# WORKING PAPER 181

Foreign Currency Loans
and Loan Arrears of Households
in Central and Eastern Europe

Elisabeth Beckmann, Jarko Fidrmuc, Helmut Stix

**Statement of Purpose**

The Working Paper series of the Oesterreichische Nationalbank is designed to disseminate and to provide a platform for discussion of either work of the staff of the OeNB economists or outside contributors on topics which are of special interest to the OeNB. To ensure the high quality of their content, the contributions are subjected to an international refereeing process. The opinions are strictly those of the authors and do in no way commit the OeNB.

# Editorial

Given recent adverse developments, widespread foreign currency borrowing in CEECs poses a serious challenge for financial stability. Against this background, the authors use survey data to study the determinants of loan arrears of private households. Their data confirm a non-negligible impact of foreign currency loans on financial vulnerability. However, higher loan delinquency rates in depreciation countries can only partly be explained by foreign currency borrowing. Employing survey information about the reasons for households' financial difficulties, the authors show that income shocks exert a stronger impact on loan delinquency rates than the direct effect which works through increased installments on foreign currency loans.

November 9, 2012

# Foreign Currency Loans and Loan Arrears of Households
# in Central and Eastern Europe[*]

Elisabeth Beckmann[I]    Jarko Fidrmuc[II]    Helmut Stix[III]

November 2012

## Abstract

Given recent adverse developments, widespread foreign currency borrowing in CEECs poses a serious challenge for financial stability. Against this background, we use survey data to study the determinants of loan arrears of private households. Our data confirm a non-negligible impact of foreign currency loans on financial vulnerability. However, higher loan delinquency rates in depreciation countries can only partly be explained by foreign currency borrowing. Employing survey information about the reasons for households' financial difficulties, we show that income shocks exert a stronger impact on loan delinquency rates than the direct effect which works through increased installments on foreign currency loans.

---

[I] Oesterreichische Nationalbank, Foreign Research Division, e-mail: elisabeth.beckmann@oenb.at.
[II] Zeppelin University Friedrichshafen, CESifo Munich, Institute for Eastern European Studies, Regensburg, and Comenius University in Bratislava, e-mail: jarko.fidrmuc@zu.de.
[III] Corresponding author: Oesterreichische Nationalbank, Economic Studies Division, POB 61, A-1010 Vienna, Austria, e-mail: helmut.stix@oenb.at. Fax: +43-1-40420-7299.

# 1. Introduction

The emerging economies in Central and Eastern European countries (CEECs) have been hit particularly hard by the financial crisis which began in 2008. This is generally viewed as a result of vulnerabilities that accumulated in the pre-crisis period, including the consumption and lending boom which was fueled by foreign currency loans – in some CEECs, the majority of outstanding loans is denominated in euro or Swiss franc. Accordingly, the issue of foreign currency loans has received increasing attention in the academic literature and among economic policy makers. Assessing the overall welfare consequences of such loans requires balancing their contribution to growth, in particular in countries with underdeveloped domestic financial markets, against the potential increase of borrowers' and creditors' financial vulnerability (Ranciere, Tornell, and Vamvakidis, 2010; Zettelmeyer Nagy, and Jeffrey, 2011, Basso, Calvo-Gonzales and Jurgilas, 2011). In this paper, we study how foreign currency loans affect the financial vulnerability of borrowers.

The macroeconomic risks arising from foreign currency loans for financial stability – e.g. via currency mismatch on banks' balance sheets, aggregate refinancing problems of banks, the threat of sudden stops – are well understood (Fernandéz-Arias, 2006; Levy Yeyati, 2006). In contrast, little is known about how foreign currency borrowing affects private households and indirectly the credit risk of banks. The increase in non-performing loans that has occurred in many CEECs with a high share of foreign currency borrowing over the past years suggests that foreign currency loans could be too risky for (largely unhedged) households.

The limited knowledge about how foreign currency loans affect the debt servicing capacity of households is mainly caused by a lack of relevant data. To identify their impact requires detailed information from banks about individual loans as well as detailed data about the financial situation of households which took out these loans. As such data are rarely available an alternative is to resort to survey data.

The present paper follows this approach. We utilize data from representative surveys that were conducted in nine CEECs in 2010 and 2011. These surveys among private individuals gather information on whether households have a loan as well as on the purpose (consumption or mortgage) and the currency denomination of such loans. Importantly, the survey also collects information on whether households have been in arrears on loan repayments, based on the following question: "Has your household been

2

in arrears on loan repayments once or more during the last 12 months on account of financial difficulties?" We evaluate this information in two ways: First, we analyze the determinants of loan arrears of private households. Second, we study whether foreign currency loans increase loan arrears.

To answer these questions, we propose an empirical model which relates loan arrears to a set of socio-economic characteristics and to the denomination structure of the loan. Moreover, we analyze whether there is a differential impact on households in countries that experienced depreciations compared to countries that maintained a stable exchange rate in the course of the financial crisis.

The estimations yield several interesting findings: First, we find that the *de-facto* exchange rate regime affects the incidence of loan arrears. In particular, the incidence of loan arrears is – regardless of the loan currency denomination – about 12 percentage points higher in depreciation countries than in non-depreciation countries, *prima facie* providing strong support to the "fear of floating" view (Calvo and Reinhart, 2002). Second, while an appealing explanation for this finding is that depreciations cause higher arrears for *foreign* currency loans, our results show that the arrears of *local* currency loans, too, increased as a result of the financial crisis.

Higher arrears for local currency loans suggest that the observed difference in loan delinquency rates between depreciation and non-depreciation countries can only to some extent be explained by the currency denomination of loans. We further delve into this issue by employing direct survey information about the causes of loan arrears – respondents were asked whether arrears occurred because of higher installments or because of decreased income – to show, third, that high rates of arrears among households in CEECs are caused to a significant extent by adverse income shocks and that these shocks exert a more important impact than installment shocks.

The paper builds upon and is related to the previous literature, although analyses of loan arrears especially with respect to currency denomination are scarce. The paper closest to ours is Brown and Lane (2011) which utilizes survey data from 27 countries from the 2010 Life in Transition Survey (LiTS) to analyze debt overhang and its implications for consumption. EBRD (2011) uses the same data source to study arrears on mortgages. We extend their analyses by providing information on the sources of loan arrears which allows us to study the relative impact of income versus installment shocks. Moreover, we discuss arrears for consumption and mortgage loans, which represents a novel contribution of our analysis. In contrast to initial expectations, we

show that consumption loans in foreign currency are not more prone to arrears than mortgages in foreign currency. Furthermore, the analysis in EBRD (2011), though providing interesting insights, rests on a rather low number of observations which could pose a limit to the statistical reliability of results.

Our paper is also related to the growing research on foreign currency lending and borrowing which employs microdata (Brown and De Haas, 2011; Brown, Ongena, Popov and Yeşin, 2011; Brown, Ongena and Yesin, 2011; Fidrmuc, Hake and Stix, 2012). These papers provide important insights into the determinants of foreign currency borrowing. We build on these results when modeling whether an individual has a loan. Another strand of the literature focuses on the macroeconomic impact of foreign currency loans on financial stability (e.g. Levy Yeyati, 2006). As consistent aggregate data on non-performing loans of the household sector is not available for CEECs, our microdata approach can be viewed as providing valuable complementary evidence. Finally, in modeling individual loan arrears the paper builds upon the literature on households' debt repayment behavior (e.g. Böheim and Taylor, 2000; Campbell, Ramadorai and Ranish, 2012; Duygan-Bump and Grant, 2009).

The paper is structured as follows. The next section presents a literature review on loan arrears. Section 3 describes the data. Section 4 discusses the selection bias and the methodology. Estimation results are presented in Section 5 and Section 6 concludes.


## 2.   Literature Review on Debt Repayment of Households

### 2.1 Evidence on Developed and Emerging Economies

Duygan-Bump and Grant (2009) review the earlier literature on household arrears. In general, this literature is rather scarce, mainly limited by data availability. Several authors analyze data on private defaults (e.g. Fay, Hurst and White, 2002), although this approach is constrained by the low number of private defaults. Other authors use data on credit card arrears (Gross and Souleles, 2002), but those data can often lack appropriate explanatory variables. Moreover, credit card holders do not constitute a representative sample of the whole population. Finally, some authors employ data on self-reported arrears which can be subject to underreporting (Böheim and Taylor, 2000; May and Tudela, 2005; Duygan-Bump and Grant, 2009).

A variety of factors behind arrears have been identified: Bajari, Chu and Park (2008) and Aron and Muelbauer (2010) label their approach the double-trigger model. First,

cash-flow problems pose financial constraints on households. Second, households can voluntarily choose to stall repayments. Households may decide not to repay mortgages if debts exceed equity value, in particular if loan contracts are difficult to enforce.

Adverse shocks (e.g. income reduction, unemployment, health problems) constitute the main origin of repayment problems of households according to Duygan-Bump and Grant (2009). Moreover, these authors show that institutional differences in the effectiveness of punishing defaults can explain observed country differences in repayment behavior. Campbell, Ramadorai and Ranish (2012) demonstrate that regulation has important effects on loan delinquencies. They analyze the role of bank regulation on mortgage default rates in India, employing detailed bank data of individual loan records.

Other papers stress the behavioral approach to household defaults. In this vein, Guiso, Sapienza and Zingales (2012) highlight households' attitudes towards strategic default (if borrowers decide to walk away although they could afford to repay mortgages). They show that the propensity to strategic defaults increased in the USA during the financial crisis. Legal differences between US federal states play a minor role, while different moral attitudes of households and the social interactions with other borrowers have an important and significant influence on the acceptance of strategic defaults.

## 2.2 Evidence on CEECs

Arrears were a widespread phenomenon in all CEECs during early economic reforms. Bad loans and inter-enterprise arrears were caused by dysfunctional institutions and a lack of trust (Campos and Coricelli, 2002). Non-performing loans reached up to 50 percent in some CEECs in the first half of the 1990s (Roland, 2000). However, non-performing loans were dominated by large (state-owned) enterprises with soft budget constraints. Institutional reforms including privatizations, bank recapitalizations (bank sales to foreign investors) and introduction of bankruptcy laws largely solved the problem of massive non-performing loans in the corporate sector. Retail banking played only a minor role at the beginning of the economic transition. Despite the credit boom before the financial crisis, household leverage has been lower than in more advanced European countries (Brown and Lane, 2011). Moreover, it is concentrated on the wealthiest part of the population, which might be less vulnerable to financial shocks. In line with this result, EBRD (2011) find that mortgages denominated in foreign currency

do not increase the probability of loan arrears, which may, however, reflect their focus on mortgages and a correspondingly low number of observations.

As debt repayment problems of households are a relatively new feature in CEECs, only few authors analyze this issue. Kočenda and Vojtek (2006) estimate a credit scoring model for private borrowers of a Czech bank. Reported arrears (defined as overdue repayments of over 90 days) are relatively frequent (49.8 percent). Their estimations identify demographic factors (household wealth, education level and marital status), loan purpose, and the number of years the client has had an account with the bank as the most important determinants of loan defaults. Other authors report lower default rates of households. Fidrmuc and Hainz (2009) analyze loans to small and medium enterprises in Slovakia, including loans to persons (entrepreneurs). They report a low number of defaults in this group (1.5 percent for persons, as compared to 6 percent for the whole sample). They relate this to high collateral of this borrower group.

Moral hazard and enforceability problems play an important role for loan arrears. These problems are more severe in the CEECs (Dewatripont and Maskin, 1995), underlining the role of institutional quality in the lending process. Moral hazard problems could be important for foreign currency loans, in particular if borrowers and lenders underestimate the likelihood of large depreciations (Ranciere, Tornell and Vamvakidis, 2010). In the unlikely event of extreme financial volatility, debtors may expect to be bailed out ("too-many-to-fail" problem).


## 3.    Data and Descriptive Statistics

We use data from the Euro Survey project of the Austrian Central Bank (OeNB). The survey gathers information among private individuals on the role of the euro in four new EU member countries (Hungary, Poland, Bulgaria, and Romania) as well as the (potential) EU candidates (Croatia, Albania, Serbia, Bosnia and Herzegovina, and FYR Macedonia). In each country and each survey about 1,000 persons aged 14 and older are interviewed. For the estimations in this paper we only use responses from persons who are 19 or older. The surveys have been repeated on a semiannual basis (in spring and fall) and we use data from fall 2010 to fall 2011 providing us with more than 24,000 observations among which about 6,600 report to have a loan.

The surveys elicit information about whether respondents have a loan, whether households have been in arrears on loan repayments, on the currency composition and

the purpose of the loan (mortgage or consumption), but not on maturity and loan amount.

We further employ information on respondents' assessment of their economic situation and the impact of the global financial crisis on households. In addition, we use evidence on respondents' bank relationship, saving behavior and sources of income from abroad. Finally, we control for socio-demographic characteristics of respondents (age, family status, income and education groups, region, etc.). A detailed explanation of all variables is provided in the Appendix, Tables A.1 and A.2.
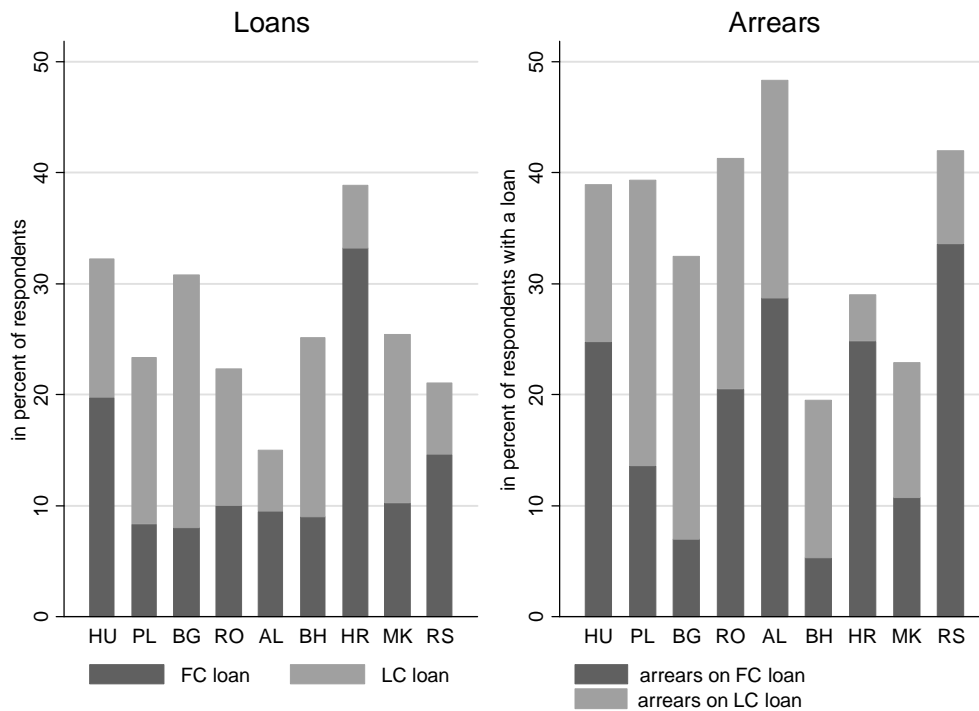


Figure 1: Sample Mean of Loans and Loan Arrears, Fall 2010 to Fall 2011

Notes: The left panel shows the incidence of loans as well as their currency denomination. The right panel shows the percentage of loan holders who report to have been in arrears at least once during the past 12 months, separated by loan currency denomination. Source: OeNB Euro Survey.

### 3.1 Descriptive Statistics

Descriptive statistics by country are presented in Tables A.3 and A.4. The central variable in our analysis is information on whether respondents have fallen into financial difficulties with their loans. This is covered by the question: "Has your household been in arrears on loan repayments once or more during the last 12 months on account of

financial difficulties?" Possible answers are "Yes, once", "Yes, twice or more", "No", "Don't know", and "No answer".

This question is only put to respondents with a loan. It is notable that the share of respondents with a loan differs widely across countries from 15 percent (Albania) to 39 percent (Croatia). Among those respondents with a loan between 26 percent (Bulgaria) and 85 percent (Croatia) have a foreign currency loan. With respect to arrears we find, on average, that 34 percent of respondents with a loan are in arrears on loan repayments and among those in arrears 54 percent have a foreign currency loan (Figure 1). Although there is considerable cross-country variation, from 19 percent in Bosnia and Herzegovina to 48 percent in Albania, these figures seem sizeable. If arrears are defined more strictly, i.e. arrears twice a year or more often, we obtain significantly lower figures: on average across countries 20 percent with a variation from 6 percent to 27 percent (Table A.3).

Notwithstanding the novel information provided by this subjective arrears measure, a correct interpretation of results requires keeping in mind some specificities of our data set: First, the question does not provide information about how long respondents have been unable to pay. However, as the question contains the reference to "financial difficulties" we consider it unlikely that respondents who are just one or two days late with one payment will answer that they are in arrears. Second, the question does not contain amounts so that arrears on a loan of 100 Euros are counted equally to arrears on a loan of 10,000 Euros. Finally, the question refers to repayment problems over the past twelve months and is thus designed quite broadly. In principle, this counteracts the under-reporting bias found in the literature (e.g. Duygan-Bump and Grant, 2009).

We note that the Euro Survey data display a higher level of arrears than the level of non-performing loans published by the national central banks. However, this comparison with aggregate data is not straightforward for several reasons. Firstly, for the countries in our dataset, only Poland and Hungary report data on non-performing loans which are disaggregated by sectors, i.e. providing separate measures for households. For all other countries, the aggregate data on non-performing loans comprises households, non-financial corporations and loans to state-owned institutions including local governments and municipalities. As state-owned institutions have a lower incidence of non-performing loans, published results can be expected to be lower than our survey based measure. Secondly, the official definition of "non-performing loans" typically refers to a timespan (e.g. 90 days) on a specified date while our

measure refers to any delay in loan repayments during the last 12 months. Moreover, the timespan differs across countries, which renders cross-country comparisons[1] even on the level of published non-performing loan data difficult.[2]

Apart from such conceptual differences of how loan arrears are measured, two additional sources of information strengthen our confidence in the data. First, anecdotal evidence from banks suggests that the high share of households in arrears found by the Euro Survey is not unrealistic. Second, questions on loan arrears were asked in three subsequent surveys, approaching different respondents in each survey, and results are found to be robust over time.

Overall, we think that the survey based measure of arrears has the potential of providing important insights; in particular, as the survey includes covariates which are otherwise unobservable (as for example risk preferences, attitudes, and expectations). Finally, a particular value added of our data is that the survey elicits information on the reasons behind late loan repayments.

## 4. Empirical Strategy

Our aim is to model the probability that a respondent is in arrears on loan repayments. As arrears are only observed for respondents with a loan (either in local or in foreign currency), we have to account for sample selectivity. Therefore, we jointly estimate the probability of having a loan and the probability of arrears (Heckman, 1979). The selection equation accounts for the incidence of a loan in local or foreign currency,

$$P(L=1) = \Phi_L(\mathbf{X}_L \boldsymbol{\beta}_L + u_L),$$ (1)

whereas the outcome equation accounts for whether the respondent has been in arrears on loan repayments over the last 12 months, given that he/she has a loan,

$$P(A=1 \mid L=1) = \Phi_A(\mathbf{X}_A \boldsymbol{\beta}_A + u_A).$$ (2)

---

[1] Barisitz (2011) documents the corresponding harmonization problems.

[2] As comparison with aggregate data is difficult, we also attempt to compare Euro Survey results on the level of arrears with those from a survey conducted by the EBRD (LiTS of 2010) which included a question on loan arrears. In general, the Euro Survey finds a higher incidence of arrears than LiTS. However, the LiTS question only refers to mortgages and the number of observations is very low for some countries. Moreover, the question only enquires about current arrears whereas the Euro Survey refers to arrears over the past twelve months.

It is assumed that the error terms are normally distributed, $u_L \sim N(0,1), u_A \sim N(0,1)$, with correlation $\mathrm{corr}(u_L, u_A) = \rho$. For identification, the selection equation has to include variables which are correlated with the probability that the respondent has a loan but not with the probability of arrears.

Duygan-Bump and Grant (2009) note that it is difficult to find strong instruments as banks will offer loans to households only after analyzing their ability to repay which somewhat restricts the applicability of selection models to arrears. Admittedly, we will not be able to completely solve this problem, however, due to our very particular sample of countries we argue that the selectivity arising from banks selecting borrowers is somewhat limited. In particular, in transition countries the banking sector has undergone an extreme transformation (Kemme, Schoors and Vander Vennet, 2008). On the one hand, these countries were underbanked and throughout the past decade banks have contested this growing market. On the other hand, state owned banks were privatized and Western European banks took over a predominant share of these markets (Beck and Brown, 2011). Both developments have led to a situation where banks competed intensively for market shares. Traditional credit scoring models do not perform well in economies where people have low savings but income and credit demand is dynamically growing. The tight bank competition implies that loan demand plays a more important role than loan supply in these countries in comparison to developed economies. This was further strengthened by less developed or less experienced bank regulations in some CEECs.

For the identification, we therefore rely mainly on variables which describe demand for loans. One such variable is the subjective distance to banks which is a strong predictor of demand for bank products (Stix, 2012). Additionally, we include a measure of ownership of a bank account which signals both access to bank products and a history of a longer bank relationship. In some countries, a sizeable share of respondents do not have a transaction account which renders it difficult for banks to observe respondents' income history.[3] Moreover, we account for the number of persons living in the household as the presence of children is likely to indicate investment needs.

---

[3] We assume that accounts, once opened, are held for a longer time period. We do not have direct information on length of bank account tenure.
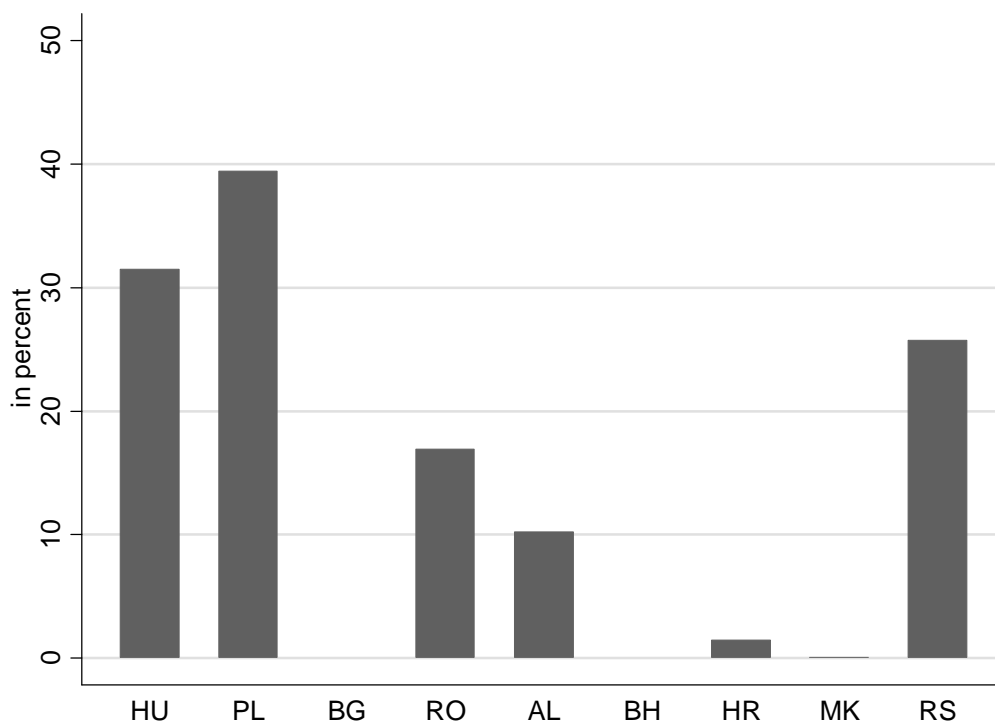
Figure 2: Maximum Cumulative Depreciation versus Non-Depreciation

Notes: The figure shows the maximum cumulative exchange rate depreciation since 2008 for local currencies against the euro or weighted exchange rates. For those countries where the share of Swiss franc loans in total foreign currency loans is above 80% (Hungary and Poland) both depreciation against the euro and the Swiss franc are calculated and weighted by the share of Swiss franc and euro loans in total foreign currency loans.
Country abbreviations: Hungary (HU), Poland (PL), Bulgaria (BG), Romania (RO), Albania (AL), Bosnia and Herzegovina (BH), Croatia (HR), Former Yugoslav Republic of Macedonia (MK), Serbia (RS).
Depreciation countries: Hungary, Poland, Romania, Albania, Serbia
Non-depreciation countries: Bulgaria, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia.
Source: National Central Banks, own calculations.

Unfortunately, our surveys do not include a question whether households were discouraged to apply for credits (Brown, Ongena, Popov and Yesin, 2011) which could be taken as a proxy for supply factors. Nevertheless, we observe risk aversion which could be interpreted as a proxy measure for banks' assessment of customers' ability to repay, i.e. whether banks are able to identify risky customers. Although risk aversion does not *per se* have a theoretical justification as an instrument and we, therefore, include it both in the selection and outcome equation, it is insignificant in nearly all outcome equations. This is in line with Guiso, Sapienza and Zingales (2012) who also find no impact of risk aversion on mortgage defaults in the USA. Therefore, risk aversion contributes to identifying the model.

## 5. Estimation Results

We apply the two-stage Heckman selection approach with standard errors clustered at the regional level. The literature has identified institutional differences across countries as influencing debt repayment behavior. We control for these differences by including country effects which shifts the focus of analysis to interpersonal differences.

One other heterogeneity across countries refers to exchange rate regimes. The local currencies of Albania, Hungary, Poland, Romania and Serbia depreciated against the euro or the Swiss franc by 10 to 40 percent in the wake of the 2008 financial crisis (Figure 2), although exchange rates partially recovered later. It is evident that households with foreign currency loans will be particularly affected by depreciations although concurrent domestic economic developments with respect to income growth, inflation and interest rates, etc. might affect all loan holders. In turn, however, countries with a *de-facto* fixed exchange rate regime could have been forced to increase interest rates to defend their peg which would affect all loan holders. To account for these differences, we estimate separate specifications for countries with recent depreciations and for countries with *de-facto* fixed exchange rates.

In the interest of brevity, we focus our discussion on the determinants of household arrears and only briefly discuss the selection equation. We use the same baseline specification throughout the paper. To arrange the presentation of our results in a clear and succinct way, we do not include the selection equation for each specification.

### 5.1 Determinants of Household Indebtedness

Table 1 presents the results concerning the determinants of loans. As the data do not contain information on loan applications and rejections of loan applications we cannot strictly distinguish whether a particular coefficient represents a supply or a demand effect, calling for some caution when interpreting results. Therefore, we focus the discussion of findings mainly on the identification variables.

We find a strong and significant effect of the size of the household: families are more likely to have loans than single person households; the effect increases with household size. *Bank account* is highly significant and robust for all specifications. The effects are important also in economic terms. The likelihood that respondents with a bank account have a loan is higher by 11 percentage points compared to persons without a bank account. This contrasts with the observed share of respondents with loans which ranges from 25 to 32 percent (depending on the specification). Another loan demand

indicator can be seen in *distance to banks*, which is negative and significant. The respective point estimate implies that households who assess the distance to the next bank as far are by around 4 percentage points less likely to have a loan than households who say that the next bank is close.[4] While the effect of distance is negative both for depreciation and non-depreciation countries, this variable is insignificant for the latter group. *Risk aversion* has a positive and highly significant effect on loans. Results imply that highly risk averse persons are by up to 12 percentage points more likely to have a loan compared to persons accepting risk easily (that is, comparing the risk aversion of 6 and 1, respectively).

With regard to other socio-demographic variables, we find that income is not robustly related to loans, which confirms that low income households also have access to credit (Hainz and Nabokin, 2009, Brown, Ongena, Popov, and Yeşin, 2011). Households with a higher level of education more frequently have loans, possibly indicating the importance of financial literacy, but the effects are not robust for country groups.[5] *Age* has non-linear (hump-shaped) effects. Not surprisingly, unemployed respondents are less likely to have a loan. No significant and robust effects, in the sense of a comparison across all three specifications, can be detected for the remaining demographic variables, including *remittances*, *income in euro*, *retired*, *head of household* and gender (*female*).

Overall, while results indicate that our identification variables are useful, we cannot say much about supply effects. In some countries, anecdotal evidence suggests that loan practices have been very loose due to a strong competition for market shares and optimistic growth expectations on the side of banks. The specification controls for these (mainly) country specific effects by including country dummies. However, the fact that country dummy results are conflated with other effects prevents making profound statements about such effects.

Table 1 about here

---

[4] This corresponds to the coefficient multiplied with the difference between the minimum and maximum value of the distance variable, that is, 0.007 times 5.

[5] Note that we control directly for income in the estimation, which is correlated with education.

## 5.2 Socio-Demographic Determinants of Arrears

Table 2 presents our basic analysis of the determinants of arrears. We can see that households with *high income* are less likely to be in arrears, but the income effect diminishes for countries where the local currency did not depreciate. Furthermore, respondents with *high education* are less likely to be in arrears. There are several potential interpretations for this effect, among them financial literacy and the stronger resilience of higher human capital individuals to income or labor market shocks. Age has again non-linear (diminishing) effects on the probability of arrears. The remaining demographic variables are insignificant in almost all specifications. Finally, we find a positive and significant correlation between the error terms of the selection and the outcome equations, indicating that a higher than predicted likelihood of having a loan is associated with a higher than predicted likelihood of arrears.

## 5.3 Foreign Currency Loans and the Impact on Arrears

As our main focus is on the impact of foreign currency loans (*FC loan*) on the probability of arrears, the first specification in Table 2 includes a dummy variable whether a household has a foreign or domestic currency loan. We find a small positive effect of 1.6 percentage points which is not significant. This result is not surprising because the inherent risk in foreign currency loans is realized only in the case of a major depreciation. However, the dummy *depr countries* indicates that the probability of being in arrears is 12 percentage points higher in countries which experienced depreciation. Therefore, the last two columns present the same analysis for the subsamples of depreciation and non-depreciation countries, respectively. We can see that the probability of arrears associated with foreign currency loans is virtually zero in the group of non-depreciation countries. It is only slightly larger (3.9 percentage points) for depreciation countries and significant.

As an alternative to splitting the sample, the second column in Table 2 compares the effects of foreign currency loans in depreciation and non-depreciation countries and local currency loans in depreciation and non-depreciation countries, including three dummy variables (the omitted category comprises local currency loans in non-depreciation countries). This specification provides evidence which is in line with the previous findings, indicating that results are not sensitive to the sample size: (i) the

14

incidence of arrears is about 4.1 percentage points higher[6] for foreign currency loans than for domestic currency loans in depreciation countries,[7] whereas (ii) no significant difference is observed in non-depreciation countries. Moreover, this specification reveals that foreign currency loan holders in depreciation countries are 13.5 percentage points more likely to be in arrears than foreign currency loan holders in non-depreciation countries.

Importantly, the results also show that a higher incidence of arrears in depreciation countries does not only apply to foreign currency loans but also to local currency loans. Holders of local currency loans in depreciation countries have a 9.4 percentage points higher likelihood of arrears than holders of such loans in non-depreciation countries. The relatively small difference between local and foreign currency loan holders in depreciation countries and the finding that arrears on both local *and* foreign currency loans are higher in deprecation countries than in non-depreciation countries highlight the importance of macroeconomic conditions for financial vulnerability. Volatile and uncertain economic developments which are observed in countries with major depreciations seem to be responsible for a large part of arrears in these countries.


Table 2 about here



### 5.4 Mortgages and Consumption Loans

One possible caveat in the above analysis is that the data do not contain information on the outstanding loan amount and maturity. This could bias results if large and long-term loans are predominantly denominated in foreign currency while small and short-term loans are predominantly denominated in local currency, or vice versa. To limit this possible source of bias we utilize information on the type of the loan, i.e. whether a loan is a mortgage or a consumption loan.

---

[6] This can be inferred from the difference between the respective coefficients (0.135 and 0.094).

[7] Note that we analyze only the incidence of arrears without accounting for the actual size of loans. In value terms, the impact could be larger if, for example, mortgage loans in foreign currency were substantially larger than mortgage loans in local currency. Against this presumption, EBRD (2011) provides evidence that the size of mortgages does not significantly differ with respect to the currency denomination.

Table 3 (column 1) presents the results for mortgages.[8] We find that the main results remain unchanged qualitatively (compared with Table 2, column 2). However, we can also see that in depreciation countries the difference between foreign currency loans and local currency loans is somewhat larger (6.5 percentage points[9]) than for all loans. Thus, the importance of macroeconomic volatility is even higher for mortgages than for other loans.

In columns 2 to 4 of Table 3 we compare consumption and mortgage loans (local currency mortgages are taken as the base category). In general, consumption loans are considered as riskier than mortgages because borrowers have to provide better collateral for mortgages. In line with this conjecture, column 2 shows that local currency consumption loans are significantly riskier (3.7 percentage points) than local currency mortgages (the base category). However, this does not hold if the loan is denominated in foreign currency. In this case, the marginal effect for mortgages is even slightly higher (1.2 percentage points) than for consumption loans.


Table 3 about here


## 5.5 Impact of Macroeconomic Shocks

The previous results establish that (i) loan arrears are higher in depreciation countries than in non-deprecation countries and (ii) that this holds both for foreign currency *and* local currency loans. This suggests that the observed difference between depreciation and non-depreciation countries is not only caused by exchange rate shocks but also by other unfavorable economic developments.

One attempt to compare the impact of exchange rate with the effects of other macroeconomic variables is to directly control for macroeconomic variables in our model. Table 4 includes as separate regressors the maximum cumulative exchange rate depreciation since fall 2008, the maximum output drop since fall 2008 and inflation performance.

---

[8] The socio-demographic determinants of arrears do not change much across specifications. For clarity, we do not present results on the socio-demographic determinants of arrears in detail in the following specifications (Tables 3 to 4). The detailed results are available upon request.

[9] This can be inferred by the difference between respective coefficients (0.197 and 0.132).

However, we have to keep in mind that it is difficult to combine macroeconomic and microeconomic data. This is especially true if the time dimension is very short, as in our case (three surveys). The previous attempts in the literature showed that macroeconomic variables tend to be insignificant (Brown, Ongena and Yeşin, 2011, Brown and De Haas, 2011, Fidrmuc, Hake, and Stix, 2012). This is caused by the correlation of macroeconomic variables with fixed and time effects. Therefore, Brown, Ongena and Yeşin (2011) recommend specifications without country fixed effects. We follow this recommendation and include fixed effects only in the selection equation, which does not include macroeconomic variables. We also exclude time effects from the output specification because of the short time dimension.

Despite these limitations, we find that exchange rate depreciations increase the likelihood of arrears both for local and foreign currency loans, with a stronger effect for the latter. The corresponding coefficients imply that a depreciation of 1 percent causes a general increase of arrears by 0.11 percentage points and an additional increase of arrears by 0.13 percentage points. The average observed depreciation in depreciation countries of about 25 percent translates into an increased probability of arrears on local currency credits by 2.7 percentage points and on foreign currency loans by 5.9 percentage points.

Moreover, columns 2 and 3 indicate that lower GDP growth performance and higher inflation are also associated with a higher rate of arrears. However, it is interesting to note that GDP does not specifically impact foreign currency loans. This supports our conjecture that unfavorable economic developments play an important role for all loans. Finally, inflation performance has insignificant effects on arrears.

However, the low number of cross-sectional observations (our sample consists of only 9 countries) in combination with the fact that the macroeconomic variables show little time variation across the three survey waves does not allow us to include all macroeconomic variables into one specification and hence to quantify the impact of exchange rate changes relative to those of other macroeconomic variables. For the same reason, we stress that the results in Table 4 are not very robust and should be treated with caution.


Table 4 about here
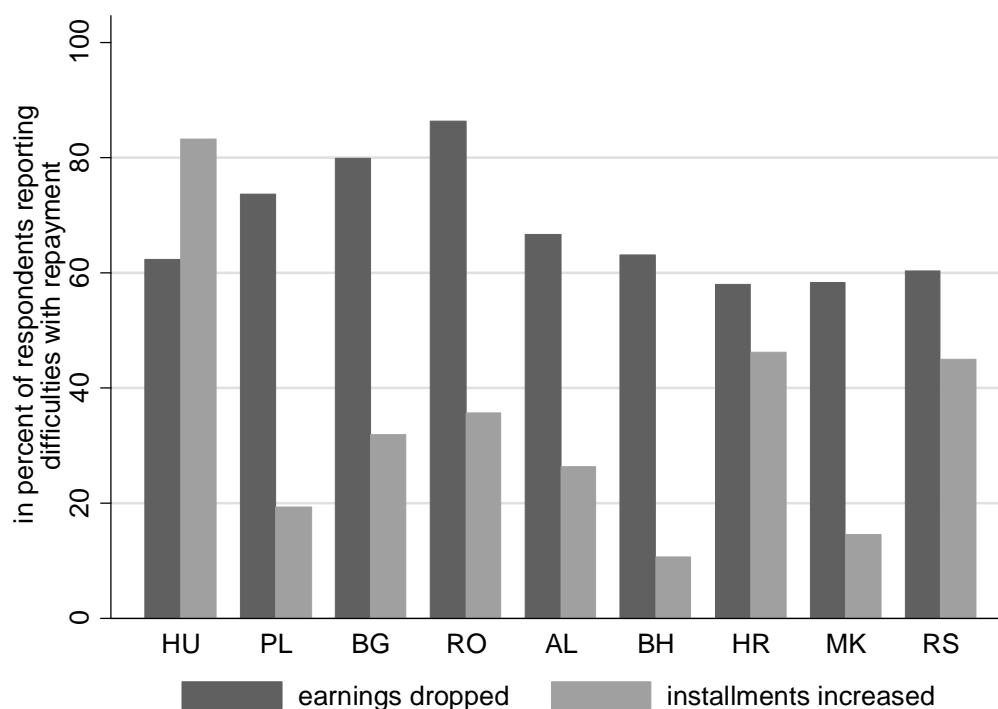
Figure 3: Reasons for Financial Difficulties, Fall 2010 to Fall 2011

Notes: The figure shows the average percentage of respondents who cite that earnings dropped or that installments increased as a reason why they find it more difficult to repay their loan in the wake of the financial crisis (multiple answers were possible). Source: OeNB Euro Survey.

## 5.6 Income and Installment Shocks

The survey data allows us to approach the issue of macroeconomic shocks from a different angle. A distinctive asset of the Euro Survey is that households have been asked whether they find it more difficult to pay back their loan as a result of the economic and financial crisis. Moreover, respondents were asked whether difficulties are due to higher installments, lower earnings or other reasons.

Figure 3 reveals that, on average, the most important reason for financial difficulties can be seen in decreased earnings. However, there are also pronounced country differences: Hungary is the only country where increased installments are cited more frequently than decreased earnings. In Croatia and Serbia increased installments come close to decreased earnings. In all other countries, decreased earnings dominate.

We utilize this information to study how these shocks affect arrears and how they interact with the currency denomination of loans (Table 5).[10] We hypothesize that income shocks are responsible for the finding that local currency loan delinquencies are higher in depreciation countries than in non-depreciation countries (column 1). In column 2 we therefore add *earnings dropped* which indicates that respondents cite this reason for financial difficulties. In line with our hypothesis, the effect of local currency loans in depreciation countries gets insignificant.[11] Next, we test whether higher arrears of foreign currency loans reflect increased installments after a major depreciation. Therefore, we include *installments up* in column 3. This renders the impact of FC loans in depreciation countries insignificant.

Table 5 about here

Alternatively and as a robustness check, the survey contains another indicator for an earnings shock, i.e. a dummy for households whose job was affected by the financial crisis. Due to the relationship of this variable to the respondent's job, the impact of *shock to job* is likely to be more severe than dropped earnings. The corresponding results in column 4 are similar to those in column 3. This provides some evidence that large income shocks are more important than installment shocks.

### 5.7 Hedging Factors

While depreciations represent a shock for the majority of households, they do not affect foreign currency borrowers with income in foreign currency. For local currency borrowers with income in foreign currency depreciations might even be a source of

---

[10] First respondents are asked about financial difficulties and then about the reasons for these difficulties, with three possible answers "installments have increased", "income has dropped" or "for other reasons" (multiple answers were allowed). Independently, respondents are asked about whether they are in arrears. Only a fraction of loan holders in difficulties report to be in arrears. Therefore, we restrict the sample in Table 5 to respondents who find it more difficult to pay back their loan which applies to about 71% of loan holders. To facilitate comparability, we repeated the benchmark regression in column 1 of Table 4 for this particular sample.

[11] Moreover, the coefficient for foreign currency loans in depreciation countries gets smaller (column 2 in comparison to column 1). This reflects that some foreign currency loan holders in depreciation countries are also affected by dropped earnings and increased installments as reasons for their financial difficulties.

windfall gains. Consequently, it is often argued that foreign currency loans should only be offered to households with income flows in foreign currency. The previous literature looked especially at remittances (Rosenberg and Tirpák, 2009). However, the relationship between remittances and arrears may be ambiguous. On the one hand, remittances may provide a more or less stable flow of foreign currency income which could be used for the repayment of foreign currency loans. However, remittances may be difficult to document to a bank. On the other hand, households in financial difficulties may be more likely to receive financial help from their relatives from abroad. Then remittances may be a result of arrears.

In order to avoid the endogeneity problems associated with remittances, we analyze whether income in foreign currency lowers the probability of arrears. Table 6, column 2, reveals that foreign currency borrowers with income in euro have slightly lower rates of arrears than those without income in euro. The difference, however, is not statistically significant. This does not change if we analyze only depreciation countries. We conclude that foreign currency borrowers who have income in euro are not less likely to be in arrears with a warranted degree of caution. We neither have information on the share of income which is denominated in euro nor on the loan amount. It could be that foreign currency borrowers with income in euro also have smaller loans. However, we found the same negligible effects of euro income also for mortgage borrowers.[12]

At the same time, we also do not want to completely disregard the finding because our results indicate one very plausible effect. Households with a local currency loan and income in euro are likely to benefit from depreciation. This is confirmed by our estimations as such households' arrears are lower by 19.6 percentage points.


Table 6 about here


## 5.8 Institutions and Trust

One of our central findings is that households in countries which experienced depreciations have higher arrears both for local and for foreign currency loans than

---

[12] Given the low number of mortgages, the results for this subsample are questionable and we do not report them here. They are available upon request from the authors.

households in countries with stable exchange rates. One possible caveat regarding this result is that it is not depreciations *per se* but other institutional differences which are correlated with depreciations that drive this result. If this was the case, the previous analysis would overvalue the impact of depreciations.

We tackle this issue with two checks. First, we repeat regressions for eight different country samples, leaving out one country at a time. Results show that our findings are not driven by a single country.

Second, and more substantive, we check whether differences in the institutional quality drive results. Property rights and the enforcement of rules are crucial for well-functioning markets (Ostrom, 1998). This is especially important for transition economies where new institutions were created (Raiser, Rousso, Steves and Teksoz, 2008). Ranciere, Tornell and Vamvakidis (2010) view the general expectations of bailout policies (including not only bailouts of banks but also the retention of unsustainable exchange rate pegs) as one of the major motivations for foreign currency borrowing. While bailouts were not promised *ex ante*, several CEECs have provided funds to banks during the recent financial turmoil. Moreover, IMF programs and international coordination (e.g. Vienna Initiative) can be viewed as specific bailout policies. In turn, such policies might have repercussions on borrowers.

To account for the enforcement of rules, we employ an index of the strength of legal rights in the credit market collected by the World Bank. Similarly to our analysis of depreciation effects on foreign currency loans, we define country groups according to whether they are characterized by strong or by weak legal quality.[13] In Table 7 column 1, we interact information about the currency denomination of the loan with this indictor rather than with information on depreciations. If institutional differences and not observed behavior of the exchange rate drive results, then we should observe the same pattern of results as in Table 2. Reassuringly, the regression shows that none of the interacted variables are significant which excludes the possibility that results are driven by differences between countries in legal enforcement.

---

[13] The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending (cf. World Bank, www.doingbusiness.org). It ranges from 0 to 10 (in our sample from 5 to 9). Countries with an index below 8 are defined as weak legal right index countries (Bosnia and Herzegovina, Croatia, FYR Macedonia, Hungary).

Institutional differences might not only depend on measurable characteristics of institutions but also on subjective assessments. For example, the enforceability of legal rights also depends on whether lenders or borrowers trust the court system to resolve legal disputes. We utilize information about regional differences in how much people trust the court system to check whether this affects our findings (column 2).[14] The respective coefficient is not significant, while the remaining variables are unaffected, qualitatively.

Table 7 about here

Finally, we utilize direct information on the level of trust of respondents in selected institutions collected by the Euro Survey (column 3). In particular, we interpret trust in police as a proxy for trust in legal enforcement. In line with expectations, we find that trust in the police significantly lowers the probability of arrears. Moreover, we include a measure for trust in government. If this variable is interpreted as a measure of whether agents expect the government to bail out foreign currency debtors, then the bailout hypothesis would suggest a positive coefficient. Table 7, however, shows that trust in government lowers the probability of arrears by 3.7 percentage points.[15] Both results remain unchanged if we also include the regional measure of trust in the court system according to LiTS. As before, the results for depreciations remain largely robust also in this sensitivity analysis.

## 5.9 Robustness Analysis

We check the sensitivity of our analysis in several ways. As argued, the share of households who report at least one occasion of arrears over the past 12 months is quite high whereas this share drops considerably if we analyze only households who were in arrears twice or more during the same time period. To test whether our results depend on the way arrears are defined we employ the stricter definition of arrears as the

[14] This variable is taken from the Life in Transition Survey 2006 of the EBRD (EBRD, 2007). For a detailed definition, see Table A.2 in the Appendix.

[15] As this effect could be biased by reverse causality, we draw this conclusion with some caution.

dependent variable (Table 8), which includes only households who were in arrears twice or more. The corresponding results confirm the robustness of our main findings.

Table 8 about here

Another possible drawback of our analysis is that we cannot control for financial wealth. To account for this we include several proxies for wealth in Table 9 showing that households owning a house or a car have a lower probability of being in arrears. The coefficients for owning a secondary residence has the expected sign but is insignificant. As these wealth variables are available only for the last survey in fall 2011, Table 9 presents the results for specifications with and without wealth variables.[16] The results of all specifications show that the inclusion of proxies for wealth does not affect our main conclusions regarding the differential impact of foreign currency loans in depreciation and non-depreciation countries.

Table 9 about here

Finally, we adjusted the standard errors in column 2 of Table 2 for clustering at the country level and at the level of the primary sample unit, respectively. Moreover, we included regional dummies instead of country dummies. None of these modifications affect our results, qualitatively.

## 6. Conclusions

Using data from household surveys in nine CEECs we study the determinants of households' arrears on loans and analyze whether foreign currency loans increase the financial vulnerability of these economies.

We confirm that the impact of foreign currency borrowing on financial vulnerability is non-negligible. However, and not surprisingly, households with foreign currency loans are more prone to be in arrears only in depreciation countries, increasing arrears

---

[16] For comparison, we present the main specification for the survey of fall 2011 in column 1. We can see that the probability of arrears is somewhat higher for this survey than for the whole sample (see Table 2, column 2).

by 4.1 to 6.5 percentage points. This contrasts with our finding that loan delinquency rates are, on average, substantially higher in countries that experienced depreciations than in countries that maintained stable exchange rates. Notably, this holds both for foreign currency *and* for local currency loans: the difference between these two country groups is 14 and 9 percentage points for foreign and for local currency loans, respectively. This suggests that adverse economic conditions in times of large depreciations exert a stronger impact on loan delinquency rates than the direct effect which works through foreign currency loans.

To delve further into this issue, we utilize information provided by survey respondents about the reasons for their financial difficulties and show that income shocks are more important than installment shocks in the majority of countries. Moreover, we provide evidence that higher loan delinquency rates of local currency loans in depreciation countries can be traced to income shocks. This leads us to conclude that high rates of arrears among households in CEECs are caused to a significant extent by adverse income shocks and that these shocks exert a more important impact than installment shocks.

Our analysis uncovers some aspects which have not been analyzed in previous research, but should be viewed bearing in mind the shortcomings of our data. In particular we have undertaken a positive analysis describing how the incidence of arrears is affected by the currency denomination of loans. As such we cannot say whether the relatively moderate effect of foreign currency loans is due to the inherent risk structure of such loans or whether banks have been cautious when granting foreign currency loans. Nevertheless, we can draw some policy conclusions. The finding that income shocks are more frequent than installment shocks in deprecation countries calls for more attention regarding the general income situation of households. Extending the maturity of loans could be one remedy not only for borrowers who are affected by higher installments on foreign currency loans but also for local currency borrowers. Moreover, the relative dominance of income shocks implies that recent attempts to regulate foreign currency lending alone are not sufficient to stabilize the financial developments in these countries.

**References**

Aron, Janine and John Muellbauer (2010), 'Modelling and forecasting UK mortgage arrears and possessions', Centre for Economic Policy Research Discussion Paper 7986.

Bajari, Patrick, Chenghuan Sean Chu and Minjung Park (2008), 'An empirical model of subprime mortgage default from 2000 to 2007', National Bureau of Economic Research Working Paper No. 14625.

Basso, Henrique S., Oscar Calvo-Gonzales and Marius Jurgilas (2011), 'Financial dollarization and the role of foreign-owned banks and interest rates'. *Journal of Banking and Finance* 35(4), 794-806.

Beck, Thorsten and Martin Brown (2011), 'Which households use banks? Evidence from the transition economies', ECB Working Paper No. 1295.

Böheim, Rene and Mark P. Taylor (2000), 'My home was my castle: Evictions and repossessions in Britain', *Journal of Housing Economics* 9(4), 287–319.

Brown, Martin, and Ralph de Haas, (2012), 'Foreign banks and foreign currency lending in emerging Europe.' Economic Policy 69, 57-98.

Brown, Martin and Philip R. Lane (2011), 'Debt overhang in emerging Europe?', World Bank Policy Research Working Paper No. 5784.

Brown, Martin, Steven Ongena, Alexander Popov and Pinar Yesin (2011), 'Who needs credit and who gets credit in Eastern Europe?', *Economic Policy* 26(65), 93–130.

Brown, Martin, Steven Ongena and Pinar Yesin (2011), 'Currency denomination of bank loans: evidence from small firms in transition countries', *Journal of Financial Intermediation* 20(3), 285–302.

Calvo, Guillermo A. and Carmen M. Reinhart (2002), 'Fear of floating', *The Quarterly Journal of Economics* 117(2), 379–408.

Campbell, John Y., Tarun Ramadorai and Benjamin Ranish (2012), 'How do regulators influence mortgage risk? Evidence from an emerging market'. National Bureau of Economic Research Working Paper No. 18394.

Campos, Nauro F. and Fabrizio Coricelli (2002), 'Growth in transition: What we know, what we don't, and what we should', *Journal of Economic Literature* 40(3), 793–836.

Dewatripont, Mathias and Eric Maskin (1995), 'Credit and efficiency in centralized and decentralized economies', *Review of Economic Studies* 62(4), 541–55.

Duygan-Bump, Burcu and Charles Grant (2009), 'Household debt repayment behaviour: What role do institutions play?', *Economic Policy* 24(57), 107–140.

EBRD (2007), 'Life in transition survey', European Bank for Reconstruction &

Development, http://www.ebrd.com/pages/research/publications/special/transition. shtml (accessed on October 15, 2012).

EBRD (2011), The crisis from the household perspective, *in* 'Transition Report 2011', European Bank for Reconstruction & Development, pp. 44–59.

Fay, Scott, Erik Hurst and Michelle J. White (2002), 'The household bankruptcy decision', *American Economic Review* 92(3), 706–718.

Fernández-Arias, Eduardo (2006), 'Financial dollarization and dedollarization', *Economía* 6(2), 37–100.

Fidrmuc, Jarko and Christa Hainz (2010), 'Default rates in the loan market for SMEs: Evidence from Slovakia', *Economic Systems* 34(2), 133–147.

Fidrmuc, Jarko, Mariya Hake and Helmut Stix (2012), 'Households' foreign currency borrowing in Central and Eastern Europe', forthcoming in *Journal of Banking and Finance*.

Gross, David B. and Nicholas S. Souleles (2002), 'An empirical analysis of personal bankruptcy and delinquency', *Review of Financial Studies* 15(1), 319–347.

Guiso, Luigi, Paola Sapienza and Luigi Zingales (2012), 'The determinants of attitudes towards strategic default on mortgages', forthcoming in *Journal of Finance*.

Hainz, Christa and Tatjana Nabokin (2009), 'Access to versus use of loans: What are the true determinants of access?', Proceedings of the German Development Economics Conference, Frankfurt a. M. 2009.

Heckman, James J. (1979), 'Sample selection bias as a specification error', *Econometrica* 47(1), 153–61.

Kemme, David M., Koen Schoors and Rudi Vander Vennet (2008), 'Risk, regulation and competition in banking and finance in transition economies', *Comparative Economic Studies* 50(2), 210–216.

Levy Yeyati, Eduardo (2006), 'Financial dollarization: Evaluating the consequences', *Economic Policy* 21(45), 61–118.

May, Orla and Merxe Tudela (2005), 'When is mortgage indebtedness a financial burden to British households? A dynamic probit approach', Bank of England Working Paper No. 277.

Ostrom, Elinor (1998), 'A behavioral approach to the rational choice theory of collective action', *The American Political Science Review* 92(1), 1–22.

Stix, Helmut (2012), 'Why do people save in cash? Distrust, memories of banking crises, weak institutions and dollarization', Oesterreichische Nationalbank Working

Paper No. 178.

Raiser, Martin, Alan Rousso, Franklin Steves and Utku Teksoz (2008), 'Trust in transition: Cross-country and firm evidence', *Journal of Law, Economics and Organization* 24(2), 407–433.

Ranciere, Romain, Aaron Tornell and Athanasios Vamvakidis (2010), 'Currency mismatch, systemic risk and growth in emerging Europe', *Economic Policy* 25, 597–658.

Roland, Gérard (2000), *Transition and Economics: Politics, Markets, and Firms*, The MIT Press, Cambridge.

Rosenberg, Christoph and Marcel Tirpák (2009), 'Determinants of foreign currency borrowing in the new member states of the EU', *Czech Journal of Economics and Finance* 59(3), 216–228.

Vojtek, Martin and Evzen Kočenda (2006), 'Credit-scoring methods', *Czech Journal of Economics and Finance* 56(3-4), 152–167.

Zettelmeyer, Jeromin, Piroska M. Nagy and Stephen Jeffrey (2011), Addressing private sector currency mismatches in emerging Europe, in M. Kawai and E. Prasad, eds, 'Financial Market Regulation and Reforms in Emerging Markets', Brookings Institution Press, Washington, pp. 365–405.

## Table 1: Household Indebtedness (Selection Equation)

| | dependent variable: *loan* | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| sample | all countries | depreciation countries | non-depreciation countries |
| bank account | 0.114*** | 0.110*** | 0.114*** |
| | (0.016) | (0.021) | (0.024) |
| distance to bank | -0.007** | -0.013*** | -0.002 |
| | (0.003) | (0.004) | (0.004) |
| 2 person HH | 0.055*** | 0.062*** | 0.044 |
| | (0.016) | (0.020) | (0.028) |
| 3+ person HH | 0.114*** | 0.106*** | 0.119*** |
| | (0.016) | (0.021) | (0.024) |
| risk aversion 1/6 | 0.018*** | 0.012** | 0.024*** |
| | (0.004) | (0.005) | (0.005) |
| high income | 0.040*** | 0.020 | 0.069*** |
| | (0.015) | (0.016) | (0.023) |
| medium income | 0.030*** | 0.015 | 0.052*** |
| | (0.011) | (0.015) | (0.014) |
| dk / na income | -0.001 | -0.029 | 0.037 |
| | (0.015) | (0.018) | (0.023) |
| no savings | -0.015 | -0.036*** | 0.005 |
| | (0.013) | (0.014) | (0.022) |
| education high | 0.048*** | 0.047*** | 0.040 |
| | (0.014) | (0.016) | (0.027) |
| education medium | 0.042*** | 0.022* | 0.063*** |
| | (0.012) | (0.011) | (0.021) |
| age | 0.322*** | 0.298*** | 0.357*** |
| | (0.022) | (0.025) | (0.037) |
| age squared | -0.037*** | -0.035*** | -0.040*** |
| | (0.002) | (0.003) | (0.004) |
| head of household | 0.017 | 0.007 | 0.027* |
| | (0.010) | (0.012) | (0.016) |
| female | 0.012 | 0.005 | 0.021* |
| | (0.008) | (0.010) | (0.011) |
| self-employed | 0.026* | 0.036* | 0.012 |
| | (0.014) | (0.019) | (0.019) |
| unemployed | -0.064*** | -0.048*** | -0.076*** |
| | (0.012) | (0.018) | (0.015) |
| retired | -0.010 | -0.001 | -0.016 |
| | (0.012) | (0.016) | (0.020) |
| receives remittances | 0.018 | 0.030* | 0.004 |
| | (0.015) | (0.016) | (0.023) |
| income in euro | -0.015 | 0.033 | -0.056* |
| | (0.026) | (0.029) | (0.033) |
| country & time dummies | yes | yes | yes |
| Log-L | -10475.4 | -5281.7 | -5159.8 |
| N | 19420 | 10313 | 9107 |
| P(DepVar=1) | 0.28 | 0.25 | 0.32 |
| PseudoR2 | 0.10 | 0.10 | 0.09 |

The dependent variable is a dummy variable that takes the value of one if the household has a loan either in local or in foreign currency. P(DepVar=1) denotes the sample probability of this event. Coefficients report the average marginal effect. *t*-statistics are adjusted for clustering at the regional level, ***, **, and * denote significance at the 1%, 5%, and 10% level. Results present selection equations for Table 2 as identified by the sample in each column.

28

## Table 2: Determinants of Arrears

| | dependent variable: *arrears* | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| sample | all countries | all countries | depreciation countries | non-depreciation countries |
| FC loan | 0.016 | | 0.039*** | -0.021 |
| | (1.064) | | (2.603) | (-0.692) |
| depr countries | 0.122*** | | | |
| | (3.624) | | | |
| LC loan * depr | | 0.094** | | |
| | | (2.412) | | |
| FC loan * depr | | 0.135*** | | |
| | | (3.658) | | |
| FC loan * no depr | | -0.015 | | |
| | | (-0.578) | | |
| *(omitted category: LC loan*no depr)* | | | | |
| | | | | |
| risk aversion 1/6 | -0.009 | -0.009 | -0.006 | -0.017** |
| | (-1.598) | (-1.630) | (-0.846) | (-1.967) |
| high income | -0.067*** | -0.066*** | -0.079*** | -0.051* |
| | (-3.243) | (-3.190) | (-3.074) | (-1.805) |
| medium income | -0.036** | -0.035** | -0.035* | -0.031 |
| | (-2.155) | (-2.108) | (-1.693) | (-1.368) |
| dk / na income | -0.084*** | -0.084*** | -0.100*** | -0.070** |
| | (-3.813) | (-3.805) | (-3.591) | (-2.268) |
| education high | -0.088*** | -0.088*** | -0.070** | -0.112*** |
| | (-3.866) | (-3.883) | (-2.514) | (-3.280) |
| education medium | -0.040** | -0.040** | -0.048** | -0.036 |
| | (-2.092) | (-2.097) | (-2.160) | (-1.174) |
| age | 0.110** | 0.111** | 0.211*** | 0.002 |
| | (2.515) | (2.565) | (6.142) | (0.028) |
| age squared | -0.014*** | -0.014*** | -0.026*** | -0.002 |
| | (-2.835) | (-2.876) | (-6.162) | (-0.185) |
| head of household | -0.006 | -0.006 | 0.002 | -0.024 |
| | (-0.455) | (-0.476) | (0.098) | (-1.330) |
| female | 0.004 | 0.005 | 0.015 | -0.013 |
| | (0.396) | (0.436) | (0.921) | (-0.787) |
| self-employed | 0.012 | 0.011 | 0.019 | 0.014 |
| | (0.581) | (0.557) | (0.686) | (0.451) |
| unemployed | 0.026 | 0.026 | 0.013 | 0.046 |
| | (1.205) | (1.186) | (0.534) | (1.192) |
| retired | -0.018 | -0.017 | -0.007 | -0.018 |
| | (-0.768) | (-0.755) | (-0.266) | (-0.465) |
| income in euro | -0.042 | -0.041 | -0.042 | -0.023 |
| | (-1.264) | (-1.251) | (-1.198) | (-0.381) |
| village | -0.005 | -0.005 | -0.017 | 0.008 |
| | (-0.420) | (-0.374) | (-0.880) | (0.498) |
| time and country dummies | yes | yes | yes | yes |
| Rho | 0.42** | 0.42** | 0.64*** | 0.15 |
| Log-L | -13358.52 | -13354.53 | -6621.554 | -6683.993 |
| N(selection eq.) | 19215 | 19215 | 10143 | 9072 |
| N(outcome eq.) | 5300 | 5300 | 2458 | 2842 |
| P(DepVar=1) | 0.33 | 0.33 | 0.41 | 0.26 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level.

**Table 3: Arrears on Mortgage versus Consumption Loan**

| dependent variable | arrears on mortgage | arrears | arrears | arrears |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| sample | all countries | all countries | depreciation countries | non-depreciation countries |
| LC loan * depr | 0.132*** | | | |
| | (2.793) | | | |
| FC loan * depr | 0.197*** | | | |
| | (4.440) | | | |
| FC loan * no depr | 0.036 | | | |
| | (0.996) | | | |
| *(omitted category: LC loan*no depr)* | | | | |
| | | | | |
| FX consumption loan | | 0.044** | 0.049** | 0.029 |
| | | (2.458) | (2.352) | (0.868) |
| FX mortgage loan | | 0.056*** | 0.056*** | 0.045 |
| | | (3.051) | (2.675) | (1.248) |
| LC consumption loan | | 0.037** | 0.026 | 0.046* |
| | | (2.259) | (1.283) | (1.847) |
| *(omitted category: LC mortgage loan)* | | | | |
| | | | | |
| time and country dummies | yes | yes | yes | yes |
| other controls | yes | yes | yes | yes |
| Rho | 0.29 | 0.42** | 0.64*** | 0.16 |
| Log-L | -5662.93 | -13350.73 | -6618.047 | -6682.348 |
| N(selection equation) | 15616 | 19215 | 10143 | 9072 |
| N(outcome equation) | 1701 | 5300 | 2458 | 2842 |
| P(DepVar=1) | 0.34 | 0.33 | 0.41 | 0.26 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level

**Table 4: Macroeconomic Determinants of Arrears**

| | dependent variable: *arrears* | | |
| --- | --- | --- | --- |
| | (1) | (2) | (3) |
| sample | all countries | all countries | all countries |
| FC loan | 0.001 | 0.002 | 0.016 |
| | (0.057) | (0.141) | (0.890) |
| depr since 2008*FC loan / 100 | 0.129* | | |
| | (1.743) | | |
| depr since 2008 / 100 | 0.110* | | |
| | (1.696) | | |
| GDP growth since 2008*FC loan / 100 | | -0.161 | |
| | | (-0.535) | |
| GDP growth 2008 / 100 | | -0.677*** | |
| | | (-3.224) | |
| inflation*FCloan / 100 | | | -0.131 |
| | | | (-0.335) |
| inflation / 100 | | | 0.503 |
| | | | (1.562) |
| time and country dummies | selection only | selection only | selection only |
| other controls | yes | yes | yes |
| Rho | 0.58*** | 0.80*** | 0.70*** |
| Log-L | -13397.81 | -12274.89 | -13356.46 |
| N(selection equation) | 19215 | 18819 | 19215 |
| N(outcome equation) | 5300 | 5300 | 5300 |
| P(DepVar=1) | 0.33 | 0.33 | 0.33 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level.

**Table 5: Reason for Arrears: Income and Installment Shocks**

| | dependent variable: *arrears* | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| sample | all countries | all countries | all countries | all countries |
| LC loan * depr | 0.094** | 0.044 | 0.014 | 0.016 |
| | (2.412) | (1.177) | (0.359) | (0.341) |
| FC loan * depr | 0.135*** | 0.088*** | 0.044 | 0.055 |
| | (3.658) | (2.630) | (1.187) | (1.265) |
| FC loan * no depr | -0.015 | -0.029 | -0.032 | 0.013 |
| | (-0.578) | (-0.976) | (-1.069) | (0.441) |
| *(omitted category: LC loan*no depr)* | | | | |
| | | | | |
| earnings dropped | | 0.105*** | 0.125*** | |
| | | (6.215) | (6.757) | |
| installments up | | | 0.056*** | |
| | | | (2.858) | |
| shock to job | | | | 0.114*** |
| | | | | (6.491) |
| time and country dummies | yes | yes | yes | yes |
| other controls | yes | yes | yes | yes |
| Rho | 0.42** | 0.49*** | 0.49*** | 0.57 |
| Log-L | -13354.53 | -10065.22 | -10057.99 | -4358.305 |
| N(selection equation) | 19215 | 17453 | 17453 | 6490 |
| N(outcome equation) | 5300 | 3538 | 3538 | 1797 |
| P(DepVar=1) | 0.33 | 0.42 | 0.42 | 0.32 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level

## Table 6: Arrears and Hedging Factors

| | dependent variable: *arrears* | |
| --- | --- | --- |
| | (1) | (2) |
| sample | all countries | depreciation countries |
| FC loan * income in euro | -0.028 | -0.002 |
| | (-0.879) | (-0.064) |
| LC loan * no income in euro | -0.015 | -0.033** |
| | (-1.126) | (-2.484) |
| LC loan * income in euro | -0.072 | -0.196** |
| | (-1.478) | (-1.982) |
| *(omitted category: FC loan*no income in euro)* | | |
| | | |
| time and country dummies | yes | yes |
| other controls | yes | yes |
| Rho | 0.53*** | 0.68*** |
| Log-L | -13360.75 | -6620.556 |
| N(selection equation) | 19215 | 10143 |
| N(outcome equation) | 5300 | 2458 |
| P(DepVar=1) | 0.33 | 0.41 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level

**Table 7: Institutions and Trust**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | | dependent variable: *arrears* | | |
| sample | all countries | all countries | all countries | all countries |
| LC loan * weak legally | 0.026 | | | |
| | (0.789) | | | |
| FC loan * weak legally | 0.035 | | | |
| | (1.079) | | | |
| FC loan * strong legally | 0.025 | | | |
| | (0.760) | | | |
| *(omitted category: LC loan*strong legally)* | | | | |
| | | | | |
| LC loan * depr | | 0.074** | 0.085*** | 0.053* |
| | | (2.339) | (3.842) | (1.837) |
| FC loan * depr | | 0.118*** | 0.125*** | 0.093*** |
| | | (3.651) | (8.376) | (3.183) |
| FC loan * no depr | | -0.004 | -0.015 | -0.006 |
| | | (-0.142) | (-0.457) | (-0.270) |
| *(omitted category: LC loan*no depr)* | | | | |
| | | | | |
| LiTS trust courts | | -0.047 | | 0.002 |
| | | (-0.463) | | (0.025) |
| trust in government | | | -0.037** | -0.042** |
| | | | (-2.110) | (-2.535) |
| trust in police | | | -0.033* | -0.036** |
| | | | (-1.942) | (-2.550) |
| other controls | yes | yes | yes | yes |
| time and country dummies | yes | yes | yes | yes |
| Rho | 0.42** | 0.35** | 0.45** | 0.44*** |
| Log-L | -13358.18 | -13381.35 | -13174.32 | -13198.54 |
| N(selection equation) | 19215 | 19215 | 19127 | 19127 |
| N (outcome equation) | 5300 | 5300 | 5212 | 5212 |
| P(DepVar=1) | 0.33 | 0.33 | 0.33 | 0.33 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level.

## Table 8: Robustness Analysis – Arrears Twice or More

| | dependent variable: *arrears* | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| sample | all countries | all countries | depreciation countries | non-depreciation countries |
| FC loan | 0.010 | | 0.018* | -0.003 |
| | (1.249) | | (1.910) | (-0.131) |
| LC loan * depr | | 0.074*** | | |
| | | (3.564) | | |
| FC loan * depr | | 0.091*** | | |
| | | (4.253) | | |
| FC loan * no depr | | 0.001 | | |
| | | (0.063) | | |
| *(omitted category: LC loan * no depr)* | | | | |
| | | | | |
| time and country dummies | yes | yes | yes | yes |
| other controls | yes | yes | yes | yes |
| Rho | 0.52** | 0.52** | 0.67*** | 0.04 |
| Log-L | -12571.31 | -12570.56 | -6327.079 | -6197.972 |
| N(selection equation) | 19215 | 19215 | 10143 | 9072 |
| N(outcome equation) | 5300 | 5300 | 2458 | 2842 |
| P(DepVar=1) | 0.19 | 0.19 | 0.24 | 0.14 |

The dependent variable is a dummy variable that takes the value one if respondents have been in arrears on loan repayments twice or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. *t*-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level.

**Table 9: Robustness Analysis - Wealth Indicators**

| sample | dependent variable: *arrears* | | | |
|---|---|---|---|---|
| | (1) fall 2011 | (2) fall 2011 | (3) fall 2011 | (4) fall 2011 |
| LC loan * depr | 0.176*** | 0.177*** | 0.169*** | 0.163*** |
| | (4.423) | (3.795) | (4.207) | (4.152) |
| FC loan * depr | 0.194*** | 0.193*** | 0.196*** | 0.178*** |
| | (5.063) | (4.120) | (5.083) | (4.638) |
| FC loan * no depr | -0.044 | -0.043 | -0.043 | -0.045 |
| | (-0.951) | (-0.853) | (-0.906) | (-0.986) |
| *(omitted category: LC loan*no depr)* | | | | |
| | | | | |
| own car | | -0.075** | | |
| | | (-2.091) | | |
| own house | | | -0.141*** | |
| | | | (-3.037) | |
| own secondary residence | | | | -0.026 |
| | | | | (-0.655) |
| country dummies | yes | yes | yes | yes |
| other controls | yes | yes | yes | yes |
| Rho | 0.15 | 0.02 | 0.11 | 0.18 |
| Log-L | -4441.936 | -4384.31 | -4373.559 | -4321.583 |
| N(selection equation) | 6522 | 6435 | 6407 | 6353 |
| N(outcome equation) | 1732 | 1719 | 1712 | 1690 |
| P(DepVar=1) | 0.32 | 0.32 | 0.32 | 0.32 |

The dependent variable is a dummy variable that takes the value of one if respondents have been in arrears on loan repayments once or more during the last 12 months. P(DepVar=1) denotes the sample probability of this event. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the average marginal probability effects. Results for country and time dummies not shown. The reported coefficients are based on a Heckman sample selection probit model, where the selection is households' indebtedness (see Table 1). We employ distance to bank, ownership of a bank account and household size for identification. t-statistics are adjusted for clustering at the regional level and presented in parentheses below coefficients; ***, **, and * denote significance at the 1%, 5%, and 10% level.

**Appendix**

**Table A.1: Data and Variable Description - Dependent Variables**

| Label | Description |
|---|---|
| *arrears* | Dummy variable derived from answers to the question "Has your household been in arrears on loan repayments once or more during the last 12 months on account of financial difficulties? Dummy variable coded as one for answers "Yes, once." and "Yes, twice or more", else zero, missing for respondents who do not have a loan. |
| *arrears twice or more* | Dummy variable derived from question above coded as one for answer "Yes, twice or more", else zero, missing for respondents who do not have a loan. |
| *arrears on mortgage* | Dummy variable derived from answers to the question above, coded as zero for all respondents who state the purpose of their loan is to finance a house or apartment, coded as one for those respondents with a mortgage who have been in arrears on loan repayments, else zero. |

**Table A.2: Data and Variable Description - Explanatory Variables (in alphabetical order)**

| Label | Description |
|---|---|
| *age, age squared* | Age of respondent divided by 10, age squared of respondent divided by 100. |
| *bank account* | Dummy variable; one if a respondent possesses deposits and/or transactions accounts (including wage cards). |
| *consumption loan* | Dummy variable derived from answers to the question "What is the purpose of your loan?" Answers "for consumption goods" "to finance a car" and "for other purposes" are coded as one, zero if respondents states ""to finance a house or apartment". |
| *distance to bank(1/6)* | Derived from answers to the statement "for me, it takes quite a long time to reach the nearest bank branch." Answers are "strongly agree" "agree" "somewhat agree" "somewhat disagree" "disagree" "strongly disagree" Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree"). |
| *earnings dropped* | Dummy variable derived from answers to the question "If you do find it more difficult to pay down your loan. Why is this the case?" Dummy variable is defined only for respondents in arrears on loan repayments and coded as one for those who state they are in arrears because "The earnings of my household dropped." |
| *education (high, medium, low)* | Dummy variables; Degree of education (university level, medium level, and basic education). Omitted category: *education low*. |
| *head of household* | Dummy variable coded as one if the respondent is the head of household. |
| *income (high, medium, dk /na)* | Dummy variable which take value one for each net household income terciles (high, medium, low). Sample values are used to construct terciles. For those respondents who did not give an answer an additional dummy variable is defined (dk / na income). Omitted category: income low. |
| *income in euro* | Dummy variables; one if the respondent regularly receives income in euro. |
| *installments up* | Dummy variable derived from answers to the question "If you do find it more difficult to pay down your loan. Why is this the case?" Dummy variable is defined only for respondents in arrears on loan repayments and coded as one for those who state they are in arrears because "The loan installments have gone up." |

**Table A.2: Data and Variable Description – Explanatory Variables (continued)**

| Label | Description |
|---|---|
| *Loan* | Dummy variable coded as one if respondent has a loan. Derived from the question "Do you, either personally or together with your partner, have any loans?" Answers are "No." "Yes, my loans are solely denominated in foreign currency." "Yes, my loans are predominantly denominated in foreign currency." "Yes, about equal amounts of loans in local and foreign currencies." "Yes, my loans are predominantly denominated in local currency." "Yes, my loans are solely denominated in local currency." |
| *FC loan* | Dummy variable defined only for respondents with a loan, derived from the question above, coded as zero for respondents with a local currency loan and coded as one for respondents with a foreign currency loan. Categories "predominantly denominated in foreign currency" through "about equal amounts in foreign and local currency" are coded as one. |
| *Mortgage* | Dummy variable derived from answers to the question "What is the purpose of your loan?" Coded as zero for all respondents with a loan and one for those who answer "to finance a house or apartment". |
| *no savings* | Dummy variable; one if respondent does not have any of the following form of savings: cash, savings deposits, life insurance, mutual funds, stocks, pension funds, bonds or current account. |
| *own car* | Dummy variable that takes the value one if respondents owns at least one car. Question asked fall 2011 only. |
| *own house* | Dummy variable that takes the value one if respondent owns a house or apartment. Question asked fall 2011 only. |
| *own secondary residence* | Dummy variable that takes the value one if respondent owns a secondary residence. Question asked fall 2011 only. |
| *receives remittances* | Derived from answers to the question "Do you personally or your partner receive any money from abroad? E.g. from family members living or working abroad, pension payments, etc.?" Dummy variable coded as one if answer is "yes, regularly" or "yes, infrequently", else zero. |
| *risk aversion* | Derived from answers to the statement that "in financial matters, I prefer safe investments over risky investments." Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree"). |
| *self-employed, unemployed, retired* | Dummy variable coded as one if respondent belongs to selected occupational category. Omitted category: employed. Students are excluded from the sample. |
| *shock to job* | Dummy variable derived from answers to the question "Have you already been affected by the global economic and financial crisis with regard to your job or your job search? Coded as one if respondent says "Yes", else zero. Question only asked in fall 2010. |
| *size of household (2 person HH, 3+ person HH)* | Size of household: 1 person, 2 persons, 3 or more persons. Omitted category: 1 person household. |

**Table A.2: Data and Variable Description - Explanatory Variables (continued)**

| Label | Description |
|---|---|
| *trust in government; trust in police* | Based on question "I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it. 1 means 'I trust completely', 2 means 'I somewhat trust' , 3 means 'I neither trust nor distrust' , 4 means 'I somewhat distrust' and 5 means 'I do not trust at all'. (a) the government (b) the police". Dummy variable coded as one if respondents somewhat or completely trust, zero else. |
| *village* | Dummy variable which takes the value one if respondent lives in a village with less than 5000 inhabitants, else zero. |

| Regional and Macroeconomic Variables | Description |
|---|---|
| *LITS trust courts* | Derived from LITS question "To what extent do you trust courts?" Answer categories are "complete distrust", "some distrust", "neither trust nor distrust", "some trust", "complete trust" and "difficult to say". For each region, the variable represents the share of surveyed individuals who answer that they have "complete trust" or "some trust". Those that answer "difficult to say" are omitted. |
| *depr countries* | Dummy variable which takes the value one for Hungary, Poland, Romania, Albania, and Serbia (depreciation countries) and is coded as zero for Bulgaria, Bosnia and Herzegovina, Croatia, and FYR Macedonia (non-depreciation countries). |
| *depr since 2008* | Cumulative exchange rate depreciation since 2008 for local currencies against the euro. For those countries, where the share of Swiss franc loans in total foreign currency loans is above 80% (Hungary and Poland) both depreciation against the euro and the Swiss franc are calculated and weighted by the share of Swiss franc and euro loans in total foreign currency loans. |
| *GDP growth since 2008* | Maximum output decline since 2008.. |
| *inflation* | Average annual inflation in 12 months prior to the survey. |
| *weak / strong legally* | Derived from the World Bank Doing Business strength of legal rights index (www.doingbusiness.org). The index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 10 (in our sample from 5 to 9). Countries with an index below 8 are defined as weak legally (Bosnia and Herzegovina, Croatia, FYR Macedonia, Hungary). Countries with an index of 8 or 9 are defined as strong legally (Albania, Bulgaria, Poland, Romania, Serbia). |

**Table A3: Descriptive Statistics**

| Dependent Variables | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *arrears* | 0/1 | 0.39 | 0.39 | 0.32 | 0.41 | 0.48 | 0.19 | 0.29 | 0.23 | 0.42 | 0.34 |
| | | (0.49) | (0.49) | (0.47) | (0.49) | (0.50) | (0.40) | (0.45) | (0.42) | (0.49) | (0.47) |
| *arrears twice or more* | 0/1 | 0.27 | 0.22 | 0.21 | 0.27 | 0.27 | 0.06 | 0.15 | 0.13 | 0.24 | 0.20 |
| | | (0.44) | (0.41) | (0.41) | (0.44) | (0.44) | (0.25) | (0.36) | (0.33) | (0.43) | (0.40) |
| *arrears on mortgage* | 0/1 | 0.38 | 0.32 | 0.33 | 0.46 | 0.50 | 0.21 | 0.29 | 0.22 | 0.60 | 0.35 |
| | | (0.49) | (0.47) | (0.47) | (0.50) | (0.50) | (0.41) | (0.45) | (0.41) | (0.49) | (0.48) |

| Explanatory Variables | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (0.48) | (0.44) | (0.40) | (0.34) | (0.47) | (0.48) | (0.49) | (0.49) | (0.49) | (0.47) |
| *exp arrears* | 0/1 | 0.83 | 0.19 | 0.32 | 0.36 | 0.27 | 0.11 | 0.46 | 0.15 | 0.45 | 0.40 |
| | | (0.37) | (0.40) | (0.47) | (0.48) | (0.44) | (0.31) | (0.50) | (0.35) | (0.50) | (0.49) |
| *high income* | 0/1 | 0.24 | 0.21 | 0.20 | 0.27 | 0.32 | 0.28 | 0.29 | 0.27 | 0.17 | 0.25 |
| | | (0.43) | (0.41) | (0.40) | (0.44) | (0.47) | (0.45) | (0.46) | (0.45) | (0.37) | (0.43) |
| *medium income* | 0/1 | 0.23 | 0.33 | 0.27 | 0.24 | 0.30 | 0.28 | 0.26 | 0.25 | 0.20 | 0.26 |
| | | (0.42) | (0.47) | (0.44) | (0.42) | (0.46) | (0.45) | (0.44) | (0.43) | (0.40) | (0.44) |
| *dk / na income* | 0/1 | 0.18 | 0.08 | 0.25 | 0.28 | 0.11 | 0.18 | 0.22 | 0.06 | 0.24 | 0.17 |
| | | (0.38) | (0.26) | (0.43) | (0.45) | (0.32) | (0.39) | (0.42) | (0.24) | (0.42) | (0.38) |
| *education high* | 0/1 | 0.18 | 0.26 | 0.26 | 0.26 | 0.24 | 0.12 | 0.13 | 0.16 | 0.21 | 0.20 |
| | | (0.39) | (0.44) | (0.44) | (0.44) | (0.43) | (0.33) | (0.34) | (0.37) | (0.41) | (0.40) |
| *education medium* | 0/1 | 0.59 | 0.66 | 0.65 | 0.55 | 0.57 | 0.68 | 0.74 | 0.53 | 0.59 | 0.62 |
| | | (0.49) | (0.47) | (0.48) | (0.50) | (0.49) | (0.46) | (0.44) | (0.50) | (0.49) | (0.49) |
| *age* | 2/9 | 4.90 | 4.21 | 4.42 | 4.72 | 4.11 | 4.67 | 4.43 | 4.84 | 4.68 | 4.55 |
| | | (1.60) | (1.25) | (1.36) | (1.53) | (1.37) | (1.53) | (1.47) | (1.58) | (1.41) | (1.49) |
| *age squared* | 4/85 | 26.59 | 19.27 | 21.33 | 24.59 | 18.79 | 24.13 | 21.75 | 25.90 | 23.92 | 22.93 |
| | | (16.45) | (10.65) | (12.21) | (15.01) | (12.05) | (14.81) | (14.16) | (15.98) | (13.92) | (14.32) |
| *2 person HH* | 0/1 | 0.32 | 0.32 | 0.31 | 0.36 | 0.13 | 0.24 | 0.27 | 0.17 | 0.19 | 0.26 |
| | | (0.47) | (0.46) | (0.46) | (0.48) | (0.34) | (0.43) | (0.44) | (0.37) | (0.40) | (0.44) |
| *3+ person HH* | 0/1 | 0.44 | 0.58 | 0.57 | 0.46 | 0.84 | 0.65 | 0.61 | 0.77 | 0.73 | 0.63 |
| | | (0.50) | (0.49) | (0.50) | (0.50) | (0.36) | (0.48) | (0.49) | (0.42) | (0.44) | (0.48) |
| *head of household* | 0/1 | 0.66 | 0.57 | 0.63 | 0.65 | 0.54 | 0.62 | 0.54 | 0.56 | 0.53 | 0.59 |
| | | (0.47) | (0.50) | (0.48) | (0.48) | (0.50) | (0.49) | (0.50) | (0.50) | (0.50) | (0.49) |

## Table A3: Descriptive Statistics (Continued)

| Explanatory Variables | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *self-employed* | 0/1 | 0.04 | 0.08 | 0.04 | 0.04 | 0.11 | 0.04 | 0.07 | 0.06 | 0.06 | 0.06 |
| | | (0.19) | (0.28) | (0.21) | (0.19) | (0.31) | (0.21) | (0.26) | (0.24) | (0.24) | (0.24) |
| *unemployed* | 0/1 | 0.15 | 0.09 | 0.16 | 0.20 | 0.22 | 0.29 | 0.17 | 0.39 | 0.25 | 0.21 |
| | | (0.36) | (0.28) | (0.36) | (0.40) | (0.41) | (0.45) | (0.38) | (0.49) | (0.43) | (0.41) |
| *retired* | 0/1 | 0.33 | 0.10 | 0.16 | 0.31 | 0.09 | 0.24 | 0.21 | 0.22 | 0.19 | 0.21 |
| | | (0.47) | (0.30) | (0.37) | (0.46) | (0.29) | (0.42) | (0.41) | (0.41) | (0.39) | (0.40) |
| *bank account* | 0/1 | 0.75 | 0.88 | 0.31 | 0.17 | 0.34 | 0.75 | 0.94 | 0.73 | 0.73 | 0.63 |
| | | (0.43) | (0.33) | (0.46) | (0.38) | (0.47) | (0.43) | (0.24) | (0.44) | (0.45) | (0.48) |
| *distance to bank* | 1/6 | 2.19 | 2.46 | 2.51 | 3.01 | 2.86 | 3.17 | 2.74 | 3.20 | 2.85 | 2.77 |
| | | (1.30) | (1.28) | (1.63) | (1.53) | (1.45) | (1.54) | (1.54) | (1.72) | (1.66) | (1.55) |
| *loan* | 0/1 | 0.33 | 0.25 | 0.32 | 0.26 | 0.15 | 0.26 | 0.39 | 0.26 | 0.25 | 0.28 |
| | | (0.47) | (0.44) | (0.47) | (0.44) | (0.36) | (0.44) | (0.49) | (0.44) | (0.43) | (0.45) |
| *FX loan* | 0/1 | 0.61 | 0.36 | 0.26 | 0.45 | 0.63 | 0.36 | 0.85 | 0.40 | 0.69 | 0.52 |
| | | (0.49) | (0.48) | (0.44) | (0.50) | (0.48) | (0.48) | (0.35) | (0.49) | (0.46) | (0.50) |
| *housing loan* | 0/1 | 0.58 | 0.24 | 0.22 | 0.27 | 0.39 | 0.22 | 0.37 | 0.32 | 0.22 | 0.32 |
| | | (0.49) | (0.43) | (0.41) | (0.44) | (0.49) | (0.41) | (0.48) | (0.47) | (0.42) | (0.47) |
| *consumption loan* | 0/1 | 0.57 | 0.79 | 0.81 | 0.77 | 0.62 | 0.80 | 0.71 | 0.69 | 0.86 | 0.73 |
| | | (0.50) | (0.41) | (0.40) | (0.42) | (0.49) | (0.40) | (0.46) | (0.46) | (0.34) | (0.44) |
| *no savings* | 0/1 | 0.43 | 0.28 | 0.52 | 0.49 | 0.21 | 0.50 | 0.34 | 0.17 | 0.35 | 0.36 |
| | | (0.50) | (0.45) | (0.50) | (0.50) | (0.41) | (0.50) | (0.47) | (0.38) | (0.48) | (0.48) |
| *receives remittances* | 0/1 | 0.02 | 0.03 | 0.05 | 0.07 | 0.22 | 0.12 | 0.06 | 0.11 | 0.08 | 0.09 |
| | | (0.13) | (0.18) | (0.22) | (0.26) | (0.41) | (0.32) | (0.24) | (0.32) | (0.27) | (0.28) |
| *income in euro* | 0/1 | 0.01 | 0.01 | 0.02 | 0.01 | 0.05 | 0.03 | 0.02 | 0.05 | 0.03 | 0.03 |
| | | (0.10) | (0.10) | (0.14) | (0.12) | (0.22) | (0.17) | (0.15) | (0.22) | (0.16) | (0.16) |
| *risk aversion 1/6* | 1/6 | 4.61 | 4.47 | 4.93 | 4.52 | 4.68 | 4.22 | 4.74 | 5.22 | 4.92 | 4.71 |
| | | (1.33) | (1.22) | (1.24) | (1.25) | (1.20) | (1.39) | (1.15) | (1.01) | (1.21) | (1.26) |
| *village* | 0/1 | 0.30 | 0.00 | 0.28 | 0.36 | 0.55 | 0.48 | 0.58 | 0.45 | 0.43 | 0.39 |
| | | (0.46) | (0.00) | (0.45) | (0.48) | (0.50) | (0.50) | (0.49) | (0.50) | (0.50) | (0.49) |
| *shock to job* | 0/1 | 0.35 | 0.29 | 0.44 | 0.33 | 0.42 | 0.39 | 0.47 | 0.41 | 0.52 | 0.40 |
| | | (0.48) | (0.45) | (0.50) | (0.47) | (0.49) | (0.49) | (0.50) | (0.49) | (0.50) | (0.49) |

## Table A3: Descriptive Statistics (Continued)

| Explanatory Variables | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *trust in government* | 0/1 | 0.26 | 0.24 | 0.30 | 0.08 | 0.40 | 0.28 | 0.15 | 0.40 | 0.17 | 0.25 |
| | | (0.44) | (0.43) | (0.46) | (0.26) | (0.49) | (0.45) | (0.35) | (0.49) | (0.37) | (0.43) |
| *trust in police* | 0/1 | 0.33 | 0.38 | 0.32 | 0.21 | 0.46 | 0.48 | 0.46 | 0.45 | 0.27 | 0.37 |
| | | (0.47) | (0.49) | (0.47) | (0.41) | (0.50) | (0.50) | (0.50) | (0.50) | (0.44) | (0.48) |
| *own car* | 0/1 | 0.49 | 0.74 | 0.67 | 0.42 | 0.42 | 0.66 | 0.86 | 0.60 | 0.60 | 0.61 |
| | | (0.50) | (0.44) | (0.47) | (0.49) | (0.49) | (0.47) | (0.35) | (0.49) | (0.49) | (0.49) |
| *own house* | 0/1 | 0.87 | 0.68 | 0.90 | 0.93 | 0.93 | 0.95 | 0.93 | 0.95 | 0.90 | 0.89 |
| | | (0.33) | (0.47) | (0.30) | (0.26) | (0.25) | (0.22) | (0.26) | (0.21) | (0.30) | (0.31) |
| *own secondary residence* | 0/1 | 0.07 | 0.07 | 0.16 | 0.06 | 0.08 | 0.08 | 0.14 | 0.12 | 0.14 | 0.10 |
| | | (0.25) | (0.26) | (0.37) | (0.24) | (0.26) | (0.28) | (0.34) | (0.32) | (0.34) | (0.30) |
| **Regional Variables** | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
| *LiTS trust courts* | 0.07/.046 | 0.42 | 0.27 | 0.15 | 0.25 | 0.27 | 0.24 | 0.15 | 0.15 | 0.15 | 0.23 |
| | | (0.04) | (0.09) | (0.10) | (0.06) | (0.06) | (0.04) | (0.03) | (0.04) | (0.02) | (0.10) |
| **Macroeconomic Variables** | Min/Max | HU | PL | BG | RO | AL | BH | HR | FM | SR | Total |
| *depr since 2008* | -0.01/39.4 | 31.46 | 39.41 | 0.00 | 16.90 | 10.23 | 0.00 | 1.49 | -0.01 | 25.73 | 14.15 |
| | | (2.53) | (2.27) | (0.00) | (0.27) | (0.81) | (0.00) | (0.23) | (0.01) | (1.29) | (14.35) |
| *GDP growth since 2008* | -8.27/0.42 | -8.27 | 0.42 | -5.48 | -8.27 | -1.46 | -2.8 | -7.26 | -1.44 | -4.48 | -4.38 |
| *inflation* | 0.31/11.59 | 6.45 | 1.46 | 1.54 | 3.24 | 3.54 | 2.44 | 8.50 | 2.28 | 4.37 | 3.76 |
| | | (0.86) | (0.52) | (0.37) | (0.70) | (0.03) | (0.88) | (2.73) | (1.48) | (0.38) | (2.49) |

Note: Descriptive statistics are the average value for fall 2010 to fall 2011, except for *shock to job* where data is available for fall 2010 only and for *own car, own house and own secondary residence* where data is available for fall 2011 only. The average across countries "Total" is not weighted by country size.

# Index of Working Papers:

| | | | |
|---|---|---|---|
| May 29, 2009 | Helmut Elsinger | 156 | Financial Networks, Cross Holdings, and Limited Liability |
| July 20, 2009 | Simona Delle Chiaie | 157 | The sensitivity of DSGE models' results to data detrending |
| November 10, 2009 | Markus Knell<br>Helmut Stix | 158 | Trust in Banks?<br>Evidence from normal times<br>and from times of crises |
| November 27, 2009 | Thomas Scheiber<br>Helmut Stix | 159 | Euroization in Central, Eastern and South-eastern Europe – New Evidence On Its Extent and Some Evidence On Its Causes |
| January 11, 2010 | Jesús Crespo Cuaresma<br>Martin Feldircher | 160 | Spatial Filtering, Model Uncertainty and the Speed of Income Convergence in Europe |
| March 29, 2010 | Markus Knell | 161 | Nominal and Real Wage Rigidities.<br>In Theory and in Europe |
| May 31, 2010 | Zeno Enders<br>Philip Jung<br>Gernot J. Müller | 162 | Has the Euro changed the Business Cycle? |
| August 25, 2010 | Marianna Červená<br>Martin Schneider | 163 | Short-term forecasting GDP with a DSGE model augmented by monthly indicators |
| September 8, 2010 | Sylvia Kaufmann<br>Johann Scharler | 164 | Bank-Lending Standards, the Cost Channel and Inflation Dynamics |
| September 15, 2010 | Helmut Elsinger | 165 | Independence Tests based on Symbolic Dynamics |
| December 14, 2010 | Claudia Kwapil | 166 | Firms' Reactions to the Crisis and their Consequences for the Labour Market. Results of a Company Survey conducted in Austria |
| May 10, 2011 | Helmut Stix | 167 | Does the Broad Public Want to Consolidate Public Debt? – The Role of Fairness and of Policy Credibility |
| May 11, 2011 | Burkhard Raunig,<br>Johann Scharler | 168 | Stock Market Volatility, Consumption and Investment; An Evaluation of the Uncertainty Hypothesis Using Post-War U.S. Data |

# Call for Entries:
# Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably post-doc) who work in the fields of macroeconomics, international economics or financial economics and/or with a regional focus on Central, Eastern and Southeastern Europe.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between 3 and 6 months, but timing is flexible.

Applications (in English) should include

- a curriculum vitae,
- a research proposal that motivates and clearly describes the envisaged research project,
- an indication of the period envisaged for the research visit, and
- information on previous scientific work.

Applications for 2013 should be e-mailed to *eva.gehringer-wasserbauer@oenb.at* by May 1, 2013.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2013.