

Household Debt and Economic Vulnerability

During the Great Recession

[PRELIMINARY. PLEASE DO NOT QUOTE]

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Abstract

We use data on over 25,000 European households to analyze whether borrowing *before* and *during* the global financial crisis cushioned or exacerbated the impact of income shocks on consumption. For Emerging Europe, which experienced a credit boom before the crisis, we find that households with FX-denominated mortgages had to reduce consumption more in response to negative income shocks when compared with similar households without such debt. In both Emerging and Western Europe households that could access ‘emergency’ loans during the crisis –either from banks or from friends and family– were better able to smooth consumption. We conclude that while credit helps consumers to alleviate the impact of negative income shocks, the accumulation of risky debt can make households vulnerable to such shocks in the first place.

JEL codes: D14, D18, D91, F34, G01, G21

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1. Introduction

Over the last two decades, and especially in the run up to the Great Recession, household indebtedness has increased rapidly across countries at very different levels of economic development. In advanced economies, (sub-prime) mortgages, credit-card debt, and consumer loans increased household debt from 99 to 138 per cent of income in the five years before the crisis (IMF, 2012). In emerging markets such as those in Central and Eastern Europe, a combination of deep financial integration and abundant global liquidity allowed households to borrow freely in anticipation of future income growth (Brown and De Haas, 2012). And in developing countries the rapid growth of microcredit ramped up the debts of many of the poorest households in the world (Chen, Rasmussen, and Reille, 2010). Across the globe household debt not only grew in absolute terms but also relative to corporate debt (Büyükkarabacak and Valev, 2010).

How did this rapid increase in borrowing influence households' welfare and their ability to cope with economic shocks? Although household debt has become a key component of financial systems the world over, evidence on its impact – either at the macro or at the household level – is scarce. An important explanation is the dearth of detailed household data that are comparable across countries. In this paper we use such data from the second wave of the Life in Transition Survey (LiTS II), a large-scale household survey undertaken across Europe at the end of 2010. LiTS II elicited information on how the 2008-09 global financial crisis had affected households and which coping strategies they had used. By asking the same questions to families across different countries, this survey provides detailed crisis-impact measures that are comparable across countries.

Banks' and households' willingness to lend and borrow –and therefore the equilibrium amount and riskiness of the debt that households were willing to take on pre-crisis– is determined within the specific institutional and macroeconomic environment in which these financial transactions take place. Such country-level characteristics may also directly influence the severity of the crisis impact, thus confounding the relationship between household debt and crisis impact. The LiTS II data allow us to tease out the impact of the type and quality of financial intermediation on the severity of the crisis impact because these data display significant variation *within* countries. We exploit this within-country variation to identify the impact of the quantity and type of debt on households' crisis response *given* a particular institutional and macroeconomic framework. Our data thus provide a unique opportunity to investigate the impact of debt accumulation on household vulnerability.

Europe is a particularly interesting setting to study the interaction between household debt and income shocks due to the sharp historical differences between the West and the East. In Western Europe banks are among the most advanced in the world and households have had access to a variety of debt products for a long time. In contrast, household finance only started to emerge in Eastern Europe after the fall of the Berlin Wall in 1989. During the next two decades Emerging Europe rapidly integrated

with the West and more and more households were able to access financial services such as bank accounts and mortgages (Beck and Brown, 2011). The combination of optimistic income expectations and improved financial access led households to accumulate a growing amount of debt. Expectations about nominal exchange rate stability meant that this debt was increasingly denominated in foreign currencies (FX), leaving households vulnerable to unexpected exchange rate depreciations. At the macroeconomic level overheating manifested itself in inflationary pressures, rising real-estate prices and double-digit current account deficits.

The global financial crisis of 2008-09 abruptly halted this boom in most of Emerging Europe. Exports slumped, growth declined, and unemployment shot up. Many households directly felt the impact of the crisis as household members lost their job or had to accept pay-cuts, small-scale businesses folded, and remittances dried up. Access to formal credit became restricted as Western banks transmitted funding problems to their Eastern European subsidiaries (Popov and Udell, 2012; De Haas and Van Lelyveld, 2013). Some households had to resort to informal borrowing from friends and relatives.

Against this backdrop, we use the LiTS II survey to assess whether household debt helped consumers weather income shocks during the crisis or, on the contrary, amplified the impact of such shocks. We find that Eastern European households with FX-denominated mortgages had to cut back consumption more in response to negative income shocks during the crisis when compared to similar households that had not accumulated debt. This effect is absent in Western Europe. In both regions households that managed to access ‘emergency’ loans during the crisis –either from banks or from friends and family– were able to use this credit to smooth consumption. Our results therefore show that while credit can help consumers to alleviate the impact of negative income shocks, the accumulation of risky debt may make households more vulnerable to such shocks in the first place.

This paper contributes to several strands of the literature. First and foremost, our results add to the literature on the ‘bright side’ (consumption smoothing) and ‘dark side’ (overindebtedness) of household borrowing. As for the bright side, life-cycle (Modigliani and Brumberg, 1954) and permanent income models (Friedman, 1957) suggest that households aim to smooth consumption in response to income fluctuations as they value a stable consumption path. Improved access to credit may allow households to better smooth consumption over time (Campbell and Mankiw, 1991; Jappelli, 1990).¹ This implies that if credit is available and if income fluctuations are anticipated, consumption only responds to a very limited extent to income shocks. Households that expect future shocks can smooth them out over time by increasing their savings (expected negative shock) or by borrowing more (expected positive shock). Yet, credit-constrained households may find it difficult to smooth consumption even when they anticipate higher incomes.

¹ See also Meghir and Pistaferri (2004) and Jappelli and Pistaferri (2006) for empirical evidence on consumption smoothing in response to income shocks.

Unanticipated shocks, such as a sudden financial crisis, may have larger consumption impacts as households have not had time to increase precautionary savings. It is important to distinguish between transitory shocks –such as a temporary job loss– and permanent ones –such as a chronic disease. In case of the latter consumption needs to be adjusted but in case of the former consumption need not change much as households can run down their savings or increase borrowing to overcome temporary problems. Of course, when credit constraints are binding even transitory income declines translate into consumption adjustments as households cannot ‘bridge’ such shocks (Kaplan and Violante, 2010).² In short, the bright side of household borrowing is that it allows households to smooth consumption when faced with expected positive shocks or unexpected negative transitory shocks.

Whereas the literature on consumption smoothing is well-established, theoretical and empirical work on overindebtedness is still in its infancy and this is where we contribute most. Households may take on too much debt and become overindebted if they are overoptimistic and/or lack basic financial literacy (Lusardi and Tufano, 2009), expect to be bailed out (moral hazard), or when banks push too much debt onto them.³ Negative effects of overindebtedness may be exacerbated if households take on risky forms of debt, such as debt denominated in a foreign currency. A key contribution of this paper is that our data allow us to distinguish between different types of household debt and different currencies of denomination.

Second, our results can also be seen in light of the wider literature on the relationship between financial development and long-run economic growth. A well-functioning financial system may lead to a higher propensity to save and invest, which stimulates capital accumulation as well as technological progress as more – and more efficient – investment projects get financed. In the end, this will boost long-run per capita economic growth.⁴ Indeed, a large number of empirical contributions indicate that financial development (measured broadly as aggregate credit to GDP, without distinguishing between lending to firms versus households) accelerates growth by relaxing firms’ funding constraints and boosting factor productivity (Beck, Levine, and Loayza, 2000).⁵

² A large body of empirical research analyzes the consumption impact of negative unexpected income shocks due to disability, unemployment, adverse weather shocks, and natural disasters in developing countries, where credit and insurance markets tend to be underdeveloped. For the U.S., Christelis, Georgarakos and Jappelli (2011) examine the consumption impact of wealth as well as income shocks during the global financial crisis.

³ See Kempson (2002) and Haas (2006) on the UK and Germany, respectively.

⁴ The extent to which increased savings lead to higher long-term economic growth is theoretically undetermined. In neoclassical growth models economic growth is independent of the savings rate in the long term whereas in endogenous growth models a higher savings rate does influence long-term growth.

⁵ See also Atje and Jovanovic (1993) and King and Levine (1993) at the country level; Rajan and Zingales (1998) and Fisman and Love (2007) at the industry level; and Demirgüç-Kunt and Maksimovic (2002) and Claessens and Laeven (2003) at the firm level.

A number of recent papers qualify this view by underlining that while financial intermediation has a positive direct impact on long-run economic growth it may also have indirect negative effects in the shorter term (Loayza and Rancière, 2006). In particular, while financial liberalization may lead to rapid financial deepening it may also intensify economic volatility if it increases a country's propensity to experience a financial crisis. This may be the case if higher investments by (formerly) financially constrained firms lead to more risk taking, for instance because firms start to use more FX debt or because banks' screening practises become less strict (Dell'Ariscia and Marquez, 2004). Overall, however, the direct positive effect of financial deepening is found to outweigh such indirect negative effects (Rancière, Tornell, and Westermann, 2008; Gaytán and Rancière, 2005).

There are only few contributions that look more specifically at the relationship between the development of financial services for *households* and economic growth. The distinction between household and firm credit is important because as financial systems develop and households' credit constraints are reduced, precautionary savings may go down, thus *restricting* economic growth (Jappelli and Pagano, 1994). On the other hand, however, credit to households may have a positive impact on long-term economic development if relaxing households' credit constraints enables individuals to invest in human capital or entrepreneurship.⁶ Beck, Büyükkarabacak, Rioja, and Valev (2012) disentangle the role of enterprise and household credit and show that the growth of household credit raises debt levels without much effect on long-term income (whereas firm credit contributes to economic growth).

At the micro-level, these neutral results on the impact of household credit on growth are confirmed by randomized controlled trials which document very limited impacts of access to microcredit on income generation.⁷ Recent experimental evidence suggests, however, that financial development in developing countries may help households to relax savings rather than credit constraints (Dupas and Robinson, 2012). Better savings products allow households to smooth consumption while at the macro-level increased savings may stimulate investment and growth.

The remainder of this paper is structured as follows. Section 2 provides more information on our dataset and methodology, after which Section 3 describes our empirical results on the impact of pre-crisis borrowing on household consumption during the crisis. Section 4 discusses our results on the role of 'emergency' borrowing during the crisis. Section 5 concludes.

⁶ Individual and collective poverty trap models highlight credit market imperfections as the main cause of poverty (Galor and Zeira, 1993; Banerjee and Newman, 1993).

⁷ See for instance Banerjee, Duflo, Glennerster and Kinnan (2010), Crépon, Devoto, Duflo and Parienté (2011), and Augsburg, De Haas, Harmgart and Meghir (2012).

2. Data and methodology

2.1. *The LiTS II survey*

The second Life in Transition Survey (LiTS II) was conducted jointly by the European Bank for Reconstruction and Development and the World Bank in late 2010. Almost 39,000 households across 29 Emerging European and Central Asian countries and five western European comparator countries – France, Germany, Italy, Sweden and the UK – were surveyed to assess public attitudes, well-being and the impacts of economic and political change.⁸ To make the LiTS sample nationally representative, a two-stage clustered stratified sampling procedure was used to select the households. The survey was conducted face-to-face in 1,000 randomly chosen households per country. In Russia, Ukraine, Uzbekistan, Serbia, Poland and the United Kingdom there were 1,500 face-to-face household interviews in order to allow for a large enough sample for a follow-up telephone survey.

During a first stage, a sample frame of Primary Sampling Units (PSUs) was selected. Local electoral territorial units were used as PSUs wherever possible. To ensure an even distribution across regions and type of settlement, PSUs were ordered by geographical region and levels of urbanity or rurality. Then 50 PSUs (75 in Russia, Ukraine, Uzbekistan, Serbia, Poland, and the UK) were selected from these lists, with a selection probability proportional to PSU size (number of households).

In a second sampling stage households were selected within each PSU. In the majority of countries, a random walk fieldwork procedure was used: the fieldwork coordinator selected the first address to be sampled, and the interviewer was given clear instructions on how to select remaining addresses within the PSUs. For a small number of countries – Hungary, Lithuania, Slovenia and Sweden and the United Kingdom – the sample was pre-selected to ensure that the probability of any household's inclusion was always equivalent to the probability generated by random selection.

The first part of the LiTS questionnaire was conducted with the household head and elicits information on household composition, housing, and expenses. The second part was administered to one adult member of the household and yields information on that person's attitudes and values, current economic activity, life history, as well as personal information. We use information from the first part of the survey to yield indicators of household use of banking services, location, income, and economic activity. From the second part of the survey we get indicators of education, current and past employment status, nationality and religion.

In all countries except France, Poland and Sweden, there is a significant majority of females and older people in the sample. This is likely to have resulted from the fact that household members who were

⁸ For more details see http://www.ebrd.com/downloads/research/surveys/LiTS2e_web.pdf. This paper focuses on the 18 Emerging European as well as the five Western European benchmark countries. In total we have detailed data on over 25,000 household across these 23 countries (see Table 2).

away from home on a permanent basis, either for work or studies, were excluded from the sample. We therefore applied a weighting scheme which first identifies target populations in each country disaggregated by age and gender. In a second step, weights were assigned in order for the sample to reproduce the gender and age breakdown within the country's population. We use this weighing scheme when calculating summary statistics.

2.2. *Impact of and response to the crisis*

Table 1 provides the definitions and basic summary statistics for all variables that we create using LiTS II. We first generate a number of dummy variables that indicate how households were impacted by the global financial crisis. *Income shock* is a measure of the impact that the crisis had on each household by checking whether one or more household members lost their job; working hours were reduced; wages were delayed or suspended; wages were reduced; remittances were reduced; or family members returned home from abroad. As there are relatively few households that experienced several of these shocks, this variable is a dummy that is '1' if the household experienced at least one of these exogenous impacts. This was the case for about 60 per cent of the households across Emerging Europe. More specifically, in about 20 per cent of all households at least one person lost his or her job, 2 per cent of the households had to close their family business, almost 40 per cent of the households saw their income from wages reduced, and 16 per cent of all households had to cope with a reduction in the remittances they received from abroad. Importantly, compared with their western counterparts, households in Emerging Europe suffered far more job losses, wage reductions and reductions in remittances. For example, the proportion of households which reported a job loss between late 2008 and late 2010 was twice as high (20 per cent) as in Western Europe.

[Insert Tables 1 and 2 here]

Next, we create three measures of how a household responded to the crisis. Households were asked whether they changed their consumption and investment behaviour as a result of a decline in income or other economic difficulty in the past two years. The first variable quantifies the *Base response* and ranges between zero and eight. It measures whether the household reduced its consumption of (i) staple foods; (ii) alcohol; and/or (iii) tobacco; (iv) skipped a visit to the doctor; (v) reduced medication; (vi) delayed utility payments; (vii) had utilities cut; or (viii) stopped using TV, internet, or phone services. Table 2 shows that the crisis was on average much harder for households in Emerging Europe (an average score of 1.17) than for those in Western Europe (average of 0.42). This is particularly the case for some categories essential to well-being: only 11 per cent of households in the

western comparators reduced staple food consumption as a result of the crisis, as opposed to 38 per cent in the transition region. In the western countries, only 4 per cent reported postponing or skipping medical treatment; in the transition region, almost 13 per cent did so. The percentage of households reporting delays in paying utility bills was also more than twice as high in Emerging Europe.

The second response variable – *Overall response* – ranges between zero and 17 and adds the following nine categories to *Base response*: (i) reduction in luxury goods; (ii) reduced use of a car; (iii) reduced vacation; (iv) cancellation of health insurance; (v) postponement or withdrawal from university; (vi) postponement or withdrawal from a training course; (vii) reduced help to friends; (viii) the selling of assets; (ix) forced move to cheaper premises. The average household also took at least one of these crisis-response measures, bringing the overall crisis response to 2.2 (2.4 in Emerging Europe versus 1.4 in Western Europe).

Third, we create a dummy variable that indicates whether, conditional on having a mortgage, this mortgage was in arrears in 2010. This was the case for about 7 per cent of all mortgagors. In line with a much stronger crisis impact in Emerging Europe, Table 2 shows that mortgage arrears were about eight times as prevalent in the East (17 per cent of all mortgages) than in the West (2 per cent).

In all, the data show that households in the transition region suffered much more as a result of the 2008-10 financial crisis than those in western European comparator countries. The crisis led to larger reductions across virtually all consumption categories, particularly in essentials such as staple foods and health expenditures. Table 2 however also shows that there is considerable cross-country variation within both regions in both the severity of the income shocks that households were exposed to and the extent to which they had to cut back their consumption. For instance, Hungary, Lithuania and Serbia were hit relatively hard whereas in Poland the crisis affected households to an extent comparable to what happened in Western Europe, regardless of whether this is measured in terms of income shocks or consumption response.

2.3. Household borrowing before and during the crisis

The LiTS II survey provides us with information on household borrowing before and during the crisis. Our measure of pre-crisis borrowing is whether a household had a *Mortgage* in 2008. For those households with a mortgage the indicator *FX mortgage* further captures whether this mortgage was denominated in a foreign currency. Table 3 shows that mortgages were much more prevalent in Western than in Eastern Europe (23 versus 5 per cent of all households) at the time of the outbreak of the crisis.⁹ Close to 40 per cent of the mortgages in Emerging Europe were denominated in a foreign currency, whereas Western European households only took mortgages in their own currency.

⁹ We exclude mortgages originated in 2009-10 so as to focus on debt already outstanding when the crisis started.

We employ measures of formal and informal borrowing during the crisis. *Try borrow formal* (*Try borrow informal*) measures whether a household tried to borrow from a financial institution (from family or friends) in 2009 or 2010. *Borrow formal* (*Borrow informal*) measures whether a household did borrow from a financial institution (from family or friends) in 2009-10. Table 3 shows that in Emerging Europe ten per cent of all households tried to borrow money from a financial institution during the crisis and 9 out of 10 of these people succeeded in doing so. Twice as many people – 22 percent – tried to borrow money through informal channels such as friends and family (again 9 out of 10 were able to do so). In Western Europe, the percentage of households that borrowed informally (or attempted to) was about half of that in Emerging Europe. However, (attempted) formal borrowing was as prevalent in the West compared to the East.

[Insert Table 3 here]

2.4. Empirical approach

Our main empirical analysis relates our consumption-response variables *Base response* and *Overall response* $R_{h,c}$ for household h in country c to our indicators of household borrowing $D_{h,c}$ before the crisis (*Mortgage*, *FX Mortgage*) or during the crisis (*Borrow formal*, *Borrow informal*). In our univariate tests we control for the *Income shock* $I_{h,c}$ experienced by the household during the crisis. In our multivariate analysis we also control for household-level characteristics through a vector of covariates $X_{h,c}$ that may influence the extent to which households had to adjust during the crisis. We further control for heterogeneous socioeconomic conditions (such as government safety nets) with country fixed effects α_c . We cluster standard errors at the PSU level to control for possible correlation across households within PSUs. Our baseline regression looks as follows:

$$R_{h,c} = \alpha_c + \beta_1 D_{h,c} + \beta_2 I_{h,c} + \gamma X_{h,c} + \varepsilon_{h,c} \quad (1)$$

With respect to our household-level control variables – $X_{h,c}$ – the variable *Income* is our measure of current household income and measures total household expenses in EUR per year (excluding housing expenses) measured according to the OECD household equivalized scale. On the one hand, higher-income households may have been less vulnerable as they had built up more savings before the crisis. We therefore expect the high-income households to have displayed less of a *Base response* during the crisis. On the other hand, however, high-income households may have been consuming more types of (luxury) goods before the crisis and this may make it more likely that their *Overall response* was somewhat higher during the crisis.

We also include *Education* (on a 1-7 scale) as a proxy for *permanent* income. Households with a higher permanent income will be less likely to have to reduce consumption as their higher future expected income will allow them to better patch over temporary income declines.

We capture the main source of current household income through the dummy variables *Self-employment* and *Transfer income* (with wage and capital income as the reference category). *Transfer income* covers both state and private (charity) transfers. The variable *Formal employment* captures the respondent's most recent employment history, i.e. whether the respondent had a formal employment contract during the past 12 months. We expect that households which had formal employment in the past year reduced consumption less as the relative security of their source of income meant they had to reduce consumption less. On the other hand, we expect that households which rely on self-employment and transfer income felt compelled to reduce consumption more due to the inherent uncertainty related to these income sources.

Housing expenses measures housing expenses as a percentage of total expenses. As housing expenses are typically fixed, or can only be changes at very high one-off costs, we expect that households with relatively high housing expenses had less financial flexibility and had to adjust consumption more during the crisis.

Assets measures, on a 0-3 scale, whether a household owns a car, PC, and/or second residency. Richer households according to this basic scale will be less likely to have to reduce consumption their consumption since they can sell part of their fixed assets and/or because ownership of these assets may proxy for other unobserved wealth components. *Bank account* measures whether the household has a bank account. We expect a negative relationship between having a bank account and the household's consumption response. First, having a bank account may be a proxy for (unobservable) household sophistication, a characteristic that may be related to more stable consumption patterns. Second, bank accounts may allow households to save more, thus providing for the financial means to patch over difficult times.

Gender indicates whether the household head is a male (1) or female (0). As female-headed households tend to be socially and economically weaker (Buvinic and Gupta, 1997) we expect a negative relationship between *Gender* and consumption response. Finally, *Household size* measures the number of household members. All else equal, larger households (more children) will have had to reduce consumption more as income per capita is lower.

3. Pre-crisis borrowing and consumption response

To what extent did debt accumulated before the crisis actually make households more vulnerable in the first place? The pre-crisis boom period, and the associated optimistic assumptions about future

incomes, may have enticed banks and households to ramp up household debt too fast. While this allowed households to increase current spending against potential future earnings, it may also have made them more vulnerable to unexpected income shocks. Consequently, highly leveraged households, with high debt-servicing burdens, may have had to cut back their consumption the most. Can such effects be detected in the LiTS, and if so, how damaging was pre-crisis debt in exacerbating the household consumption compression during the crisis?

3.1. Univariate results

Table 4 presents our univariate results for the relation between pre-crisis borrowing and household consumption response in the crisis. With t-tests we compare the mean of *Base response* and *Overall response* for households that had a *Mortgage* in 2008 to those that did not. We conduct this comparison separately for households that did experience an *Income shock* during the crisis and for households that did not experience such a shock. This difference-in-difference approach allows us to capture whether those households that were hit directly by the crisis had to cut back more on consumption if they were indebted before the crisis.

Panel A shows that in Eastern Europe households that experienced an income shock had to reduce base consumption (1.47 vs. 0.68) and overall consumption (2.97 vs. 1.41) by twice as much as those households that did not experience an income shock. Importantly, we find that the impact of an income shock on consumption is significantly higher for households which had a mortgage at the onset of the crisis when compared to households that did not have a mortgage. Households in Eastern Europe that were hit by an income shock reduced their base consumption by 0.2 points more (sample mean: 1.02) and overall consumption by 0.6 points more (sample mean: 2.18) if they had a mortgage.

In Western Europe those households that experienced an income shock also cut back significantly more on consumption than households that did not experience such a shock. However, the difference-in-difference estimates presented in Panel B of Table 4 suggest that in Western Europe, mortgages did *not* make households more vulnerable to such income shocks. Mortgagors even did slightly *better* during the crisis –regardless of whether they experienced income shocks or not– perhaps because they could use their mortgage to smooth consumption by liquidating part of their housing wealth.

[Insert Table 4 here]

3.2. Multivariate results

The difference between Eastern and Western Europe in the relationship between pre-crisis mortgage borrowing and households' consumption response to income shocks is striking. Does this result

reflect that retail credit markets are more complete in Western Europe? Were mortgagors in this region better able to use their mortgage to liquidate part of their housing wealth during the crisis? An alternative explanation for the observed difference is simply that different types of households had mortgages across both regions. Mortgagors in Eastern Europe may have been more highly indebted than those in Western Europe. Also, mortgagors in Eastern Europe may have had assets and income sources which were more sensitive to the crisis than mortgagors in Western Europe.

In Table 5 we present a multivariate analysis which aims at controlling for different socioeconomic characteristics of mortgagors across the two regions. Panels A and B present OLS results for Eastern and Western Europe, respectively. In the first two columns we show results for the whole sample while including *Income shock* as a regressor. In columns 3-4 and 5-6 we then split the sample into those households that experienced an income shock and those that did not.

We first note that the estimated coefficients for the control variables have the expected signs. For instance, highly educated and wealthier people had to reduce consumption less, as did those with formal, and hence relatively secure, employment. Households that had locked themselves into paying a high proportion of their income towards housing had to adjust their consumption by more compared with those with lower fixed housing costs. Larger households had to tighten their belts more as well.

When we include these controls, we find in the first two columns of Panel A that Eastern European households with a mortgage had to tighten base and overall consumption significantly more than those without a mortgage. By contrast, the first two columns of Panel B suggest that in Western Europe mortgagors had to reduce consumption *less* than households without a mortgage.¹⁰ A comparison of columns 3-4 with columns 5-6 shows that in Emerging Europe the impact of mortgages on consumption reduction was completely due to those households that experienced negative income shocks during the crisis. Those that reported no crisis impact did not have to cut back consumption more in case they had a mortgage. In contrast, in Western Europe we do not find much of a difference between those that experienced income shocks and those that did not in terms of their sensitivity to mortgage debt. Among both groups we find that those with a mortgage had to reduce consumption less during the crisis.

Thus even when controlling for observable household characteristics, the data indicate that in Western Europe mortgages allowed households to smooth consumption when faced with the shock of the global financial crisis, whereas in Emerging Europe households with a mortgage were more vulnerable compared to similar households without the burden of mortgage debt. There are two possible interpretations. First, that the more developed western European retail credit markets enabled households to use their mortgages to withdraw equity from their property during the crisis, making

¹⁰ In robustness Table A1 we show that these results also hold when we use separate dummies for the various types of income shocks (job loss, closure of a business, less wage income, and less remittances).

them less financially constrained (cf. Midrigan and Philippon (2011) for the U.S.). Second, some relevant but unobservable differences in budget constraints (such as other assets), risk aversion, or time preferences of mortgagors are not picked up by our control variables.

In an attempt to account for unobserved heterogeneity across households, Panel C of Table 5 presents instrumental variables (IV) estimates for the subsample of households that experienced an income shock in Eastern and Western Europe, respectively. As instruments we use a dummy variable that is one if a household lives in a rural area (*Rural*) and a dummy that is one if the household head is forty years of age or less (*Young*). As rental markets are more developed in cities, rural households are more likely to own houses and thus need mortgages. Further, older households are more likely to be mortgagors as banks typically require that a house purchase is partially funded by a deposit (that is, loan-to-value ratios are below 100 per cent). This means that prospective home owners need to save for several years before they can combine these savings with a mortgage to buy a house.

The first-stage regressions reported in column (3) for Eastern Europe and column (6) for Western Europe show that these instruments are highly correlated with the endogenous variable *Mortgage* and that the sign of the coefficients is as expected. The instruments are also relatively strong: the F-statistics are comfortably above the rule of thumb value of 10. Because we have two different instruments for our endogenous variable, we can perform a test of over-identifying restrictions under the null that both of our instruments are valid. A rejection of the null would cast doubt on the validity of the instruments. The Hansen *J* test suggests that our instruments are jointly valid under traditional confidence levels, which increases our confidence in the IV procedure.

[Insert Table 5 here]

The second-stage results in columns (1-2) for Eastern Europe and (4-5) for Western Europe show that once we correct for endogeneity, the relation between mortgage borrowing and consumption response to income shocks becomes more similar between the two regions. The estimated coefficient for *Mortgage* is negative in all four columns. While the estimates are significant in the Western European sample, they are smaller and insignificant in the Eastern European sample. This suggests that the positive association between having a mortgage and these borrowers' sensitivity to income shocks that we documented in Panels A-B of Table 5, mainly reflected unobserved household heterogeneity. In other words, while in Emerging Europe households with a mortgage were more vulnerable to exogenous shocks compared to similar households without such a debt burden, this vulnerability appears not to be caused by their mortgage debt per se but rather by other (unobserved) household traits that made these households more vulnerable in general.

3.3. FX lending and household vulnerability

One reason why mortgage borrowers in Eastern Europe may have been less able to cushion income shocks is that the cost of serving their mortgages did not fall as much as they did in Western Europe. While mortgagors in Western Europe benefited from lower nominal payments on adjustable rate mortgages, adverse exchange rate movements in Eastern Europe imply that mortgagors in that region which had taken out foreign currency mortgages actually faced higher mortgage payments in their local currency. Indeed, before the crisis, 42 per cent of all mortgages in Eastern Europe were denominated in a foreign currency. In contrast, in the western comparators FX mortgages were virtually absent. In Table 6 we examine whether those households with a mortgage in Eastern Europe were more likely to cut back consumption if this mortgage was denominated in a foreign currency.

As regards currency denomination, two effects might have played a role. First, banks and households would be aware that FX-denominated mortgages might be riskier than local currency loans, as they lead to higher monthly mortgage repayments if the local currency depreciates. Banks may therefore advance FX mortgage loans only to relatively creditworthy households, particularly in countries where the risk of a substantial devaluation or depreciation was high. In some countries, such as Poland, bank regulators have explicitly demanded stricter screening procedures in the case of FX loans (see Brown and De Haas, 2012). The analysis presented in Table 6, which is based on a sample of mortgagors only, controls for observable household characteristics, and therefore for borrower quality in a rough fashion, but it is possible that banks had access to better information about borrower quality than is apparent from the LiTS data. As a result, households with FX mortgages might have been stronger financially and therefore less likely to reduce their consumption during the crisis. However, in countries where a large depreciation occurred, any such effect may have been outweighed by the large increases in the local currency value of mortgage payments faced by FX borrowers. In these circumstances, FX borrowers may have been forced to adjust their consumption more, particularly when they were hit by income shocks as well.

The results in columns 1 and 4 of Table 6 show no apparent relationship between the currency of denomination and households' reduction of their base and overall consumption, respectively. As before, we find that households that experienced an income shock reduced their consumption significantly more. Interestingly, however, columns 2 and 5 show that a large part of this effect is driven by those households that had taken out an FX mortgage. For instance, column 2 shows that among households that experienced an income shock, those with an FX mortgage had to reduce their base consumption twice as much as those that did not have such a mortgage when the crisis hit.

Note that the FX mortgage dummy itself has a negative coefficient: due to a selection effect FX borrowers that were unaffected by the crisis had to reduce consumption less than otherwise similar mortgagors holding local currency mortgages. This relatively better performance of unaffected FX

borrowers may also reflect that in some countries, such as Hungary, banks increased interest-rates in local currency loans soon after the crisis broke out ('interest defenses').

In columns 3 and 6 we then limit our sample to those countries that experienced a depreciation or devaluation of the local currency of more than 2% vis-à-vis the euro during the crisis. Excluded from these regressions are therefore households in Bulgaria, Bosnia, Estonia, Kosovo, Montenegro and Slovenia. The results suggest that in these countries in particular FX borrowers that experienced an income shock had to reduce their consumption more.

Finally, columns 7-9 investigate whether the differentiated impact of crisis shocks on FX as opposed to local-currency mortgagors also influenced (self-reported) arrears on mortgage payments. Again, there are possible conflicting effects. If FX households had a better repayment propensity (something which bankers may have detected during the loan application) they might be better risks even if they had to reduce their consumption by more in order to continue to service their mortgage debt. However, it is possible that this effect would be outweighed by the higher debt service burden triggered by a large depreciation.

As expected, columns 7 and 8 show that households that were impacted more by the crisis were more likely to be in arrears on their mortgage. However, the results also indicate that, across the entire sample, FX mortgagors tended to be better credit risks compared with local currency borrowers (see the negative coefficients in the first row). Columns 8-9 shows that while FX borrowers were on average better risks, this was less the case for those FX borrowers that were hit by an income shock, in particular in countries that depreciated. For those borrowers, the combination of an income shock and higher monthly payments due to the depreciated currency made mortgage arrears go up.

These results show that the currency composition of mortgage borrowing mattered, although not in a straightforward manner. In countries which experienced an exchange rate depreciation, households which both took out an FX mortgage *and* were hit by a negative income shock had to reduce their consumption more than similar households with a mortgage in the local currency. Arrears on FX mortgages were in general lower, even in high depreciation countries, though less so for households that experienced negative income shocks. On the one hand, this is reassuring, as it suggests that banks generally seem to have done a good job in selecting the appropriate households for FX mortgages.¹¹ However, the efforts of these households to repay in the face of a crisis and depreciation meant a significant sacrifice in terms of consumption. In this sense, FX mortgages did indeed prove costly in countries that suffered large depreciations.

¹¹ In addition, the better repayment record of FX borrowers may also reflect that local currency interest rates were much higher during the crisis period, for example because banks increased these interest rates when the crisis broke out, creating a problem for households already under stress.

[Insert Table 6 here]

4. ‘Emergency’ borrowing in the crisis

In this section we examine to what extent access to credit *during* the crisis may have alleviated households’ problems as it allowed them to smooth consumption in response to an unexpected income shock. We analyze whether access to ‘emergency borrowing’, either from formal or from informal channels, allowed households to reduce the impact of the crisis on their consumption patterns. In the absence of good formal credit, informal self-insurance mechanisms may be used by households to try to achieve (partial) consumption smoothing, for instance by cooperation within the household or the wider community (Deaton, 1997; Townsend, 1994).

Table 7 presents our univariate results for the impact of “emergency borrowing” on household consumption. As in the previous section our dependent variables are *Base response* and *Overall response*. We first compare the mean of these two indicators for those households that tried to borrow from formal (informal) sources. Among those households that tried to borrow during the crisis we then compare the consumption response of those households that succeeded in getting credit to those that did not. Panel A of Table 7 presents results for surveyed households in Eastern Europe, while Panel B presents results for Western Europe.

Table 7 reveals a strong pattern between borrowing during the crisis and the cutback in consumption by households in both regions. Households that did not try to borrow in the crisis were those households that had to cut back on consumption the least. Among those households that did try to borrow formally or informally, we find that access to emergency credit is associated with a much lower cutback in consumption.

[Insert Table 7 here]

The latter finding suggests that emergency borrowing from formal or informal sources may have reduced the vulnerability of households to income shocks during the crisis. An alternative explanation is, however, that households which were most seriously affected by the crisis also faced the tightest liquidity constraints; that is, in addition to being hit most severely by income shocks they also faced credit rationing from formal and informal sources. To account for different propensities to access credit during the crisis the multivariate analysis presented in Table 8 controls for observable differences in household characteristics.

The first two columns of Panel A (Eastern Europe) show regressions for the full sample of Eastern European households. We confirm the findings of Table 7 that those households that borrowed during the crisis, either informally (family or friends) or formally (banks) were worse off. In columns 3-6 we therefore focus on those households that *tried* to borrow formally (informally) and then differentiate between those that *succeeded* in accessing emerging funding and those that did not.

Again we confirm the univariate findings from Table 7: households that applied and received formal or informal credit reduced their consumption significantly less than households which did not succeed in getting credit. For Western Europe (Panel B) we find very similar findings for formal borrowing: those with access to formal borrowing needed to reduce consumption much less compared to those who applied but were then refused access to formal credit. Yet, in sharp contrast to Eastern Europe, we find no role here for access to informal borrowing. This may reflect that in western European societies, where formal channels of finance are more developed, informal borrowing has become relatively less important.

In unreported robustness tests we account for the fact that the attempt to borrow (in)formally is likely to follow a selection process in which borrowers are more inclined to borrow formally rather than informally in case they have more trust in formal institutions. In the first stage of this Heckman selection procedure we include three dummy variables that indicate whether the PSU was historically under the control of the Habsburg, Prussian, or Russian empire. As expected, we find a higher propensity to borrow formally in those localities that had a positive institutional legacy due to their historical embedding in either the Habsburg or Prussian Empire (see also Becker, Boeckh, Hainz, and Woessmann, 2011 and Grosjean, 2011). This selection correction changes the economic or statistical significance of our base results only marginally.

[Insert Table 8 here]

5. Conclusions

We have used detailed survey data to assess whether household debt helped consumers weather income shocks during the 2008-09 global financial crisis or, on the contrary, amplified the impact of such shocks. We find that Eastern European households with outstanding FX-denominated mortgages had to cut back consumption more in response to negative income shocks during the crisis when compared to similar households that had not accumulated such debt. This effect is absent in Western Europe, where mortgagors seem to have been in a better position than households without a mortgage to cushion income shocks.

In both regions households that managed to access ‘emergency’ loans during the crisis –either from banks or from friends and family– were able to use this credit to smooth consumption. Our results therefore show that while credit can help consumers to alleviate the impact of negative income shocks, debt accumulation may make households more vulnerable to such shocks in the first place.

Unlike in the western comparator countries, pre-crisis borrowing may have left some households across Emerging Europe in a vulnerable state. Our results show that in particular FX denominated mortgage debt did not allow households to maintain consumption when they were hit by negative income shocks (for instance, by increasing the mortgage to withdraw equity). In particular, in countries with substantial currency depreciations, FX-denominated mortgage debt made the compression of consumption worse. In conclusion, this paper points to the ambivalent role of finance in shaping the response of Emerging Europe to the crisis. On the one hand, finance helped buffer the impact of the crisis. On the other, it created vulnerabilities – down to the household level – that exacerbated the fall in consumption.

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Table 1. Definitions and descriptive statistics

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
Crisis impact on household						
Income shock	Household experienced a negative income shock (job loss, closed business, less wage income, or less remittances) during the crisis, 1=yes	25,707	0.58	0.49	0	1
Job loss	Member of household lost job, 1=yes	25,707	0.18	0.38	0	1
Close business	Family business closed, 1=yes	25,707	0.02	0.16	0	1
Less wage income	Wage income reduced, 1=yes	25,707	0.38	0.49	0	1
Less remittances	Reduced flow of remittances, 1=yes	25,707	0.16	0.37	0	1
Household response						
Base response	Reduction of basic consumption (0=no, 8=high)	25,706	1.02	1.33	0	8
Overall response	Reduction of consumption and assets (0=no, 17=high)	25,706	2.18	2.13	0	17
Mortgage arrears	Mortgage is in arrears in 2010, 1=yes	2,196	0.07	0.26	0	1
Household debt						
Mortgage	Household had a mortgage in 2008, 1=yes	25,706	0.09	0.28	0	1
FX mortgage	Mortgage in foreign currency, 1=yes	2,221	0.18	0.39	0	1
Try borrow formal	Tried to borrow from banks during the crisis, 1=yes	25,087	0.10	0.30	0	1
Borrow formal	Borrowed from banks during crisis, 1=yes	25,087	0.09	0.28	0	1
Try borrow informal	Tried to borrow from informal sources during the crisis, 1=yes	25,087	0.20	0.40	0	1
Borrow informal	Borrowed informally during crisis, 1=yes	25,087	0.18	0.39	0	1
Socioeconomic controls						
Income	OECD equivalized expenses (excluding housing) per year in EUR	25,706	3,510	3,951	0	218,297
Housing expenses	Housing expenses in % of total expenses	24,484	0.08	0.16	0	1
Self-employment	Main income source is self employment, 1=yes	25,707	0.12	0.32	0	1
Transfer income	Main income source is state or private transfers, 1=yes	25,707	0.35	0.48	0	1
Formal employment	Respondent has formal employment, 1=yes	25,687	0.41	0.49	0	1
Bank account	Household member has bank account, 1=yes	25,702	0.68	0.47	0	1
Assets	Household has a car, pc, and/or 2 nd residency (scale 0-3)	25,707	1.32	0.91	0	3
Education	Education level: 1= none, 7=MA or PhD	25,705	4.02	1.50	1	7
Gender	Household head is male, 1=yes	25,684	0.41	0.49	0	1
Household size	Number of household members	25,706	2.74	1.53	0	12
Instrumental variables						
Rural	Household lives in rural area, 1=yes	25,706	0.63	0.48	0	1
Young	Age of household head <= 40 years, 1=yes	25,693	0.39	0.49	0	1

Table 2. Crisis impact and household response

This table reports mean statistics by country for all indicators of the crisis impact on the household (*Income shock*, *Job loss*, *Close business*, *Less wage income*, *Less remittances*) and of households' response to the crisis (*Base response*, *Overall response*, *Mortgage arrears*). Table 1 provides all variable definitions.

	Crisis impact on household					Household response		
	Income shock	Job loss	Close business	Less wage income	Less remittances	Base response	Overall response	Mortgage arrears
Albania	0.64	0.27	0.05	0.38	0.21	1.24	2.63	0.37
Bosnia & Herzegovina	0.74	0.16	0.02	0.36	0.40	0.99	1.91	0.03
Bulgaria	0.52	0.21	0.01	0.35	0.07	1.64	3.24	0.29
Croatia	0.64	0.17	0.02	0.50	0.09	0.92	2.30	0.14
Czech Republic	0.41	0.13	0.01	0.34	0.01	0.69	1.71	0.04
Estonia	0.58	0.22	0.02	0.44	0.12	0.93	1.90	0.04
Hungary	0.81	0.17	0.01	0.22	0.63	1.31	2.56	0.23
Kosovo	0.62	0.24	0.09	0.40	0.30	1.30	3.23	0.61
Latvia	0.70	0.33	0.02	0.56	0.09	1.63	2.71	0.20
Lithuania	0.90	0.21	0.03	0.53	0.48	1.15	2.52	0.27
Macedonia	0.63	0.30	0.09	0.43	0.11	1.90	3.67	0.07
Montenegro	0.72	0.17	0.05	0.52	0.26	1.23	2.42	0.12
Poland	0.34	0.09	0.01	0.24	0.03	0.58	1.18	0.04
Romania	0.70	0.23	0.03	0.53	0.15	1.48	2.65	0.11
Serbia	0.79	0.21	0.03	0.46	0.34	1.56	2.91	0.18
Slovakia	0.45	0.17	0.01	0.31	0.09	0.45	1.34	0.03
Slovenia	0.65	0.13	0.02	0.56	0.02	0.68	2.09	0.09
Ukraine	0.61	0.19	0.02	0.47	0.08	1.42	2.35	0.11
Eastern Europe	0.64	0.20	0.03	0.42	0.19	1.17	2.41	0.17
France	0.36	0.12	0.01	0.27	0.04	0.46	1.57	0.04
Germany	0.34	0.08	0.01	0.17	0.12	0.31	1.06	0.03
Great Britain	0.31	0.10	0.01	0.17	0.10	0.49	1.28	0.03
Italy	0.58	0.12	0.01	0.46	0.00	0.68	2.25	0.01
Sweden	0.17	0.04	0.00	0.11	0.04	0.15	0.58	0.00
Western Europe	0.35	0.09	0.01	0.23	0.06	0.42	1.35	0.02

Table 3. Borrowing prior to and during the crisis

This table reports mean statistics by country for all indicators of household borrowing prior to the crisis (*Mortgage, FX mortgage*) and emergency borrowing during the crisis (*Try borrow formal, Borrow formal, Try borrow informal, Borrow informal*). Crisis period is 2009-2010. Table 1 provides all variable definitions.

	Pre-crisis borrowing		Emergency borrowing during the crisis			
	Mortgage	FX mortgage	Try borrow formal	Borrow formal	Try borrow informal	Borrow informal
Albania	0.02	0.43	0.06	0.04	0.25	0.19
Bosnia & Herzegovina	0.03	0.17	0.09	0.08	0.18	0.16
Bulgaria	0.03	0.28	0.14	0.12	0.17	0.15
Croatia	0.06	0.84	0.12	0.11	0.17	0.16
Czech Republic	0.08	0.00	0.08	0.07	0.17	0.15
Estonia	0.14	0.51	0.07	0.06	0.19	0.16
Hungary	0.14	0.58	0.06	0.04	0.14	0.11
Kosovo	0.01	0.00	0.08	0.08	0.21	0.20
Latvia	0.06	0.82	0.07	0.06	0.27	0.26
Lithuania	0.05	0.41	0.08	0.08	0.25	0.24
Macedonia	0.01	0.12	0.14	0.14	0.30	0.28
Montenegro	0.03	0.00	0.17	0.16	0.28	0.26
Poland	0.04	0.47	0.06	0.06	0.15	0.14
Romania	0.04	0.75	0.14	0.13	0.29	0.27
Serbia	0.03	0.73	0.13	0.11	0.29	0.28
Slovakia	0.09	0.00	0.08	0.06	0.17	0.14
Slovenia	0.03	0.25	0.15	0.11	0.15	0.12
Ukraine	0.01	0.56	0.08	0.07	0.36	0.34
Eastern Europe	0.05	0.38	0.10	0.09	0.22	0.20
France	0.26	0.00	0.11	0.10	0.10	0.09
Germany	0.13	0.01	0.02	0.02	0.08	0.07
Great Britain	0.19	0.00	0.10	0.08	0.10	0.09
Italy	0.12	0.00	0.02	0.02	0.11	0.09
Sweden	0.45	0.00	0.20	0.19	0.07	0.06
Western Europe	0.23	0.00	0.09	0.08	0.09	0.08

Table 4. Pre-crisis borrowing - Univariate results

This table shows univariate estimates for *Base response* and *Overall response* in Eastern Europe (Panel A) and Western Europe (Panel B). We compare households that had a *Mortgage* before the crisis to those which did not and households that experienced an *Income shock* to those that did not. Standard errors are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Table 1 provides all variable definitions.

Panel A. Eastern Europe

	Base response			Overall response		
	Income shock (n=12,759)	No income shock (n=7,443)	Difference in Difference	Income shock (n=12,759)	No income shock (n=7,443)	Difference in Difference
<i>All households</i>	1.47 (0.01)	0.68 (0.01)		2.97 (0.02)	1.41 (0.02)	
Mortgage	1.58 (0.06)	0.60 (0.07)	0.20** (0.10)	3.49 (0.10)	1.36 (0.12)	0.60*** (0.15)
No Mortgage	1.46 (0.01)	0.68 (0.01)		2.94 (0.02)	1.41 (0.02)	
Difference	0.12** (0.06)	-0.08 (0.07)		0.55*** (0.08)	-0.05 (0.11)	

Panel B. Western Europe

	Base response			Overall response		
	Income shock (n=2,033)	No income shock (n=3,471)	Difference in Difference	Income shock (n=2,033)	No income shock (n=3,471)	Difference in Difference
<i>All households</i>	0.82 (0.03)	0.26 (0.01)		2.34 (0.05)	0.86 (0.02)	
Mortgage	0.71 (0.05)	0.17 (0.02)	-0.03 (0.06)	2.21 (0.09)	0.71 (0.04)	0.02 (0.11)
No Mortgage	0.86 (0.03)	0.29 (0.01)		2.38 (0.05)	0.91 (0.03)	
Difference	-0.15** (0.07)	-0.11*** (0.03)		-0.18 (0.11)	-0.20*** (0.05)	

Table 5. Pre-crisis borrowing - Multivariate analysis

This dependent variables in this table are *Base response* and *Overall response*. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively. Standard errors clustered at the level of primary sampling units are reported in parentheses. Table 1 provides all variable definitions.

Panel A. Eastern Europe

Columns (1-2) report OLS estimates for all surveyed households in Eastern Europe. Columns (3-4) report OLS estimates for the households which experienced an income shock during the crisis. Columns (5-6) report estimates for households which did not experience an income shock during the crisis.

Sample: Dependent variable:	All households		Income shock		No income shock	
	Base response [1]	Overall response [2]	Base response [3]	Overall response [4]	Base response [5]	Overall response [6]
Mortgage	0.256*** (0.066)	0.421*** (0.105)	0.294*** (0.083)	0.546*** (0.129)	0.133 (0.084)	-0.000 (0.143)
Income shock	0.734*** (0.028)	1.421*** (0.047)				
Income	-0.0222 (0.021)	0.0463 (0.033)	-0.0219 (0.028)	0.0812* (0.044)	-0.026 (0.0234)	0.002 (0.040)
Housing expenses	0.393*** (0.112)	0.700*** (0.181)	0.458*** (0.135)	0.760*** (0.203)	0.307* (0.159)	0.661** (0.296)
Self employment	-0.0467 (0.041)	-0.0002 (0.066)	-0.0676 (0.053)	-0.024 (0.083)	-0.0139 (0.050)	0.0503 (0.094)
Transfer income	0.0294 (0.031)	-0.0566 (0.048)	0.0061 (0.040)	-0.115* (0.060)	0.0827* (0.043)	0.019 (0.071)
Assets	-0.164*** (0.018)	0.0247 (0.027)	-0.176*** (0.023)	0.0689* (0.036)	-0.134*** (0.021)	-0.0475 (0.033)
Bank account	-0.109*** (0.039)	-0.0805 (0.059)	-0.0994** (0.050)	-0.0692 (0.074)	-0.132*** (0.042)	-0.100 (0.070)
Formal employment	-0.0573** (0.026)	-0.0790** (0.039)	-0.0842** (0.034)	-0.105** (0.051)	0.00931 (0.034)	-0.00192 (0.060)
Education	-0.0692*** (0.009)	-0.0401*** (0.013)	-0.0909*** (0.012)	-0.0526*** (0.018)	-0.0384*** (0.011)	-0.016 (0.017)
Gender	0.0217 (0.020)	-0.0167 (0.031)	0.0616** (0.027)	0.0398 (0.042)	-0.0487* (0.027)	-0.116*** (0.044)
Household size	0.0401*** (0.010)	0.0617*** (0.016)	0.0390*** (0.013)	0.0690*** (0.019)	0.0338** (0.013)	0.0528** (0.024)
Observations	19,084	19,084	12,138	12,138	6,946	6,946
No. countries	18	18	18	18	18	18
No. PSUs	1,331	1,331	1,263	1,263	1,225	1,225
Method	OLS	OLS	OLS	OLS	OLS	OLS
R-squared	0.167	0.193	0.096	0.070	0.134	0.134
Country FE	yes	yes	yes	yes	yes	yes

Panel B. Western Europe

Columns (1-2) report OLS estimates for all surveyed households in Western Europe. Columns (3-4) report OLS estimates for the households which experienced an income shock during the crisis. Columns (5-6) report estimates for households which did not experience an income shock during the crisis.

Sample: Dependent variable:	All households		Income shock		No income shock	
	Base response [1]	Overall response [2]	Base response [3]	Overall response [4]	Base response [5]	Overall response [6]
Mortgage	-0.169*** (0.035)	-0.305*** (0.064)	-0.259*** (0.078)	-0.425*** (0.129)	-0.122*** (0.030)	-0.244*** (0.063)
Income shock	0.495*** (0.040)	1.236*** (0.070)				
Income	0.042 (0.034)	0.138** (0.058)	0.0545 (0.072)	0.177 (0.126)	0.0387 (0.031)	0.126** (0.050)
Housing expenses	0.604*** (0.082)	1.217*** (0.146)	0.911*** (0.182)	1.562*** (0.309)	0.436*** (0.065)	1.036*** (0.131)
Self employment	-0.107** (0.053)	-0.196* (0.101)	-0.112 (0.088)	-0.236 (0.155)	-0.0557 (0.048)	-0.123 (0.108)
Transfer income	-0.0381 (0.046)	-0.149* (0.079)	-0.0248 (0.090)	-0.236 (0.149)	-0.041 (0.039)	-0.096 (0.079)
Assets	-0.112*** (0.022)	-0.0561 (0.035)	-0.230*** (0.047)	-0.170** (0.073)	-0.0617*** (0.022)	-0.00745 (0.039)
Bank account	-0.244** (0.100)	-0.242 (0.148)	-0.170 (0.161)	-0.300 (0.238)	-0.279*** (0.101)	-0.211 (0.156)
Formal employment	-0.0578 (0.040)	-0.0861 (0.070)	-0.0553 (0.068)	-0.0403 (0.114)	-0.0565* (0.034)	-0.0995 (0.072)
Education	-0.0364*** (0.009)	-0.0474*** (0.016)	-0.0543*** (0.021)	-0.045 (0.035)	-0.0292*** (0.008)	-0.0510*** (0.016)
Gender	-0.0177 (0.025)	-0.120*** (0.045)	-0.0489 (0.052)	-0.176** (0.088)	-0.0096 (0.024)	-0.101** (0.050)
Household size	0.0823*** (0.017)	0.145*** (0.028)	0.138*** (0.034)	0.204*** (0.053)	0.0415*** (0.015)	0.104*** (0.027)
Observations	5,356	5,356	1,985	1,985	3,371	3,371
No. countries	5	5	5	5	5	5
No. PSUs	354	354	326	326	349	349
Method	OLS	OLS	OLS	OLS	OLS	OLS
R-squared	0.143	0.227	0.092	0.085	0.068	0.106
Country FE	yes	yes	yes	yes	yes	yes

Panel C. Instrumental variable estimates

This panel reports estimates for households which experienced an income shock only. Columns (1-2) report IV estimates for Eastern Europe where *Mortgage* is instrumented with *Rural* and *Young*. The first-stage regression is reported in column (3). Columns (4-5) and (6) report the corresponding IV estimates and first-stage regression for Western Europe.

Region: Sample: Dependent variable:	Eastern Europe			Western Europe		
	Income shock =1			Income shock=1		
	Base response	Overall response	Mortgage	Base response	Overall response	Mortgage
	[1]	[2]	[3]	[4]	[5]	[6]
Mortgage	-0.718 (1.623)	-2.738 (2.629)		-2.183*** (0.807)	-2.902** (1.340)	
Rural			0.0136*** (0.00430)			0.0168 (0.0194)
Young			-0.0202*** (0.00396)			-0.100*** (0.0188)
Observations	12,130	12,130	12,130	1,985	1,985	1,985
Number of countries	18	18	18	5	5	5
Number of PSU	1,263	1,263	1,263	326	326	326
Method	IV	IV	IV-1 st stage	IV	IV	IV-1 st stage
F-test of instruments			18.24			14.56
Hansen J test (p-value)	0.16	0.76		0.07	0.17	
Socioeconomic controls	yes	yes	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes	yes	yes

Table 6. Foreign-currency mortgages and household vulnerability

This table examines for the impact of foreign currency denomination of mortgages for the subsample of households in Eastern Europe which had a mortgage in 2008. The dependent variables are *Base response* (columns 1-3), *Overall response* (columns 4-6) and *Mortgage arrears* (columns 7-9). Columns (1-2, 4-5, 7-8) report estimates for all countries. Columns (3,6,9) report estimates only for countries which experienced a depreciation of the local currency of more than 2% vis-à-vis the euro during the crisis. Excluded from these regressions are households in Bulgaria, Bosnia, Estonia, Kosovo, Montenegro and Slovenia. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively. Standard errors clustered at the level of primary sampling units are reported in parentheses. Table 1 provides all variable definitions.

Sample: Eastern European households with a mortgage in 2008									
Dependent variable:	Base response			Overall response			Mortgage arrears		
Countries:	All	Depreciation		All	Depreciation		All	Depreciation	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
FX mortgage	0.115 (0.147)	-0.539*** (0.182)	-0.612** (0.244)	0.199 (0.253)	-1.057*** (0.304)	-1.178*** (0.403)	-0.0916*** (0.0333)	-0.135*** (0.0352)	-0.192*** (0.0505)
Income shock	0.810*** (0.118)	0.488*** (0.131)	0.340** (0.151)	1.950*** (0.189)	1.331*** (0.200)	1.159*** (0.238)	0.0692*** (0.0251)	0.0478* (0.0282)	0.0445 (0.0366)
<i>Income shock * FX mortgage</i>		0.488*** (0.101)	0.599*** (0.134)		0.936*** (0.170)	1.076*** (0.213)		0.0322* (0.0184)	0.0554** (0.0271)
Observations	767	767	541	767	767	541	756	756	534
R-squared	0.184	0.222	0.246	0.208	0.262	0.269	0.162	0.166	0.137
Number of countries	18	18	12	18	18	12	18	18	12
Number of PSU	458	458	317	458	458	317	458	458	317
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Socioeconomic controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed-effects	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table 7. Emergency borrowing in the crisis- Univariate results

This table shows univariate estimates for *Base response* and *Overall response* in Eastern Europe (Panel A) and Western Europe (Panel B). We compare households that tried to borrow formally (informally) in the crisis to those which did not. Among those households that tried to borrow we compare those households which succeeded to those which did not. Standard errors are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Table 1 provides all variable definitions.

Panel A. Eastern Europe

	Borrow formal				Borrow informal				
	Base response		Overall response		Base response		Overall response		
Not tried to borrow (n=17'708)	1.13 (0.01)	-0.49*** (0.03)	2.30 (0.02)	-1.05*** (0.05)	Not tried to borrow (n=15'191)	0.97 (0.01)	-0.94*** (0.02)	2.09 (0.02)	-1.38*** (0.04)
Tried to borrow (n=1'938)	1.62 (0.04)		3.35 (0.06)		Tried to borrow (n=4'455)	1.91 (0.02)		3.47 (0.04)	
Tried to borrow and succeed (n=1'704)	1.55 (0.04)	-0.55*** (0.11)	3.27 (0.06)	-0.70*** (0.17)	Tried to borrow and succeed (n=4'044)	1.88 (0.03)	-0.29*** (0.08)	3.43 (0.04)	-0.38*** (0.12)
Tried to borrow and not succeed (n=234)	2.10 (0.12)		3.97 (0.17)		Tried to borrow and not succeed (n=411)	2.17 (0.08)		3.82 (0.13)	

Panel B. Western Europe

	Borrow formal				Borrow informal				
	Base response		Overall response		Base response		Overall response		
Not tried to borrow (n=4'905)	0.44 (0.01)	-0.25*** (0.04)	1.37 (0.02)	-0.47*** (0.08)	Not tried to borrow (n=4'868)	0.37 (0.01)	-0.97*** (0.04)	1.22 (0.02)	-1.81*** (0.08)
Tried to borrow (n=536)	0.69 (0.06)		1.84 (0.11)		Tried to borrow (n=573)	1.34 (0.06)		3.04 (0.11)	
Tried to borrow and succeed (n=470)	0.57 (0.05)	-1.02*** (0.17)	1.60 (0.10)	-1.93*** (0.31)	Tried to borrow and succeed (n=516)	1.30 (0.07)	-0.37* (0.22)	3.00 (0.12)	-0.40 (0.36)
Tried to borrow and not succeed (n=66)	1.59 (0.20)		3.53 (0.37)		Tried to borrow and not succeed (n=57)	1.67 (0.18)		3.40 (0.29)	

Table 8. Emergency borrowing in the crisis - Multivariate results

The dependent variables in this table are *Base response* and *Overall response*. Columns (1-2) report full sample estimates. Columns (3-4) report estimates for those households which tried to borrow from formal sources during the crisis. Columns (5-6) report estimates for those households which tried to borrow from informal sources during the crisis. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively. Standard errors clustered at the level of primary sampling units are reported in parentheses. Table 1 provides all variable definitions.

Panel A. Eastern Europe

Sample:	All		Tried to borrow formal		Tried to borrow informal	
	Base response	Overall response	Base response	Overall response	Base response	Base response
Dependent variable:	[1]	[2]	[3]	[4]	[5]	[6]
Borrowed formal	0.262*** (0.0423)	0.521*** (0.0654)	-0.444*** (0.133)	-0.620*** (0.200)		
Borrowed informal	0.634*** (0.0362)	0.897*** (0.0553)			-0.324*** (0.0988)	-0.487*** (0.141)
Income shock	0.653*** (0.0280)	1.302*** (0.0463)	0.835*** (0.0742)	1.617*** (0.124)	0.807*** (0.0590)	1.409*** (0.0903)
Observations	18,620	18,620	1,853	1,853	4,225	4,225
R-squared	0.203	0.225	0.179	0.158	0.132	0.128
Number of countries	18	18	18	18	18	18
Number of PSU	1,331	1,331	722	722	1,044	1,044
Method	OLS	OLS	OLS	OLS	OLS	OLS
Socioeconomic controls	yes	yes	yes	yes	yes	yes
Country fixed-effects	yes	yes	yes	yes	yes	yes

Panel B. Western Europe

Sample:	All		Tried to borrow formal		Tried to borrow informal	
	Base response	Overall response	Base response	Overall response	Base response	Base response
Dependent variable:	[1]	[2]	[3]	[4]	[5]	[6]
Borrowed formal	0.143*** (0.0498)	0.292*** (0.0903)	-0.607*** (0.190)	-1.039*** (0.335)		
Borrowed informal	0.721*** (0.0813)	1.319*** (0.133)			-0.136 (0.214)	-0.170 (0.340)
Income shock	0.447*** (0.0388)	1.151*** (0.0681)	0.634*** (0.125)	1.426*** (0.219)	0.628*** (0.138)	1.204*** (0.240)
Observations	5,298	5,298	528	528	563	563
Number of countries	5	5	5	5	5	5
Number of PSU	354	354	203	203	238	238
Method	OLS	OLS	OLS	OLS	OLS	OLS
Socioeconomic controls	yes	yes	yes	yes	yes	yes
Country fixed-effects	yes	yes	yes	yes	yes	yes

Table A1 Robustness

The dependent variables are *Base response* and *Overall response*. In columns (1-2) we replicate columns (1-2) of Panel A in Table 5. In columns (3-4) we columns (1-2) of Panel B in Table 5. In all specifications we replace the explanatory variable *Income shock* with its individual components: *Job loss*, *Close business*, *Less wage income* and *Less remittances*. Table 1 provides all variable definitions.

Sample: Dependent variable:	Eastern Europe		Western Europe	
	Base response	Overall response	Base response	Overall response
	[1]	[2]	[3]	[4]
Mortgage	0.229*** (0.065)	0.367*** (0.101)	-0.162*** (0.035)	-0.287*** (0.063)
Job loss	0.661*** (0.032)	1.205*** (0.048)	0.602*** (0.065)	1.312*** (0.110)
Close business	0.341*** (0.077)	0.905*** (0.118)	0.594*** (0.215)	1.351*** (0.346)
Less wage income	0.518*** (0.027)	1.035*** (0.041)	0.390*** (0.047)	1.016*** (0.077)
Less remittances	0.410*** (0.040)	0.793*** (0.062)	0.215*** (0.064)	0.751*** (0.114)
Observations	19,084	19,084	5,356	5,356
No. countries	18	18	5	5
No. PSUs	1,331	1,331	354	354
Method	OLS	OLS	OLS	OLS
R-squared	0.19	0.23	0.16	0.25
Country FE	yes	yes	yes	yes