

# Foreign currency borrowers in Austria – evidence from the Household Finance and Consumption Survey

We analyze the structure and distribution of households with a foreign currency loan on the basis of micro-level information provided by the Eurosystem Household Finance and Consumption Survey (HFCS) for Austria. Almost 4% of the Austrian household population have a foreign currency loan, which in most cases is used to finance real estate. An extensive set of risk indicators that we estimated suggests that these households have a relatively high risk-bearing capacity. However, a dynamic analysis shows that unrealized losses due to recent exchange rate developments have increased: The median exchange rate of households' highest mortgage has decreased by about 32%, from CHF/EUR 1.6 at the time the mortgage was taken out to CHF/EUR 1.1 in January 2015. To evaluate different potential characteristics that may have been important for choosing a foreign currency loan instead of a loan in domestic currency, we set up a two-stage econometric model. We find that one of the most important determinants of currency choice is the interest rate differential between Austria and Switzerland at the time the loan was taken out. An increase of 1 percentage point in this differential increased the probability of having a foreign currency loan by 16 percentage points. In contrast, exchange rate variation did not seem to play a statistically significant role in the loan currency decision.

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JEL classification: D12, D14, F34, F37, G15, G21

Keywords: FX borrowing, mortgages, banking sector, Austria, Swiss francs

After booming for almost two decades, foreign currency (FX) loans to Austrian households have been declining continuously since fall 2008. Between late 2008 and end-2014, the amount of FX loans (measured in euro and adjusted for exchange rate effects) shrank by almost 53%. This was mainly the result of several supervisory measures implemented in recent years to reduce the risks of FX loans and loans linked with repayment vehicle.

In 2003, the Austrian Financial Market Authority (FMA) issued its Minimum Standards for Granting and Managing Foreign Currency Loans and Loans with Repayment Vehicles (“Minimum Standards”), which aimed at improving the FX loan-related risk man-

agement of banks. In 2006, the FMA published an information brochure<sup>2</sup> for bank customers to raise households' risk awareness in connection with FX loans. Following the financial crisis, the FMA urged banks not to grant FX loans to households and extended its Minimum Standards in March 2010, recommending stronger rules for granting new FX loans. For instance, FX loans should be granted only to customers with high creditworthiness or with income in the currency in which the loan is denominated. Moreover, at the European level in the fall of 2011, the European Systemic Risk Board (ESRB) published a set of seven recommendations to curb lending in FX. Finally, in 2013, the FMA issued new

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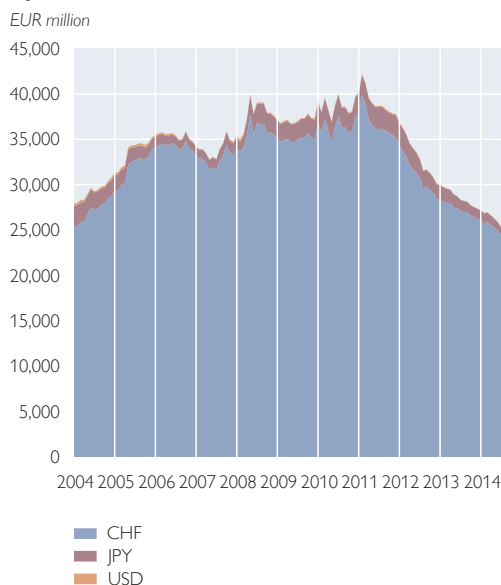
<sup>2</sup> [https://www.fma.gv.at/typo3conf/ext/dam\\_download/secure.php?u=0&file=5509&t=1425988084&hash=0f66b4f5d75d2cc0c56e6b31b8ca7f85](https://www.fma.gv.at/typo3conf/ext/dam_download/secure.php?u=0&file=5509&t=1425988084&hash=0f66b4f5d75d2cc0c56e6b31b8ca7f85), retrieved on March 9, 2015.

Refereed by:  
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Chart 1

## Loans to households in FX

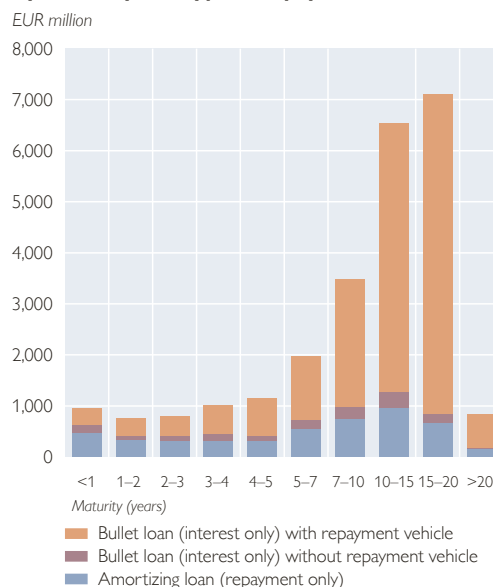
### By FX



Source: OeNB.

Note: As at end-December 2014.

### By maturity and type of repayment



Minimum Standards,<sup>3</sup> taking into account the ESRB recommendations and the supervisory experience gained so far.

However, the real decline in FX lending has been offset by the appreciation of the Swiss franc, both before the Swiss central bank established the exchange rate ceiling in late summer 2011 and also after it removed it on January 15, 2015. This is due to the fact that loans to households in Swiss francs are by far the most common type of FX loans in Austria, accounting for more than 95% of all household loans in FX (see chart 1, left-hand panel). Between 2007 and 2011 (before the introduction of the exchange rate ceiling), the Swiss franc appreciated by 30% and since

January 15, 2015, it has appreciated by a further 11%.<sup>4</sup>

FX loans also carry risks other than exchange rate risks. FX borrowers should additionally take into account interest rate risk, the performance risk of the repayment vehicle in case of a bullet loan, and, finally, the risk of “unplanned costs” (e.g. the potential burden of hedging against unfavorable interest or exchange rate developments, the cost of switching the loan currency made necessary by repayment problems or the need for higher collateralization in case of unfavorable exchange rate developments).<sup>5</sup>

As can be seen in chart 1, by the end of 2014, Austrian households held more than EUR 25 billion outstanding

<sup>3</sup> [https://www.fma.gv.at/typo3conf/ext/dam\\_download/secure.php?u=0&file=8939&t=1425987697&hash=d48e3ff32bf97f0c363e633958e21859](https://www.fma.gv.at/typo3conf/ext/dam_download/secure.php?u=0&file=8939&t=1425987697&hash=d48e3ff32bf97f0c363e633958e21859) (retrieved on March 9, 2015).

<sup>4</sup> As on March 8, 2015.

<sup>5</sup> For further information about the functioning of FX lending in Austria, see Waschiczek (2002), Tzanninis (2005) or Beer et al. (2010).

loans in FX. This is almost 20% of the total amount of loans made to households in Austria, and – as can be seen in the right-hand panel of chart 1 – many of them will mature over the next 7 to 10 years.

In this paper we exploit the detailed micro-level information provided by the Eurosystem Household Finance and Consumption Survey (HFCS) 2010 for Austria to give an in-depth analysis of the structure of FX borrowing in Austria on the household level.<sup>6</sup> The analysis focuses in particular on the following questions: What are the structure and distribution of FX loans in comparison to euro-denominated debt? What is the risk-bearing capacity of FX loan holders? And what are the reasons why households chose a FX loan over a euro-denominated loan?

The paper is structured as follows: Section 1 presents the data we use. In section 2, the distribution, the components and the household structure of FX debt are discussed. In section 3, we analyze the risk-bearing capacity of FX borrowers. In section 4, the determinants for holding FX debt and their marginal effects are presented and discussed, and section 5 concludes.

## 1 Data

The data for this analysis are taken from the first wave of the HFCS in Austria, which was conducted in 2010 and 2011. The HFCS is a euro area-wide project coordinated by the European Central Bank (ECB).<sup>7</sup> The OeNB is responsible for conducting the survey in Austria. HFCS data provide detailed informa-

tion on the whole balance sheet as well as several socioeconomic and sociodemographic characteristics of households in the euro area.<sup>8</sup> In this study, we additionally use some specific variables for Austria which are not publicly available. In particular, the information on FX loans is not part of the core variables of the HFCS but is additionally collected in Austria due to the high prevalence and thus importance of this type of credit.

The results reported in the present paper apply to households in Austria only. Unless otherwise noted, all estimates are calculated using the final household weights and the survey's multiple imputations provided by the data producer (see Albacete et al., 2012b, for a detailed description of the survey methodology in Austria).<sup>9</sup>

We define a household's debt stock as the sum of the outstanding balance of mortgage debt and the outstanding balance of nonmortgage debt. Nonmortgage debt includes all liabilities that are not collateralized with real estate, i.e. consumer loans, credit lines/overdrafts, and credit card debt above the monthly repayment, but does not include leasing contracts. The data provide information about the currency of mortgages and consumer loans but no information about the denomination of other nonmortgage debt; however, we find it reasonable to assume in the present analysis that this share of nonmortgage debt, which concerns only sight accounts and credit cards, is held in euro. Gross wealth is defined as the sum of total real assets (main residence, other real estate property, vehicles,

<sup>6</sup> A general analysis of household debt and vulnerability based on the HFCS in Austria can be found in Albacete and Lindner (2013).

<sup>7</sup> The HFCS is envisaged to be conducted about every three years. The HFCS in Austria has no panel component.

<sup>8</sup> In the first wave of the HFCS, 15 out of the 17 euro area countries at the time of the field period collected the data. Estonia and Ireland will be included in the second wave, together with the new euro area country Latvia.

<sup>9</sup> An extensive methodological documentation of the euro area HFCS can also be found in ECB (2013).

valuables, and self-employment businesses) and total financial assets (deposits, mutual fund shares, bonds, non-self-employment private businesses, publicly traded shares, managed accounts, money owed to households, voluntary pension/whole life insurance contracts and other financial assets).

There are 2,380 households in the net sample of the HFCS in Austria. Of these 2,380 households, 803 hold debt. 77 of this share have debt in FX whereas 726 have debt only in euro. These figures underline the necessity of using a relatively large survey sample in order to be able to analyze the group of FX loan holders in Austria. The sample size of the first wave of the HFCS in Austria and hence the number of observations restricts the estimation of subpopulations of FX loan holders. In the tables, cells with fewer than 15 observations are suppressed.<sup>10</sup>

## 2 Foreign currency debt

This section first examines the structure and distribution of FX debt of

Austrian households and its components, i.e. FX mortgages and FX non-mortgage debt. We then explore the relationship between some of households' most important socioeconomic characteristics and their debt in FX. To highlight the specifics of FX debt, we compare the latter to debt held in euro.

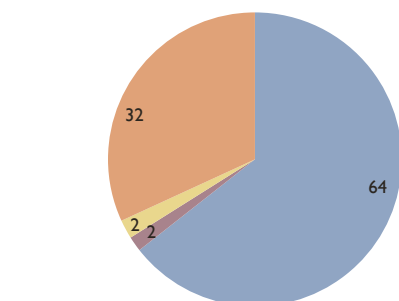
### 2.1 Distribution of foreign currency debt

The left-hand panel of chart 2 breaks down all households into four groups by their debt status (no debt, debt only in FX, debt in FX and euro, debt only in euro) and shows the percentages of households in the respective groups. Almost 4% of the Austrian household population have FX loans, which are around 150,000 households. Half of them also hold debt in euro, the other half has only debt in FX. Households holding debt only in euro are a larger group, accounting for around 32% of Austrian households. The remaining 64% of households do not have debt, representing the largest group by far.

Chart 2

#### Distribution of households and their debt

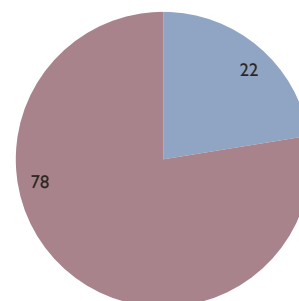
**Households**  
%



■ No debt  
■ Debt only in FX  
■ Debt in euro and FX  
■ Debt only in euro

Source: HFCS Austria 2010, OeNB.

**Debt**  
%



■ FX debt  
■ Euro debt

<sup>10</sup> Some potentially interesting classifications were not discussed due to our relatively small sample.

The right-hand panel of chart 2 breaks down the aggregate debt of all households by currency. At 78%, euro debt accounts for the largest share in total household debt. However, foreign currency debt makes up the remaining 22% of total household debt, which is relatively high compared to the proportion of households holding these liabilities. This figure compares to national accounts data, according to which about 20% of aggregate debt is held in FX. We may therefore assume that HFCS data capture the relation reasonably well.

In order to investigate the distribution of FX debt, we estimate nine conditional percentiles which divide all the households with FX loans into ten identically large groups (i.e. deciles) sorted in ascending order according to their FX debt level. We proceed analogously for households with euro-denominated debt. Accordingly, chart 3 breaks down the Austrian household population with FX (euro) loans into deciles of around 15,000 (128,000) households each. One-tenth of Austrian households with FX debt have FX debt of less than EUR 14,000, and one-half have FX debt of less than some EUR 70,000. By contrast, about one-fifth of households

with FX debt have FX debt of more than EUR 140,000, and one-tenth have FX debt of more than some EUR 240,000. The mean of Austrian households' FX debt is around EUR 100,000 and hence is in the seventh decile. This implies that more than three-fifths of households have less FX debt than the average. The finding illustrates the slightly positively skewed distribution of FX debt.

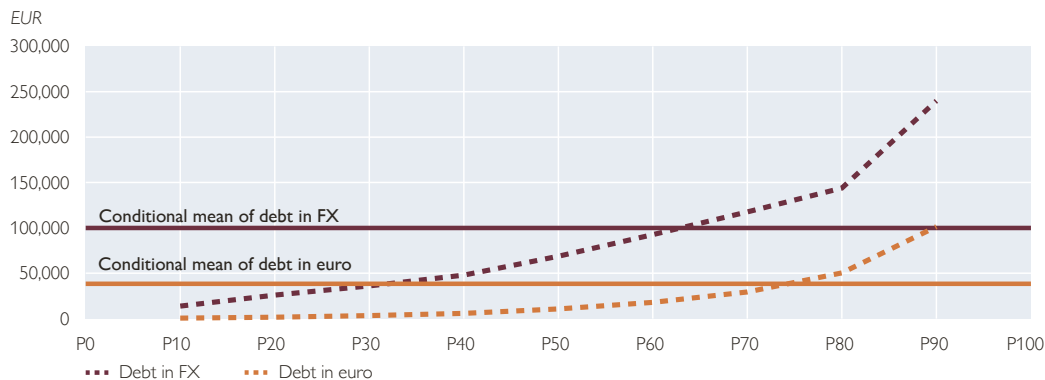
All FX debt values are relatively high compared with euro debt values, as illustrated by the fact that all percentiles of FX debt are above the respective figures of euro-denominated debt. When interpreting this result, it must be borne in mind that FX loans, in contrast to euro loans, are usually bullet loans, in which the principal is repaid at the end of maturity. The finding that FX debt is generally higher is also linked to the structure of FX loans, which are almost exclusively mortgage loans (see also below). We also see that FX debt is more dispersed than euro debt.

## 2.2 Components of foreign currency debt

Household FX debt is the sum of two components: FX mortgage debt and FX

Chart 3

### Households with debt in FX versus euro-denominated debt: percentiles and mean



Source: HFCS Austria 2010, OeNB.

Table 1

### Types of debt in FX vs euro-denominated debt

	Debt in FX			Debt in euro		
	Participation conditional on having FX debt	Median	Mean	Participation conditional on having debt in euro	Median	Mean
		EUR	EUR		EUR	EUR
Mortgage loans	97.0	71,296	101,730	46.9	29,680	64,894
Nonmortgage debt	3.0	. <sup>1</sup>	. <sup>1</sup>	62.7	3,016	12,533

Source: HFCS Austria 2010, OeNB.

<sup>1</sup> „..“ indicates that the estimation result had to be suppressed due to an estimation sample of fewer than 15 observations.

nonmortgage debt. FX debt can be analyzed in more detail at the level of these two components. We perform this analysis in two steps: First we determine household participation in a specific FX component, i.e. how many FX borrowers have this component of FX debt. Second, we compute the median and the mean for the households with this debt component.

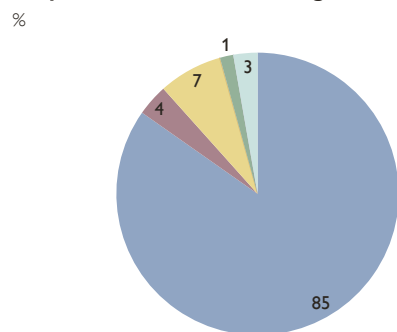
Mortgage loans are by far the most common component of FX debt among Austrian households (see table 1). Almost 97% of FX borrowers have at least

one FX mortgage loan. The average value of these loans is about EUR 102,000 (i.e. very close to the overall mean of FX debt). Only 3% of FX borrowers have FX nonmortgage debt, whose average value is much lower than that of mortgage loans. This suggests that FX loans are almost exclusively used to finance real estate. Nonmortgage debt is much more common in euro-denominated borrowing. While 63% of euro debt holders have euro nonmortgage debt, only 47% have euro mortgage loans.

Chart 4

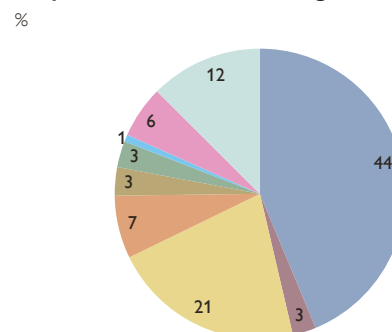
### Distribution of households by main loan purpose – FX versus euro loans

Purpose of the household's highest loan in FX



- To purchase main residence
- To purchase other real estate asset
- To refurbish or renovate main residence
- To buy a vehicle or other means of transport

Purpose of the household's highest loan in euro



- To finance a business or professional activity
- To consolidate other consumption debts
- For education purposes
- To cover living expenses or other purchases
- Other

Source: HFCS Austria 2010, OeNB.

In mortgage loans, real estate is used as collateral; importantly, over the past few years, the prices of real estate have not decreased. This fact, and a median loan-to-value (LTV) ratio for FX loans of significantly less than 100% (see section 3) suggest that FX borrowers have sufficient resources to cover the potential costs of the additional risks of a FX loan.

In the left-hand panel of chart 4 we break down households with loans in FX by the main purpose of their highest FX loan into several classes and show the percentages of the households in the respective classes. The right-hand panel shows the same information for households with loans in euro. Clearly, the majority of FX borrowers (85%) used their FX loans to purchase their main residence.

Another 7% took out a FX loan to refurbish or renovate their home, and only a very small fraction of 4% of FX loan holders used this form of credit to consolidate consumption debt or cover other expenses. This is in stark contrast to euro borrowers, among whom only 44% used their highest euro loan to purchase their home. 21% used it to refurbish or renovate their home, 7% to buy a vehicle, and 6% to cover living expenses.

### 2.3 Household structure of foreign currency debt

In addition to loan-level information on households' FX debt, the HFCS also compiles economic and socio-demographic household information, which allows us to investigate the distribution of household characteristics among FX borrowers. Table 2 shows a breakdown of household FX debt by household characteristics.<sup>11</sup>

The data for the gross income percentile and the gross wealth percentile in table 2 show that around 83% of FX loan holders receive above-median income and that almost all FX loans are held by households with above-median wealth. This suggests that in general, most FX loan holders are affluent households. We can also see that FX debt levels rise with household size. While one-person households – at 18%, the smallest group of households with FX debt in Austria – have median FX debt of around EUR 54,000; this value rises to about EUR 71,000 for two-person households. One reason for this gap is that two-person households are more likely to have higher resources or collateral to afford higher debt. The breakdown by age shows that FX debt tends to be lower for households with an older reference person. Both the median and mean values rise from the youngest age group up to the 40- to 49-years age group and are markedly lower for households with an older reference person.<sup>12</sup> The fewest FX loan holders are in the oldest age group. These results may be indicative of changes in borrowing constraints or demand over the life cycle. The breakdown of FX debt by the reference person's education level shows that there are only marginal education-specific differences in the average value of FX debt; median FX debt, however, is about EUR 69,000 for households with a reference person without a tertiary degree and only EUR 59,000 for those with a tertiary degree. Most (about 80%) of FX borrowers own their main residence. These households also hold larger FX debt than those who do not own their homes: both the median and the mean are about EUR 20,000 higher

<sup>11</sup> As was already mentioned above, some cells have to be suppressed due to a low number of observations.

<sup>12</sup> The households's reference person is defined as the household member with the highest income.

Table 2

**Debt in FX vs euro by household characteristics**

	Debt in FX			Debt in euro		
	Share in households with debt in FX	Median	Mean	Share in households with debt in euro	Median	Mean
	%	EUR	EUR	%	EUR	EUR
Gross income percentile						
1–50	16.9	.. <sup>1</sup>	.. <sup>1</sup>	39.3	4,270	20,811
51–100	83.1	65,119	102,421	60.7	18,000	49,642
Gross wealth percentile						
1–50	3.1	.. <sup>1</sup>	.. <sup>1</sup>	42.2	3,080	10,702
51–100	96.9	72,178	101,916	57.8	23,014	58,476
Household size						
1 hh member	18.0	.. <sup>1</sup>	.. <sup>1</sup>	29.8	3,558	18,631
2 hh members	29.1	71,046	102,697	29.7	11,253	31,861
3+ hh members	52.9	76,992	109,256	40.5	22,579	57,589
Age of reference person						
16–39	38.5	82,565	100,475	31.6	10,846	45,778
40–49	38.5	85,506	117,527	28.6	19,756	44,007
50+	23.0	43,200	71,171	39.8	8,340	28,368
Education of reference person						
No tertiary degree	74.7	68,614	99,199	86.0	9,588	36,788
Tertiary degree	25.3	58,965	101,971	14.0	20,605	47,826
Ownership of main residence						
No	19.4	.. <sup>1</sup>	.. <sup>1</sup>	44.2	3,323	12,575
Yes	80.6	72,089	104,077	55.8	23,823	58,742
Region						
Eastern Austria	32.4	74,311	119,159	43.5	9,220	30,714
Southern Austria	32.4	60,351	80,765	20.8	9,473	36,505
Western Austria	35.2	65,643	99,453	35.7	14,884	48,694

Source: HFCS Austria 2010. OeNB.

<sup>1</sup> „..“ indicates that the estimation result had to be suppressed due to an estimation sample of fewer than 15 observations.

Note: The regions in Austria are based on the NUTS-1-level codes. Eastern Austria: Burgenland, Lower Austria and Vienna; southern Austria: Carinthia and Styria; western Austria: Upper Austria, Salzburg, Tyrol and Vorarlberg. The household's reference person is defined as the household member with the highest income.

for homeowners. Finally, the breakdown by region shows that FX debt is lowest among households living in southern Austria, with an average FX debt of about EUR 81,000, and highest among households living in eastern Austria, with around EUR 120,000, probably partially reflecting the higher housing prices in Vienna.

Comparing the structure of FX debt with that of euro debt shows great similarities across most household characteristics. The main difference is a regional one: households living in eastern Austria have relatively low euro debt compared to households in western Austria. This may be explained by the

fact that average income and wealth are lower in eastern Austria. Comparing the shares we can see that the proportion of households with a reference person with a tertiary degree is higher among households with FX loans than among households with euro debt. About one-fourth of households with a FX loan have a reference person with a tertiary degree while the respective figure for households with euro-denominated loans is only 14%.

### 3 Risk-bearing capacity of FX borrowers

The empirical literature using household-level data about FX loans can be



divided into (1) studies analyzing the determinants of the decision to take out a FX loan (which we discuss in section 4) and (2) studies analyzing the effects of holding FX loans on households' financial vulnerability.

Albacete et al. (2012a) study the effects of FX loans on households' financial vulnerability in Austria, and Beckmann et al. (2012) look at the same topic for Central and Eastern European countries (CEECs). Albacete et al. (2012) use data from the Household Survey on Housing Wealth 2008 to estimate conditional counterfactual distributions in order to calculate the differences in terms of risk buffers between Austrian FX borrowers and their domestic currency counterparts, and they find that FX borrowers have substantially higher risk buffers measured in terms of household real estate wealth, household income and potential rental income.

Beckmann et al. (2012) find a non-negligible impact of FX loans on financial vulnerability (i.e. loan arrears) in CEECs. However, higher loan delinquency rates in depreciation countries can only partly be explained by FX borrowing; in particular, income shocks were found to exert a stronger impact.

This section presents a large set of risk indicators obtained from the HFCS in order to assess the risk-bearing capacity<sup>13</sup> of FX borrowers. The set can be divided into four groups: household characteristics, properties of a household's highest loan, subjective risk measures and debt ratios.

The first group includes variables describing general socioeconomic characteristics of households, such as income, wealth, negative net wealth, unemployed reference person or risk aversion.<sup>14</sup> The second group includes the properties of a household's highest loan that are relevant for a risk assessment of the household, such as the interest rate, adjustable or fixed interest rate, total maturity of the loan or its remaining maturity. The third group of risk indicators consists of the household's self-assessment, e.g. whether expenses were above income in the last 12 months, whether expenses were higher than average in the last 12 months, or whether the household would be able to get EUR 5,000 from friends. The last group also includes objective risk measures, such as the initial LTV ratio at the time the mortgage was taken out, the current LTV ratio, the debt-to-assets ratio, the debt-to-gross income ratio, or the debt service<sup>15</sup>-to-gross income ratio.

Table 3 shows the means or medians of these indicators for households with debt in FX and compares them with those of households with exclusively euro-denominated debt. For the convenience of the reader, column 3 shows the differences between the two subpopulations. FX borrowers have considerably higher median gross income and net wealth than non-FX borrowers. Also, the top 5% wealth class is more often represented among FX borrowers. Furthermore, there are substantially fewer households with nega-

<sup>13</sup> Further information on the risk-bearing capacity of households in Austria can also be found in Albacete and Linder (2013) and Albacete et al. (2014).

<sup>14</sup> We measure risk aversion with the following question: "Which of the following statements comes closest to describing the amount of financial risk that you (and your husband/wife/partner) are willing to take when you save or make investments?" We classify a household as risk averse if its answer was "Not willing to take any financial risk", and we classify it as not risk averse in all other cases.

<sup>15</sup> Payments into the repayment vehicle linked to a FX loan are not defined as part of the debt service of FX loans, since these loans are repaid at the end of maturity.

Table 3

**Risk indicators for households with FX debt and households with euro debt**

	Households with debt in FX	Households with debt only in euro	Difference
<b>Household characteristics</b>			
Gross income (EUR, median)	63,102	38,633	24,469
Net wealth (EUR, median)	212,794	87,234	125,559
Part of top 5% wealth class	6.8	6.0	0.9
Has negative net wealth	7.8	15.7	-7.8
Unemployed household reference person <sup>1</sup>	5.6	5.7	-0.1
Risk averse household	50.4	57.7	-7.3
<b>Properties of highest loan</b>			
Interest rate (median)	2.274	2.900	-0.626
Proportion with adjustable interest rate	76.2	66.4	9.8
Total maturity (median)	20	19	1
Remaining maturity (median)	16	12	4
<b>Subjective risk measures</b>			
Households whose expenses exceed income	11.7	19.8	-8.1
Households with above-average expenses	34.2	35.8	-1.6
Households able to get EUR 5,000 from friends	68.0	52.4	15.5
<b>Debt ratios</b>			
Initial LTV ratio for main residence (median)	0.776	0.517	0.259
LTV ratio for main residence (median)	0.379	0.138	0.240
Debt-to-assets ratio (median)	0.252	0.148	0.104
Debt-to-gross income ratio (median)	1.411	0.281	1.130
Debt service-to-gross income ratio (median)	0.113	0.090	0.023
Number of households	77	726	

Source: HFCS Austria 2010, OeNB.

<sup>1</sup> The reference person is defined as the household member with the highest income.

Note: Households whose highest loan was not a mortgage are excluded from the computation of interest rate and remaining maturity. Households without loans but with other nonmortgage debt are excluded from the computation of the proportion with adjustable interest rates and total maturity.

tive net wealth among FX loan holders, fewer households whose expenses are above income or above average, more households that are able to get money from friends, fewer unemployed households, and mortgages in this group have a lower median interest rate and longer median maturities. All in all, these results point toward a relatively high risk-bearing capacity of FX borrowers compared to euro-only borrowers (see also Albacete et al., 2012).

However, we also find that all debt ratio measures point toward a higher indebtedness of FX borrowers relative to their income or assets (see bottom panel of table 3). As a case in point, the debt-to-assets ratio is by 24 percentage points higher for FX loan holders than for euro debt holders. This indicator

clearly mirrors the relatively high share of mortgage loans in FX loans (see table 1). Moreover, the proportion of households whose highest mortgage has an adjustable interest rate is also higher among FX borrowers than among non-FX borrowers. In general, FX loan holders are less risk averse than other indebted households.

As mentioned in the introduction, FX loans carry particular risks, like exchange rate risk, the risk of the interest rate differential and the performance risk of the repayment vehicle. As FX loans in Austria are usually bullet loans (see chart 1, right-hand panel), these risks can only materialize at the end of maturity. In order to assess how these risks have “virtually” changed for each FX borrower since they took out their

Table 4

### Market price developments relevant for households with FX debt

	At the time the highest FX loan was taken out (household level)		January 2015 (macro level)	Difference	
	Median	Mean		Median	Mean
CHF/EUR <sup>1</sup> exchange rate	1.550	1.583	1.094	-0.456	-0.489
3m EURIBOR <sup>2</sup> – 3m LIBOR (CHF)	1.569	1.595	0.512	-1.057	-1.083
Austrian 10y bonds	4.267	4.454	0.550	-3.717	-3.904
ATX index	1,977	2,293	2,172	195	-121
Eurostoxx	3,252	3,308	3,204	-48	-104

Source: HFCS Austria 2010, OeNB, Thomson Reuters.

<sup>1</sup> Up to end-1998: ATS.

<sup>2</sup> Up to end-1998: VIBOR.

Note: Households whose highest loan was not a mortgage are excluded from the computation.

highest FX loan, it is necessary to perform a more dynamic analysis than the one done in table 3. Table 4 shows the CHF/EUR exchange rate as well as the interest rate differential between Austria and Switzerland, and three measures of capital market performance, both at the time when the highest FX loan was taken out and at the present time (January 2015).<sup>16</sup>

It can be seen that all three types of risk have increased both at the mean and at the median level (except the ATX index). In particular, the median exchange rate relevant for households with FX loans has virtually decreased by about 32% from CHF/EUR 1.6 at the time the corresponding household took out its highest FX loan to CHF/EUR 1.1 in January 2015. Obviously, as long as this loan has a remaining maturity, these losses are unrealized losses that do not necessarily materialize;<sup>17</sup> in this case, households are only affected by higher interest payments. Indeed, in table 3 we see that the median remain-

ing maturity of FX loans is 16 years, compared to 12 years of remaining maturity of non-FX loans. In other words, the risks to financial stability emanating from FX holders depends on the future development of the exchange rate of the loan currency as well as the performance of the repayment vehicle. Therefore, these risks are difficult to predict and will have to be monitored until (at least a substantial part of) the FX loans currently outstanding will have been repaid.

## 4 Determinants of FX borrowing in Austria

### 4.1 Background literature

To our knowledge, the only empirical study analyzing the determinants of households' decision to take out a FX loan in Austria is Beer et al. (2010). They find that independent financial advisors appear to have played an important role in arranging some of the contracts. Also, factors such as risk appetite, affluence, financial literacy, and

<sup>16</sup> For the sake of simplicity, the following analysis assumes that all FX loans are in Swiss francs and that all FX loans are bullet loans.

<sup>17</sup> Some FX loan contracts in Austria include a so-called stop loss clause; in this case, losses may indeed have materialized, especially since the Swiss central bank removed the exchange rate ceiling. However, the FMA recommends in these cases to renegotiate the loan contract in order to find alternative solutions.

marriage play a role when taking out a housing loan in FX.

Several other papers exist that study the determinants of FX borrowing in CEECs where these kinds of loans are very popular. Fidrmuc et al. (2013) use a Heckman selection probit model in order to control for sample selectivity. They find that FX loans are driven by households' lack of trust in the stability of the local currency and in domestic financial institutions. Moreover, remittances and expectations of euro adoption play an important role. Beckmann and Stix (2015) use a similar model to specifically study the effect of financial literacy on the demand for FX loans in CEECs, and they find that knowledge about exchange rate risks reduces demand for FX loans.

In this section we perform a similar regression analysis to study the socio-demographic and economic determinants of FX borrowing in Austria.

#### 4.2 Methodology

Our analysis differs from the one of Beer et al. (2010) in two important ways. On the one hand, the HFCS data provide detailed information about households' whole balance sheets, including the year when loans were taken out. This allows us to take into account interest and exchange rate differences to explain the decision to borrow in FX. On the other hand, we employ the Heckman selection model used by Fidrmuc et al. (2013) and Beckmann and Stix (2015) in order to control for sample selectivity in Austria. Besides extending the approach of Beer et al. (2010), we are able to update the results by using the more recent information from the HFCS.

Sample selectivity could arise due to the fact that demand for FX debt is observed only if a household actually holds debt (either in euro or in FX). Di-

rectly modeling the probability that a respondent has FX debt, hence neglecting sample selectivity, could result in biased estimates. Therefore, we estimate the probability to hold debt and the probability to hold FX debt jointly. In particular, in the first stage, the selection equation defines probability  $L$  that a household has debt

$$P(L=1) = \Phi_L(X_L\beta_L + u_L). \quad (1)$$

In the second stage, we estimate a probit equation that an indebted household has FX debt

$$P(F=1|L=1) = \Phi_F(X_F\beta_F + u_F), \quad (2)$$

where the error terms are normally distributed,  $u_L \sim N(0,1)$ ,  $u_F \sim N(0,1)$ , and correlated,  $\text{corr}(u_L, u_F) = \rho$ . Our results confirm that the correlation of both error terms is high and significant. This result shows the necessity to model the borrowing decision before modeling the decision about the currency of this loan.

The selection equation contains similar variables for identification as used in Fidrmuc (2013). In particular, we take three employment categories: student, retired and unemployed. They are assumed to be correlated with access to debt, but not with the decision about the currency of debt.

In the second stage our empirical strategy is to employ three different specifications for the set of independent variables  $X_F$ . The first specification contains the basic explanatory variables. The second specification additionally contains the interest rate differential between Austria and Switzerland in the year the household's highest loan was taken out, interacted with a dummy indicating whether the year of the highest loan is not missing. Finally, the third specification contains the first specification plus the CHF/EUR exchange rate in the year the household's highest

loan was taken out, interacted with a dummy indicating whether the year of the highest loan is not missing. The exchange rate level in the year the highest loan was taken out is used as a proxy for the expected exchange rate development since we assume a correlation between these two indicators in that the lower the exchange rate level in the year the highest loan was taken out (i.e. the currency is potentially undervalued at this time), the higher the expected exchange rate level in the future; and on the other hand, the higher the exchange rate level (i.e. the currency is potentially overvalued at this time), the lower the expected exchange rate level in the future. The interaction in the second and third specifications is necessary as information about the time at which the highest loan was taken out is not collected in the HFCS if a household's highest loan is a consumer loan or if a household does not have a loan but just other nonmortgage debt. As table 1 shows, this is the case only for a few households with FX loans.<sup>18</sup>

The definition of all explanatory variables is described in the annex (see table A1). Note that some of the household characteristics may have changed since debt was incurred. But loan decisions are to some extent reversible or loans are convertible so that current household attributes should also matter.

### 4.3 Results

The results of the probit estimation of equation (1) will not be discussed here but can be found in table A2 in the annex. We concentrate on the discussion of the FX decision equation (2), which is also estimated by a probit regression model. The dependent variable is a dummy that is 1 if a household has FX

debt. Table 5 shows the average marginal effects from the estimation of the second stage.

Specification (1) in table 5 shows that gross income has a positive significant effect on the probability of having FX debt. In contrast, the effect of gross wealth is not statistically significant. Furthermore, a conditional increase by one unit in the number of adults in the household decreases the probability of having FX debt by 8 percentage points. We do not find evidence of a statistically significant effect of the reference person having a tertiary degree or of being risk averse. However, like Beer et al. (2010), we do find a statistically significant effect of the household's geographical distance to the Swiss border: the larger the distance, the lower the probability of having FX debt. Households living close to the border may have income in Swiss francs (the dominant currency of FX loans in Austria), which makes a loan in Swiss francs a more natural decision.

The second specification in table 5 shows that having FX debt also depends on the interest rate differential between Austria and Switzerland in the year when the highest loan was taken out. This result is both statistically and economically significant. An increase by 1 percentage point in the difference between the (higher) Austrian and the (lower) Swiss interest rates measured in terms of 3-month interbank rates increases the probability of having FX debt by 16 percentage points. In contrast, exchange rate expectations do not seem to play a statistically significant role in the debt currency decision (see third specification in table 5).

The correlation of both error terms  $\rho$  is negative; this indicates that unob-

<sup>18</sup> However, a sizeable proportion of households with consumer loans or other nonmortgage debt denominated in euro are taken into account in this interaction.

Table 5

### Determinants of household FX borrowing

Variables	(1)	(2)	(3)
IHS (gross income)	0.0931* (0.0524)	0.0695 (0.0425)	0.0810* (0.0437)
IHS (gross wealth)	0.00276 (0.0203)	0.00521 (0.0163)	0.00260 (0.0186)
Reference person is female	-0.0468 (0.0467)	-0.0307 (0.0428)	-0.0393 (0.0423)
Age of reference person	-0.00361 (0.00375)	-0.00138 (0.00317)	-0.00264 (0.00283)
Reference person has tertiary degree	-0.0299 (0.0546)	-0.0219 (0.0548)	-0.0267 (0.0490)
Household is risk averse	0.00769 (0.0400)	0.0161 (0.0382)	0.00933 (0.0379)
Reference person lives with partner	0.0306 (0.0495)	0.0339 (0.0457)	0.0299 (0.0444)
Number of adults in household	-0.0837*** (0.0299)	-0.0789*** (0.0290)	-0.0746** (0.0295)
Number of children in household	-0.0457 (0.0369)	-0.0704* (0.0411)	-0.0462 (0.0420)
Household owns main residence	-0.350*** (0.0668)	-0.335*** (0.0983)	-0.326*** (0.125)
Distance to Swiss border	-0.0404** (0.0164)	-0.0380** (0.0159)	-0.0368** (0.0154)
Year of highest loan not missing	0.599*** (0.138)	0.283** (0.132)	0.698*** (0.267)
Year of highest loan not missing*interest rate differential Austria vs Switzerland		0.156*** (0.0583)	
Year of highest loan not missing*exchange rate CHF/EUR			-0.101 (0.149)
Rho	-0.743 (0.3183)	-0.889 (0.1627)	-0.774 (0.2821)
Total number of observations	2,339	2,281	2,339
Uncensored number of observations	787	727	783

Source: HFCS Austria 2010, OeNB.

Note: The dependent variable is the probability that a household holds a FX loan. Only the outcome equation is reported. Coefficients report the average marginal probability effects. Rho denotes the correlation of first- and second-stage errors. Standard errors are in parentheses. All estimates are calculated using multiple imputations, but not household weights.

\*\*\* Significance at 1% level. \*\* Significance at 5% level. \* Significance at 10% level.

servables increasing the probability of having debt are associated with a lower probability of having FX debt. Thus, if e.g. impatience is an unobservable and it is positively related to having debt (selection equation) then it is negatively related to having debt in FX (outcome equation).

## 5 Summary

This study provides an overview of the structure and distribution of Austrian households holding FX debt on the basis of information from the Eurosystem

HFCS in Austria. The Austrian HFCS covers households' FX debt and euro debt, real and financial assets as well as a broad range of socio-economic characteristics, thereby providing for the first time data to calculate Austrian households' debt in FX jointly with their total wealth and household characteristics. This is relevant for a wide range of financial stability issues, for instance for analyzing households' risk of default.

The main results of this analysis are as follows: Almost 4% of the Austrian

household population – around 150,000 households – had a FX loan at end-2010. Mortgage loans are by far the most common type of FX loans among Austrian households and they are almost exclusively used to finance real estate. Almost 97% of FX borrowers have at least one FX mortgage loan. The average value of these loans is about EUR 102,000. Only 3% of FX borrowers have FX nonmortgage debt. A household's FX debt tends to increase with age, household size and homeownership.

A static risk analysis shows that FX borrowers have considerably higher median income or net wealth than non-FX borrowers. Our risk measures point toward a relatively high risk-bearing capacity of FX loan holders. However, these households also use a higher proportion of their income and wealth for debt service and debt holding. Furthermore, a dynamic analysis shows that the median exchange rate of households' highest mortgage has decreased by about 32%, from CHF/EUR 1.6 at the time the mortgage was taken out to CHF/EUR 1.1 in January 2015. At present, these losses are unrealized losses because most FX loans are bullet loans and also have longer maturities than euro loans; actual losses finally will depend on future exchange rates, interest rate developments as well as the performance of the respective repayment vehicle. Even though FX loans

can be a substantial burden for the households affected, a recent microsimulation exercise published in this issue of the Financial Stability Report (see page 30) suggests that they do not pose a risk to the stability of the Austrian banking sector.

We find that one of the most important determinants of choosing FX loans over euro debt was the interest rate differential between Austria and Switzerland at the time the loan was taken out. An increase by 1 percentage point in this difference measured in terms of 3-month interbank rates increased the probability of having FX debt by 16 percentage points. Quite surprisingly, exchange rate expectations were not found to play a statistically significant role in the loan currency decision.

Comprehensive information on FX borrowers in Austria is crucial, especially because in the coming years, many FX loans will mature. Therefore, new questions regarding FX loans were included in the second wave of the HFCS, such as whether households with debt in FX have income in a matching currency or about the motives for the decision to take out a FX loan. Furthermore, the sample size of the second wave of the HFCS will be larger, which will allow a more precise and also more disaggregated analysis of FX debt.

## References

- Albacete, N., P. Fessler and M. Schürz. 2012a.** Risk Buffer Profiles of Foreign Currency Mortgage Holders. In: Financial Stability Report 23. 58–71.
- Albacete, N., P. Lindner, K. Wagner and S. Zottel. 2012b.** Eurosystem Finance and Consumption Survey 2010: Methodological Notes for Austria. Addendum to Monetary Policy and the Economy Q3/12.
- Albacete, N. and P. Lindner. 2013.** Household Vulnerability in Austria – A Microeconomic Analysis Based on the Household Finance and Consumption Survey. In: Financial Stability Report 25. 57–73.

- Albacete, N., J. Eidenberger, G. Krenn, P. Lindner and M. Sigmund. 2014.** Risk-Bearing Capacity of Households – Linking Micro-Level Data to the Macroprudential Toolkit. In: Financial Stability Report 27. 95–110.
- Beckmann, E., J. Fidrmuc and H. Stix. 2012.** Foreign Currency Loans and Loan Arrears of Households in Central and Eastern Europe. OeNB Working Paper 181.
- Beckmann, E. and H. Stix. 2015.** Foreign Currency Borrowing and Knowledge about Exchange Rate Risk. In: Journal of Economic Behavior & Organization. Forthcoming.
- Beer, C., S. Ongena and M. Peter. 2010.** Borrowing in Foreign Currency: Austrian Households as Carry Traders. In: Journal of Banking and Finance 34. 2198–2211.
- ECB. 2013.** The Eurosystem Household Finance and Consumption Survey: Methodological Report for the first wave. ECB Statistics Paper Series No 1. April.
- Fidrmuc, J., M. Hake and H. Stix. 2013.** Households' Foreign Currency Borrowing in Central and Eastern Europe. In: Journal of Banking and Finance 37. 1880–1897.
- Tzanninis, D. 2005.** What Explains the Surge of Foreign Currency Loans to Austrian Households? In: IMF Country Report 05/249.
- Waschiczek, W. 2002.** Foreign Currency Loans in Austria – Efficiency and Risk Considerations. In: Financial Stability Report 4. 83–99.

## Annex

Table A1

### Definition of explanatory variables

Variable name	Variable definition	Subject
IHS(gross income)	Inverse hyperbolic sine transformation of gross income in euro	Household
IHS(gross wealth)	Inverse hyperbolic sine transformation of gross wealth in euro	Household
Reference person is female	1=female; 0=male	Reference person
Age of reference person	Age in years	Reference person
Reference person has tertiary degree	1=ISCED code equals 5 or 6; 0=ISCED code equals 1,2,3,or 4	Reference person
Household is risk averse	1=my partner and me are not willing to take any financial risk; 0=we are willing to take at least average financial risks	Financially knowledgeable person and partner
Reference person lives with partner	1=married or consensual union on a legal basis; 0=single, widowed, or divorced	Reference person
Number of adults in household	Number of household members aged 18+	Household
Number of children in household	Number of children in household (0-13)	Household
Household owns main residence	Household owns or partly owns main residence	Household
Distance to Swiss border	1=Vorarlberg; 2=Tyrol; 3=Salzburg, Carinthia; 4=Upper Austria, Styria; 5=Lower Austria, Vienna, Burgenland	Household
Reference person is student	1=student or other; 0=employed, self-employed, unemployed, or retired	Reference person
Reference person is retired	1=retired; 0=employed, self-employed, unemployed, or other	Reference person
Reference person is unemployed	1=unemployed; 0=employed, self-employed, retired, or other	Reference person
Year of highest loan not missing	1=household's highest loan is a mortgage loan; 0=other	Household
Interest rate differential	Average 3M EURIBOR minus average 3M LIBOR CHF in the year the household's highest loan was taken out	Household
Exchange rate	Average CHF/EUR exchange rate in the year the household's highest loan was taken out	Household

Source: HFCS Austria 2010, OeNB.

Note: The household's reference person is defined as the household member with the highest income.



Table A2

### Determinants of household debt holding

Variables	(1)	(2)	(3)
IHS(gross income)	0.0981** (0.0454)	0.0967** (0.0447)	0.0980** (0.0456)
IHS(gross wealth)	-0.0594*** (0.0193)	-0.0573*** (0.0189)	-0.0593*** (0.0193)
Reference person is female	0.0430 (0.0692)	0.0204 (0.0696)	0.0432 (0.0693)
Age of reference person	-0.00946*** (0.00302)	-0.0103*** (0.00302)	-0.00950*** (0.00304)
Reference person has tertiary degree	-0.0272 (0.0890)	-0.0596 (0.0942)	-0.0264 (0.0889)
Household is risk averse	-0.0940 (0.0606)	-0.0784 (0.0618)	-0.0942 (0.0606)
Reference person lives with partner	0.0584 (0.0785)	0.0173 (0.0800)	0.0588 (0.0786)
Number of adults in household	0.0423 (0.0449)	0.0465 (0.0468)	0.0419 (0.0448)
Number of children in household	0.297*** (0.0486)	0.328*** (0.0486)	0.298*** (0.0487)
Household owns main residence	0.591*** (0.0828)	0.511*** (0.0836)	0.590*** (0.0827)
Distance to Swiss border	0.0285 (0.0251)	0.0292 (0.0258)	0.0284 (0.0251)
Reference person is student	-0.389* (0.221)	-0.403* (0.221)	-0.388* (0.221)
Reference person is retired	-0.444*** (0.107)	-0.438*** (0.107)	-0.443*** (0.108)
Reference person is unemployed	0.280* (0.145)	0.258* (0.141)	0.282** (0.144)
Constant	-0.751 (0.475)	-0.719 (0.467)	-0.750 (0.476)
Total number of observations	2,339	2,281	2,339

Source: HFCS Austria 2010.

Note: The dependent variable is the probability that a household holds debt. Only the selection equation is reported. Coefficients do not report marginal effects. Standard errors are in parentheses. All estimates are calculated using multiple imputations, but not household weights.

\*\*\* Significance at 1% level, \*\* significance at 5% level, \* significance at 10% level.