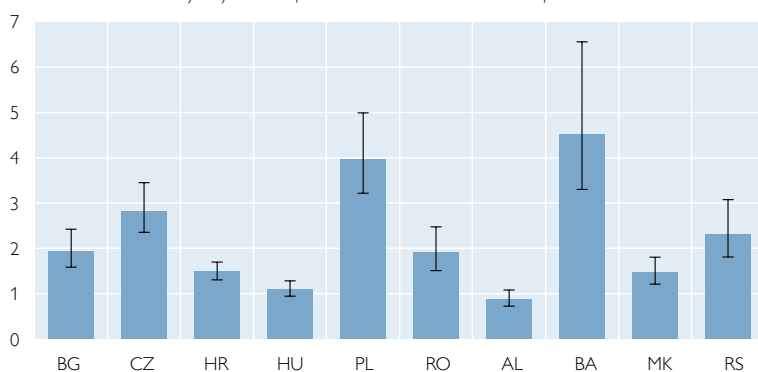


Source: National central banks, census of individual countries, UN, Eurostat, OeNB Euro Survey.

Chart 11

Household debt-to-income ratio, 2017

Ratio based on the mean yearly income of indebted households and 90% confidence intervals



Source: National central banks, census of individual countries, UN, Eurostat, OeNB Euro Survey.

Bosnia and Herzegovina and 20% in Bulgaria and Serbia. Yet, if we hypothetically assume that countries have the same levels of outstanding debt and the same number of households across countries, we could infer from chart 9 that Croatian and Macedonian households on average must shoulder twice the amount of debt compared to a Bulgarian household. Of course, as we have seen in section 1, debt levels do vary considerably across countries (as does the number of households of course). Unfortunately, the OeNB Euro Survey does not provide information on the total outstanding amount of a household's debt. Therefore, we make use of the above-introduced macrodata on total outstanding debt as well as of data on the total number of households in each country¹⁹ to arrive at an estimate of debt per indebted households in the countries under review.

Note that the values derived will be overestimated for two reasons. First, household debt from macrodata includes overdraft and credit lines, while respondents in the OeNB Euro Survey are not asked to report this kind of debt. Second, macrodata also include debt

from NPISH (see also section 1.1). Although the values recorded for both items are very low compared to the total value of debt, we must be cautious when interpreting these estimates as absolute amounts. However, we think that the extent of uncertainty is negligible when we want to interpret the amounts in relative terms, i.e. for a cross-country comparison.

In chart 10 we report the respective estimates, which are expressed in units of purchasing power standards (PPS) against the euro²⁰ to control for differences in price levels and currencies. Combining debt levels from macrodata with microdata results in an even more heterogeneous picture compared to debt-to-GDP ratios (see chart 1 in section 1.1). The distance between the country with the highest household debt (Poland) and that with the lowest (Albania) increases significantly. Moreover, some countries' ranking in terms of household debt changes. While Poland and the Czech Republic still stand out with the highest debt levels, FYR Macedonia

¹⁹ Data on the total number of households in each country are obtained from Eurostat (2011 Census) as well as from national statistics in the case of non-EU countries.

²⁰ Purchasing power standards are obtained from the wiiw (<https://data.wiiw.ac.at/>).

and Serbia seem to have switched positions as the share of indebted households is twice as high in FYR Macedonia as in Serbia.

In chart 11 we additionally relate the estimates of debt per household to the mean of the yearly income²¹ of all indebted households. The resulting estimates hence reflect the average debt-to-income ratio of indebted households and therefore do not need to be converted into PPS to be comparable across countries. By and large, the results are qualitatively similar to those presented in chart 10 as far as the country ranking is concerned. The only significant change concerns Bosnia and Herzegovina, which now appears as the country with the highest household debt. However, due to the high confidence interval the ratio is not significantly different from the levels in Poland and the Czech Republic. This is related to the fact that the estimate of income is based on very few observations in Bosnia and Herzegovina, due to a comparably high refusal rate. Overall, it can be said that debt levels in the CESEE-10 region are much more heterogenous when we express macrodata in units obtained from microdata, which we think are more suitable to reflect the debt-servicing capacity of a country. Still, a major drawback of the presented results is that we cannot draw any conclusions on the distribution of the debt-servicing capacity within the group of indebted households, which can be very different across countries. We will get back to this issue in section 4, though.

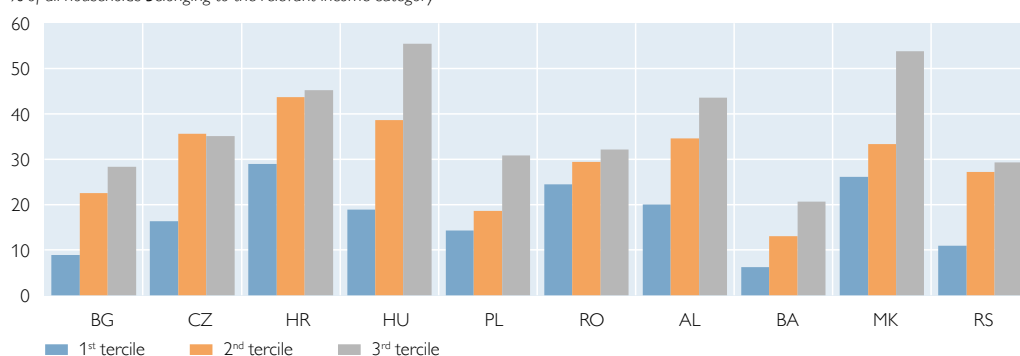
3 Which households hold debt? The influence of income and wealth

An interesting and relevant aspect regarding a country's potential vulnerabilities with respect to household debt is exploring households' participation in the debt market across the wealth and income distribution. This can be analyzed by making use of OeNB Euro Survey data from fall 2017. While data on income levels are available, we do not ask respondents to report the value of their wealth positions.

Chart 12

Debt participation across income tertiles

% of all households belonging to the relevant income category



Source: OeNB Euro Survey 2017.

²¹ In the OeNB Euro Survey 2017, respondents were asked to report the monthly net income (after taxes) of the households they live in. Based on this data, we approximate the mean yearly income by multiplying the respective monthly values by twelve. If respondents refused to answer the question, they were asked to position themselves in a range of at least 20 income categories that are defined country-wise. For those respondents who only answered the second question (35% of all respondents answered this question), we take the mean of the upper and lower bound of the chosen income category as a proxy for their household income.

Hence, we will proxy the individual wealth position of a household by relying on several qualitative survey questions on financial wealth and real estate.

Chart 12 reports the share of households that hold debt within each income tercile. We see that debt participation increases with net income. In Hungary for example, more than 50% of households in the third income tercile are indebted, while this share falls to 20% in the first income tercile. This relationship holds for all countries, though in some countries like Serbia, the Czech Republic and Croatia, the link is somewhat blurred across the upper two categories. With respect to a country's vulnerability, a higher share of indebted households in higher income categories is more favorable as these households are better able to service their debt. Against this background, the least desirable distribution of debt participation across income seems to be found in Romania as the shares of indebted households are very close to each other across the income terciles.

In charts 13 and 14 we report debt participation across different categories of financial wealth and real estate ownership. We proxy financial wealth by a variable

Chart 13

Debt participation across financial wealth categories

% of all households belonging to the relevant wealth category



Source: OeNB Euro Survey 2017.

Chart 14

Debt participation across real estate wealth categories

% of all households belonging to the relevant wealth category



Source: OeNB Euro Survey 2017.

Table 1

Characteristics of households participating in the debt market

	All respondents		Household manager	
	Marginal effect	p-value	Marginal effect	p-value
Income 2	0.04***	0.00	0.05***	0.00
Income 3	0.05***	0.00	0.06***	0.00
Financial wealth	0.06***	0.00	0.05***	0.00
Real estate	0.05***	0.00	0.04***	0.00
Education				
Medium-level education	0.04***	0.02	0.05***	0.01
High-level education	0.05***	0.02	0.06***	0.01
Size of household				
2 people	-0.01	0.48	0.00	0.99
3 people	0.03	0.12	0.06**	0.03
4 people	0.07***	0.00	0.09***	0.00
5 or more people	0.07***	0.01	0.10***	0.00
Children	0.04***	0.00	0.03**	0.05
Married	0.03*	0.06	0.00	0.91
Age	0.02***	0.00	0.02***	0.00
Age ²	-0.00***	0.00	-0.00***	0.00
Employment status (omitted: retired)				
Student	-0.02	0.47	-0.01	0.86
Unemployed/other	-0.06***	0.00	-0.06***	0.01
Working	0.03*	0.09	0.04*	0.09
Self-employed	0.06**	0.03	0.06*	0.05
Religion (omitted: Christian)				
Muslim	-0.10***	0.00	-0.10***	0.00
Other	0.04**	0.04	0.04*	0.08
N		9,542		7,726

Source: Author's estimations.

Note: Country dummies included; household weights implied; second specification (household manager) restricts the sample to respondents claiming that they are in charge of managing household finances. Marginal effects represent the unweighted average of the individual marginal effects.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

that takes the value 1 if respondents report that they have one or more financial asset(s) like bonds, funds or stocks (and 0 otherwise), as such respondents are more likely to be further up in the wealth distribution. Wealth from real estate is measured in a quite similar manner. As home ownership is exceptionally high in the CESEE-10 region (84% of all respondents), we assign those respondents the value of 1 who report that they own either a secondary residence or other additional real estate (and 0 otherwise). The results presented in charts 13 and 14 are qualitatively the same as in chart 12, where we have looked at income terciles. In general, debt participation seems to increase with wealth. Only in the Czech Republic this link does not seem to hold. Yet, as we do not have information on the amounts of wealth, we cannot make any further serious assessment regarding potential vulnerabilities of individual countries. However, we will test whether the observed link between debt participation on the one hand and income and wealth on the other hand holds for the CESEE-10 region in general if we control for other household characteristics as well.

In table 1 we report the regression output of a simple probit model which establishes a relationship between holding debt (0/1) and several characteristics including income and wealth. The remaining variables contain information on the household,

like the number of household members and whether there are children in the household. Also, we include individual respondent characteristics that might potentially interact with household debt, like education, age, employment status and religion (Costa and Farinha, 2012). We also consider country dummies to control for the individual debt participation levels across the region. At the top of the list in table 1, we report marginal effects of the second and the third income tercile. The results strongly support the positive link we have seen in chart 12. This is also true for both wealth proxies (financial wealth and real estate), which are highly significant as well. Hence, we can conclude that debt participation in CESEE-10 countries increases with a household's income and wealth position.

4 Potentially vulnerable households

In the previous section we saw that debt participation increases with income and wealth, which is in itself a favorable outcome, as wealthier households might be regarded as less vulnerable in terms of their repayment capacities. So far, we have looked at the group of all households in the different economies to explore the distribution of debt participation across income and wealth. In this section, we will solely focus on the group of indebted households and will try to assess the share of those households that are potentially vulnerable.

4.1 Indebted households with “bad” characteristics

Financial stability risks originating from indebted households materialize in the form of nonperforming loans, i.e. the inability of a significant group of households to meet its loan obligations. Hence, one way to identify potentially vulnerable households is to look at those characteristics of borrowers that increase their probability of getting into repayment difficulties. This is exactly the approach taken in this subsection. More specifically, based on OeNB Euro Survey data from fall 2017, we will assess the share of vulnerable households in each of the ten CESEE economies by classifying indebted households according to specific characteristics. In doing so, we rely on the findings by Beckmann et al. (2012), who empirically identify two important sociodemographic factors that determine the probability of being in loan arrears. In particular, they find that households in the CESEE region are more likely to be in arrears on loan repayments when their income is lower and when the respondent exhibits a comparably low level of educational attainment. Another interesting finding worth highlighting is that households that experienced an income shock during the previous 12 months are much more likely to get into repayment difficulties. Here, we make use of these findings and report estimates of the share of households exhibiting those characteristics.

In chart 15 we report the share of indebted households that have a monthly income below the median level in the respective countries and where the respondent has only low to medium educational attainment.²² Interestingly, when looking at household vulnerabilities from this angle, countries that so far were in the lower-risk group according to the indicators based on macro-level data (i.e., credit-to-GDP ratios, credit growth, currency and interest rate structure), appear as the most vulnerable ones. This applies above all to Romania, but also to Albania. In the case of Romania, the estimated share of vulnerable households is significantly

²² Low to medium educational attainment excludes respondents who do not have a university degree.

higher compared to the regional average (unweighted). In contrast Bosnia and Herzegovina, Bulgaria and Hungary show significantly lower shares.

Restricting the group of vulnerable households further to those that experienced an income shock during the 12 months preceding the interview results in the estimates presented in chart 16. Given the already low number of observations, confidence intervals are quite large, and the interpretation of the findings presented in this chart is therefore limited. Still, by combining all three characteristics relevant for loan arrears, we can conclude that Polish and Bosnian households have the smallest risk compared to the CESEE-10 average (unweighted), while those in the Czech Republic range highest in terms of potential vulnerability.²³

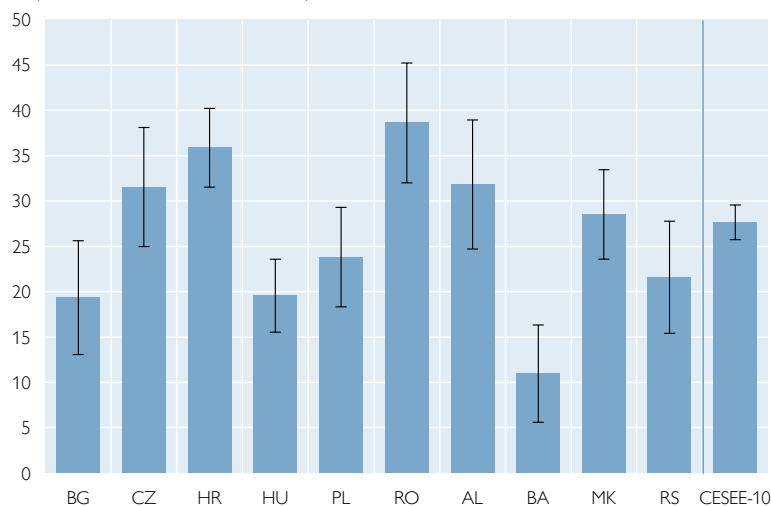
4.2 Distribution of households' debt service payments across different income categories

An often-used indicator of financial vulnerability in the literature is the debt service-to-income ratio (DSTI), which relates a household's monthly loan instalment payments to its monthly income (Fessler et al., 2017; Albacete and Lindner, 2013). Hence, it is a measure that reflects the monthly burden of a household's debt holdings to which it is committed in the short-term. Mostly, this indicator is based on gross monthly income (ECB, 2013 and 2016). In this study, however, we will present estimates of the DSTI in terms of net income for two reasons. First, it makes the indicator more comparable across countries. Second, it better reflects the debt-servicing capacity of a household when debt payments are related to the share of income that can actually be spent, i.e. net income (after taxes). Our estimates are again based on the OeNB Euro Survey wave conducted in fall 2017, where respondents were asked to report the amount

Chart 15

Share of potentially vulnerable households with low income and low educational attainment

% of all indebted households and 90% confidence intervals

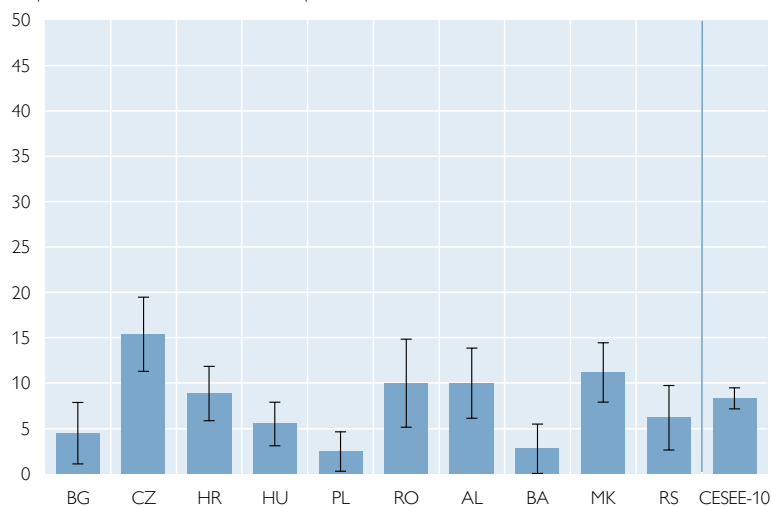


Source: OeNB Euro Survey 2017.

Chart 16

Share of potentially vulnerable households with low income, low educational attainment and income shock

% of all indebted households and 90% confidence intervals

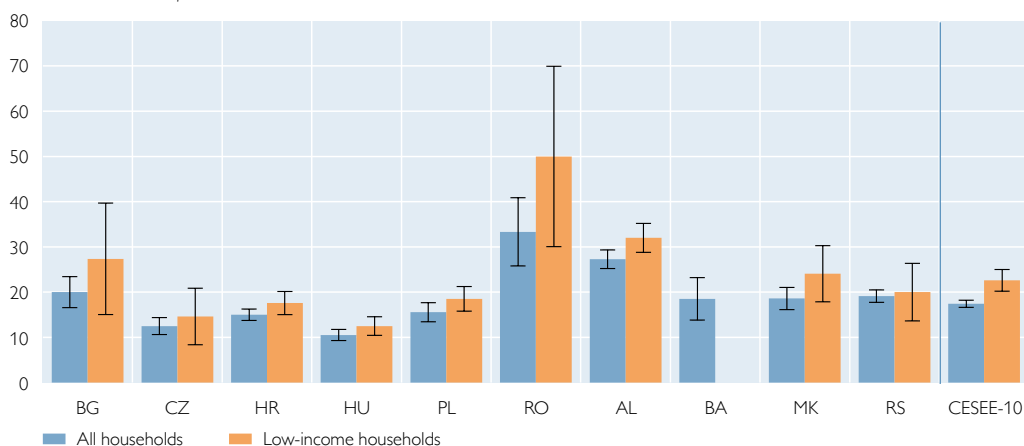


Source: OeNB Euro Survey 2017.

²³ Note that the conclusions derived from charts 15 and 16 still hold when we restrict the sample to those respondents who are in charge of managing household finances.

Median debt service-to-income ratio

Ratio in % and 90% confidence intervals



Source: OeNB Euro Survey 2017.

Note: BA: Too few observations; low-income households are those with below-median income.

spent per month to service all loans held by household members (including interest and principal payments)²⁴. We relate these payments to the household's monthly net income also reported by the respondent to calculate the ratio.

We present the median value of each country's DSTI ratio in chart 17. Let us discuss the red bars first, which show all indebted households irrespective of their individual position in the income distribution. Interestingly, two countries that already attracted our attention in the previous subsection stand out, namely Romania and Albania. In both countries the median DSTI value amounts to roughly 30%, i.e. households spend 30% of their net income to service their debt holdings. As already pointed out in the previous subsection, this result stands in stark contrast to the macrodata perspective, where both countries ranged at the bottom of the risk scale when measured in terms of the various macro-level indicators. Also, the Czech Republic, Poland and Croatia, which showed up several times among the group of countries with the highest values of macro-level indicators are much less vulnerable when we evaluate the risks from indebtedness in terms of the distribution of debt service payments across households.

We want to highlight that we are not aware of any study presenting comparable cross-country estimates of DSTI ratios for the CESEE-10 region. We found DSTI estimates for four individual countries though, namely for Hungary (ECB, 2016), Poland (NBP, 2017), the Czech Republic (CNB, 2016) and Romania (IMF, 2018; NBR, 2018). While data for the latter three countries reveal quite similar amounts, the DSTI ratio for Hungary in 2014 (the only available estimate) was significantly higher than our estimates. Based on our data, the median DSTI ratio amounted to 11% in 2017, while it amounted to 16% according to the Household Finance and Consumption Survey (HFCS) conducted in 2014. As DSTI values from HFCS data

²⁴ The respondents were asked the following question: "Think of all members in your household that have loans. How much money does your household have to spend per month to service all these loans including interest and principal payments? If you do not know the exact amount, an approximate answer would also be helpful."

are based on gross income, the difference is even larger as it seems to be at the first glance (i.e. at least 10 percentage points). The significant decrease in the median DSTI seems to reflect the debt restructuring measures taken by the central bank of Hungary at the beginning of 2015 to address the issue of the high share of non-performing loans and the associated risks to financial stability back then. These measures were aimed at reducing repayment instalments for debt holders. According to estimates by the central bank of Hungary, the measures taken reduced borrowers' loan instalment payments by 25% to 30% and by 16% in the case of nonperforming debtors (MNB, 2015). Hence, DSTI estimates based on the OeNB Euro Survey wave conducted in fall 2017 point to the fact that these measures had a lasting impact on the debt-servicing capacity of households.

One of the main conclusions drawn by the IMF in its special issue chapter on household debt in 2017 (IMF, 2017) was that lower-income households typically have higher DSTI ratios, which makes them more vulnerable to adverse shocks than higher-income households. In order to see whether this is true for the CESEE countries under review, we have estimated the median DSTI ratios for the low-income group of indebted households (i.e. below-median income), which are depicted by the blue bars in chart 17.²⁵ According to our estimates, DSTI ratios are indeed higher for the lower-income group of households. The differences are not statistically significant though, which might certainly be related to the low number of observations. In the case of Bosnia and Herzegovina, we have even too few observations to compute reliable estimates for this subgroup. However, if we look at the whole region (unweighted CESEE-10), our estimates support the findings by the IMF that low-income households are more vulnerable. This conclusion even holds, when we control for other household characteristics.

In table 2 we report estimates from a quantile regression of DSTI ratios (evaluated at the median) on a variable that indicates whether the household's position in the income distribution is below or above the relevant country's median income. We perform the regression on the overall CESEE sample including country dummies to control for the heterogeneous DSTI levels across the region. The estimates reveal that the median DSTI ratio is 7 percentage points higher for low-income households. Another interesting finding is that DSTI ratios are higher for mortgage loans than for consumer loans. This result is also observed in the euro area, where the DSTI ratio for all loans amounted to 13.5% and that for mortgages to 15.8% in 2014 (ECB, 2016).²⁶

Finally, we report the share of households that exhibit DSTI ratios above 40%. This threshold is commonly chosen in the literature (Fessler et al., 2017; Albacete and Lindner, 2013; Costa and Farinha, 2012) to assess the share of potentially vulnerable households in an economy. We report the estimates in chart 18. Again, due to the low number of observations we are confronted with high uncertainties regarding the estimated shares, which is reflected by the high confidence intervals. What can be concluded though, is that, compared to the other countries, Romania has the largest share of potentially vulnerable households. According to

²⁵ Unfortunately, a more detailed distribution across income categories is not feasible due to the limited number of observations. Note that the average number of DSTI observations per country amounts to 195. Hence, the calculated DSTI values for the low-income households are based on less than 100 observations on average.

²⁶ Note that this value is reported on the basis of gross income (ECB, 2016) and is hence not comparable with our DSTI levels.

Table 2

Debt service-to-income ratio

	All respondents		Household manager	
	Coefficient	p-value	Coefficient	p-value
Median income	-7.17***	0.00	-6.48***	0.00
Impulsive	1.56	0.20	1.88	0.15
Mortgage	6.09***	0.00	6.14***	0.00
Fixed interest rate	0.47	0.43	0.34	0.56
Education				
Medium-level education	3.51***	0.01	3.91***	0.01
High-level education	4.87***	0.00	5.13***	0.00
Size of household				
2 people	0.74	0.65	0.57	0.72
3 people	-2.65	0.12	-2.59	0.13
4 people	-1.03	0.57	-0.75	0.69
5 or more people	-1.22	0.56	-0.62	0.77
Children	1.42*	0.08	1.16	0.19
Married	-1.87*	0.10	-2.48*	0.06
Age	0.41*	0.10	0.49**	0.03
Age ²	-0.00	0.15	-0.01*	0.05
Employment status (omitted: retired)				
Student	7.22	0.53	7.62***	0.00
Unemployed/other	4.94*	0.06	5.32*	0.06
Working	2.46**	0.05	1.65	0.25
Self-employed	6.32***	0.00	5.56***	0.00
Religion (omitted: Christian)				
Muslim	0.02	0.99	0.73	0.60
Other	0.12	0.87	-0.14	0.84
N		1,473		1,374

Source: Author's estimations.

Note: Quantile regression, evaluated at the median. Country dummies included; household weights implied; second specification (household manager) restricts the sample to respondents claiming that they are in charge of managing household finances. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

our estimate, around 40% of all indebted Romanian households have DSTI ratios above 40%. In the CESEE-10 aggregate this number amounts to only 13% (unweighted). In Hungary, we do not even have one single observation for households that have to spend more than 40% of their net income to service debt holdings. This is not to say that we think that there are no households in Hungary with a higher DSTI ratio than 40%, but that the share is probably very low so that we cannot distinguish it from being statistically zero.

Concerning the high share of vulnerable households in Romania, we want to highlight that the National Bank of Romania is considering a redesign of its macroprudential tools on the back of increasing household vulnerabilities. Introducing a DSTI limit is one of the potential measures that have been evaluated.²⁷ A financial sector assessment conducted by the IMF (2018) based on central credit register data has revealed that imposing a 50% limit would lead to significantly lower nonperforming loan ratios. Unfortunately, the IMF does not report the share of loan contracts with DSTI ratios above 40%. However, as the median DSTI of

²⁷ Note that authorities of other CESEE countries like Poland or Hungary have recently also undertaken macroprudential steps (measures or recommendations) that target DSTI ratios (see ESRB, 2018b).

consumer loans is 39% (and 33% for mortgage loans), the share of all loan contracts with DSTI ratios above 40% is likely to be around 50%. Hence, the analysis by the IMF strongly supports our assessment of Romanian households in this respect.

5 Summary and conclusions

In this paper we have analyzed recent trends in household indebtedness in ten CESEE countries to assess potential vulnerabilities with respect to macro-financial stability. We have approached this task by evaluating potential risks from two different angles.

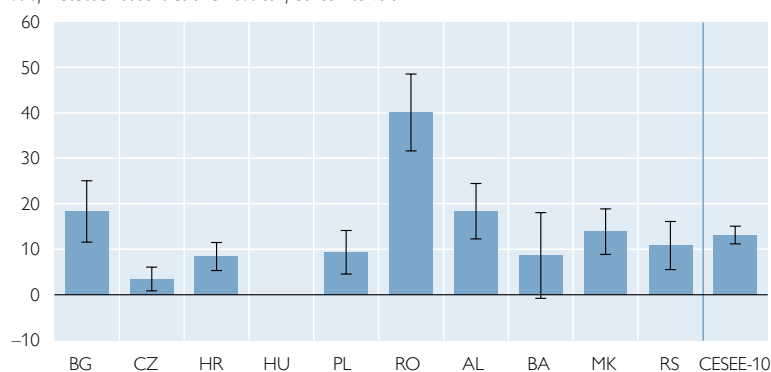
First, we looked at indicators of indebtedness that might be regarded as relevant in terms of potential vulnerabilities based on macrodata. Among them, we considered the share of foreign currency lending and the interest rate structure of outstanding loans. Both of these debt characteristics can have a significant influence on a household's debt-servicing capacity, most notably in the event of adverse shocks in interest rates as well as exchange rates.

We further argued in the paper that these indicators have their limits as they do not consider the distribution of debt across households. Risks stemming from the same level of total household debt in two countries can be very different depending on e.g. the number of households that are indebted in these countries, the debt participation across the income and wealth distribution and the characteristics of indebted households that are closely linked to the probability of repayment difficulties. All these factors should be considered when evaluating financial stability risks. In a second step, we therefore took a borrower perspective to assess risks emanating from the household sector by using microdata collected from the OeNB Euro Survey in fall 2017. Based on these data, we provided a selection of vulnerability indicators to circumvent the aforementioned limitations.

If we look at the macro-level indicators, we find that countries like Poland and the Czech Republic most frequently exhibit one of the three highest values among the ten CESEE economies, while they do not show up in the respective high-value groups when indicators based on microdata are considered. Instead, Romania and Albania stand out when we look at the borrower perspective to assess risks stemming from the household sector. Yet, our aim was not to provide a final risk assessment for the ten CESEE countries by evaluating all indicators together, but to point to the different informational content inherent in micro- and macro-level data. The introduced indicators that are based on macrodata provided us with information on the overall amount of debt in a country and the debt shares that might be affected by unfavorable interest or exchange rate movements. Hence, this information tells us something about the aggregate debt amount that is potentially at risk. In addition, the indicators based on microdata allowed us to quantify the share of indebted households whose room for manoeuvre is potentially limited in the event of an economic shock. Thus, these distributional parameters can give us a deeper look

Share of households with a DSTI ratio above 40%

% of indebted households and 90% confidence intervals



Source: OeNB Euro Survey 2017.

Note: There are no households in HU with DSTI ratios above 40%.

into the likelihood of default. Summing up, if we were to highlight the most interesting and general conclusion of this paper, we would need to stress that the assessment of macroprudential vulnerabilities across countries can be very diverse depending on the angle of view. While we do not argue in favor of one particular view, we certainly want to emphasize the importance of looking in both directions as each of the two approaches has its merits.

Our analysis of macrofinancial risks was purely descriptive. Hence, a potential avenue for future research would be to combine the presented indicators from both data sources in a more advanced and analytical framework to evaluate potential risks from household indebtedness. This is certainly a challenge as survey data are often compiled at relatively long intervals resulting in a mismatch of frequencies between indicators from macro- and micro-level data. Yet, as the OeNB Euro Survey is conducted on a yearly basis it might be possible to use future surveys to overcome this shortcoming.

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