

## Sources of Foreign Currency Debt in European Countries

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The goal of this paper is to identify the causes behind household and business debt in foreign currency as witnessed in selected European countries over the years 2003–2014. The conducted research provides estimates of a broad spectrum of factors that may increase the scale of foreign currency debt of non-financial entities, adding to topical literature. These banking sector factors are specific and include the level of lending margins and loan interest rates, and market determinants, including changes to interest rates, differences in interest rates on domestic and foreign currency, changes in currency exchange rates and macro-economic factors such as the real gross domestic product. Analysis proves that the demand for foreign currency credit is procyclical in nature and is stimulated by the level of the lending margin applied by banks, the volatility of currency exchange rates, and differences in interest rates on the domestic and foreign markets. The paper points out threats stemming from a disproportion in foreign currency debt among non-financial entities.

**Keywords:** foreign currency debt, currency risk, company, credit, banking sector.

### Źródła zadłużenia walutowego w krajach europejskich

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Opracowanie ma na celu identyfikację przyczyn zadłużenia gospodarstw domowych i przedsiębiorstw w walutach obcych, jakie miało miejsce w wybranych krajach europejskich w latach 2003–2014. Przeprowadzone badanie wnosi do literatury przedmiotu wyniki estymacji szerokiego spektrum czynników, które mogą potęgować skalę zadłużenia walutowego przez podmioty niefinansowe, a mianowicie: czynniki specyficzne sektora bankowego, tj. zmiany w wielkości marży kredytowej i oprocentowania kredytów, oraz determinanty rynkowe, w tym zmiany stóp procentowych, różnice w oprocentowaniu waluty krajowej i zagranicznej, zmienność kursów walutowych, oraz makroekonomiczne, tj. zmiany realnego produktu krajowego brutto. Analiza dowiodła, że popyt na kredyty walutowe ma charakter procykliczny, jest stymulowany poziomem marży kredytowej stosowanej przez banki, zmiennością kursów walutowych oraz różnicą oprocentowania na rynku krajowym i zagranicznym. Autorka wskazuje na zagrożenia systemowe płynące z dysproporcji zadłużenia walutowego wśród podmiotów niefinansowych.

**Słowa kluczowe:** zadłużenie walutowe, ryzyko walutowe, przedsiębiorstwo, kredyt, sektor bankowy.

**JEL:** F31, F34, E43, E44, E51, G21

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## 1. Introduction

The high share of foreign currency debt observed over recent years can have a systemic impact and generate conditions fostering the transfer of unfavorable phenomena among sectors. Credit risk generated by foreign currency credit is specifically a result of market risk, because the volatility of currency exchange rates influences the level of the credit rate and interest costs for borrowers. This risk especially touches legal entities and private individuals who do not have revenues in foreign currency and who do not secure foreign currency risk through derivative instruments. Moreover, growth in foreign currency credit campaigns demonstrates procyclical qualities that may have an unfavorable impact on the price of assets.

The intent of this paper is to identify the causes of the foreign currency debt that occurred in the countries of Europe. Bearing the above in mind, the following research hypotheses were subjected to verification: H(1) – The volume of granted foreign currency loans is significantly influenced by the level of the lending margin as charged by commercial banks; H(2) – The growth in foreign currency debt in European countries over the years 2003–2014 had its source in interest rate differences on the domestic and foreign markets; H(3) – Currency exchange rate risk may be a factor limiting demand for foreign currency credit; H(4) – Demand for foreign currency credit is procyclical in character.

The research as conducted provides topical literature with the results of empirical estimates of a broad spectrum of factors increasing the scale of foreign currency debt by non-financial entities – i.e. factors specific to the banking sector such as changes in the level of lending margins and loan interest rates, and market factors, including interest rate changes, differences in interest rates on domestic and foreign currency, and macro-economic factors such as changes in the real gross domestic product. Another objective was a look at the phenomenon from the perspective of the whole of Europe during a period of at least ten years, 2003–2014.

The analysis was theoretical and empirical in nature and consists of four parts: an overview of topical literature, identification of the causes behind the examined phenomenon, presentation of analysis results, and final conclusions.

## 2. An Overview of Literature

Topical literature shows that a disproportionate utilization of foreign currency with respect to the domestic currency for the purpose of issuing loans is especially visible during periods of economic growth and in countries going through systemic transformation. Yasin carried out a study on a sample of 9,655 companies from twenty-six transforming economies, taking into account 3,105 credit banks in the year 2005. The discoveries made suggest that from

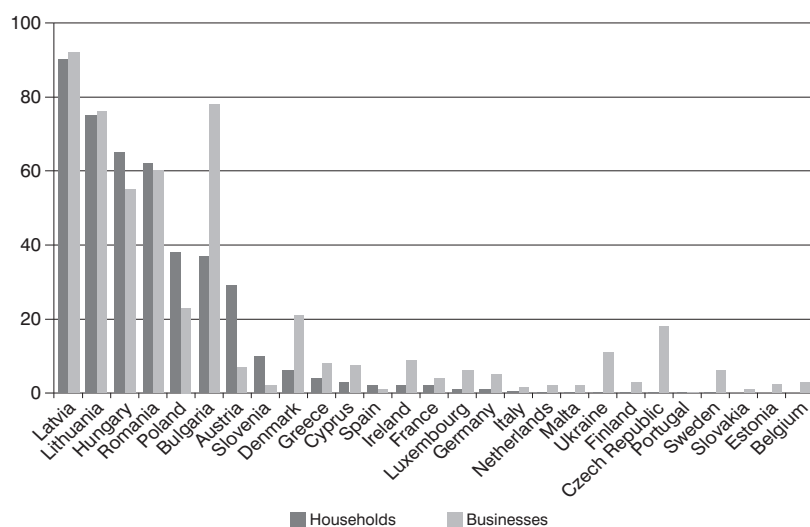
among entrepreneurs, those interested in foreign currency credit are those who have revenues in foreign currency (Yasin, 2013, p. 219–235). It is the view of Yasin that in the examined sample there is an absence of significant relations between the volatility of the currency exchange rate and the cost of money (high interest rates), and borrower-side demand. In his turn, Kabza suggested that there is substitution between credit in foreign currency and domestic currency in the case of households in the banking systems of selected countries of Central and Eastern Europe. This has its source in the difference between domestic and foreign interest rates, where the greater the difference the greater the share of credit in total foreign currency credit (Kabza, 2014). The same is true of Ranciere, Tornell, and Vamvakidis who noted that the phenomenon of a mismatch in bank credit volumes is especially visible in the developing countries of Europe and is taken advantage of by both small companies and private individuals (Ranciere, Tornell, and Vamvakidis, 2012). These entities take out loans in foreign currency seeing the benefits stemming from lower interest rates. Ranciere, Tornell, and Vamvakidis also note that cheaper credit as a potential source of economic development can also be a source of systemic risk. White is of the view that in open economies the appearance of a credit boom may be caused by the flows of financial capital through foreign credit (White, 2006). Growth in foreign debt-financing foreign currency credit – generates quicker credit growth in the economy than growing domestic savings could have guaranteed, especially in developing countries. Brzoza-Brzezina Chmielewski, and Niedźwiedzińska prove that the disproportion in the volume of credit in foreign and local currency is the result of the monetary policy of the central bank (Brzoza-Brzezina, Chmielewski, and Niedźwiedzińska, 2010). Their research, conducted on four countries of Central and Eastern Europe (Czech Republic, Poland, Slovakia, and Hungary), demonstrated that restrictive monetary policy leads to a fall in importance of loans in the domestic currency in favor of foreign currency credit. The matter of the size of monetary and credit aggregates is subject to the objective of the applied monetary policy for many reasons. Firstly, the creation of credit is significantly dependent on monetary policy in terms of interest rates (Mishkin, 1996). Secondly, it turns out that in many countries changes in monetary and credit aggregates can provide useful information on future real and nominal changes (Borio and Filardo, 2004; Fischer, Lenza, Pill, and Reichlin, 2006).

Topical literature cites the following reasons for growth in the level of credit in the economy. Among others, Favara is of the view that a more developed financial sector supports economic growth, which results in the level of credit growing more quickly than production during the economic growth phase (Favara, 2003; Levine, 1997). Furthermore, the above-average growth in credit level may be caused by improper reactions to changes in risk over time on the part of financial market participants. Bernanke and Gertler argue that excessive optimism with respect to future profits causes

an increase in the assessment of assets securing credit and, in consequence, allows borrowing on the part of businesses and households on a greater scale (Bernanke, Gertler, and Gilchrist, 1999).

### 3. Identification of Credit Debt in Foreign Currency in European Countries

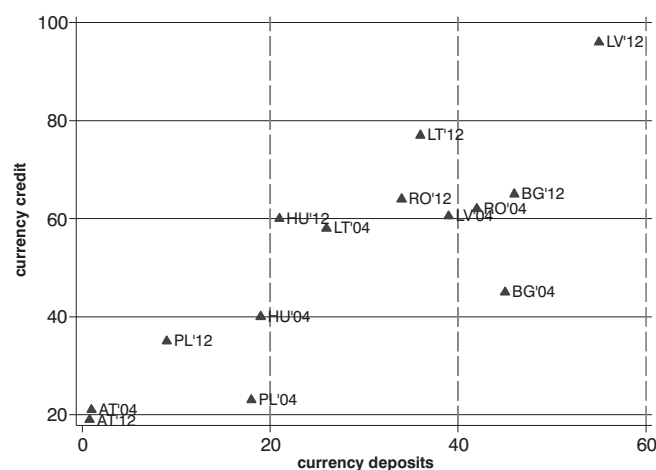
In the European Union, intensification of the credit campaign in foreign currency is extremely varied and has its basis on both the demand and supply sides. The share of foreign currency credit in all credit granted by the banking sector is relatively small in the countries of Western Europe. However, in the countries of Central and Eastern Europe, where differences in interest rate levels encourage borrowers to benefit from “cheaper” credit and banks find access to financing in dominant foreign banks, the disproportion is significant. The following countries are in the higher risk group: Bulgaria, Czech Republic, Estonia, Lithuania, Latvia, Slovakia, Slovenia, Poland, and Romania. Another cause for concern is the fact that financing through foreign credit is mainly utilized by entities that do not secure themselves against market risk – i.e. households (compare Figure No. 1).



Legend: The graph depicts the percentage of credit in foreign currency granted by monetary financial institutions (MFI) with respect to total credit.

Fig. 1. Share of Foreign Currency Credit for Households and Businesses in Total Credit in the Countries of the European Union in 2012. Source: Developed on the basis of R. Karkowska (2015). *Ryzyko systemowe. Charakter i źródła indywidualizacji w sektorze bankowym* [Systemic risk: Character and sources of individualization in the banking sector]. Cracow: Wolters Kluwer.

Moreover, a growth tendency in the analyzed phenomenon is observable in countries whose entities are financed through foreign currency credit. Figure No. 2 presents changes that occurred over the December 2004–April 2012 period. The same period saw only a minimal increase or even a fall in foreign currency deposits in the non-financial sector. It should be noted that growth in foreign currency credit took place in spite of a general fall in demand for credit. This may suggest the existence of factors encouraging growth in demand for foreign currency credit as well as the existence of potential threats stemming from a currency mismatch in the banking sector balance.



Legend: LV – Latvia, LT – Lithuania, PL – Poland, RO – Romania, HU – Hungary, BG – Bulgaria, AT – Austria, '04 and '12 – signified the years 2004 and 2012, respectively. The graph presents foreign currency credit granted to residents other than financial institutions as compared to deposits made by residents other than financial institutions. The values depict the percentage of the overall credit and deposit balances. Changes relate to the December 2004 – April 2012 period.

*Fig. 2. Changes in the Share of Foreign Currency Credit and Deposits in Selected Member States over the Years 2004–2012. Source: Developed on the basis of R. Karkowska (2015). Ryzyko systemowe. Charakter i źródła indywidualizacji w sektorze bankowym [Systemic risk: Character and sources of individualization in the banking sector]. Cracow: Wolters Kluwer.*

The phenomenon of growing share of foreign currency credit is sufficiently significant to be a real cause for concern and to meet with a reaction on the part of the European Systemic Risk Board – Regulation (EU) No. 1092/2010 of the European Parliament and of the Council of November 24, 2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board – which issued recommendations stimulating systemic risk preventive measures (European Systemic Risk Board (ESRB), 2012):

- Restrict regulatory arbitrage bypassing domestic regulations,
- Manage the disproportion in foreign currency credit campaigns with respect to the local currency,
- Decrease the market for credit risk open positions,
- Prevent the generating of speculative bubbles on financial markets, and
- Prevent information asymmetry among entities taking out loans and banks in order to increase the awareness of risk among borrowers and provide encouragement for the responsible granting of credit.

#### **4. Data Characteristics and Research Method**

This study has verified the sensitivity of foreign currency loans that are taken out to factors that are specific to the banking sector as well as market and macro-economic factors. It is to this end that the dependent variable was defined as the annual change in foreign currency credit volume (granted in a currency other than the domestic currency) and the total sum of credit. The indicated measure was subjected to analysis of sensitivity to several factors specific to the banking sector – i.e. changes to the level of the interest rates, differences in the interest on domestic and foreign currency (the study took into account the differences between the domestic currency and three foreign currencies – EUR, USD, and CHF – which hold the largest share of the debt of European countries), the volatility of currency exchange rates, and macro-economic factors, such as changes to the real gross domestic product. The research was conducted on the aggregated annual data from the Thomson Reuters Eikon, OECD, and World Bank databases. The study was performed for data from twenty-seven European countries: (i) the young market economies (that the author described as emerging countries) made up of Bulgaria, Croatia the Czech Republic, Estonia, Lithuania, Latvia, Poland, Romania, Slovenia, Slovakia, and Hungary and (ii) the mature economies (developed countries) made up of Austria, Belgium, Cyprus, Greece Finland, France, Denmark, Germany, Spain, the Netherlands Luxembourg, Ireland, Portugal, Sweden, Italy, and Great Britain. Selection of the sample was determined by accessibility of the appropriate time sequences. The period analyzed was extended to twelve years (2003–2014) due to the procyclical nature of demand for bank credit.

Panel data was received upon combining the time and cross-sectional dimensions. Model parameter estimates were made using the Generalized Method of Moments (GMM) with the help of the Arellano and Bond estimator (Arellano and Bond, 1991). Use of the indicated method by application of the variable first differences limited problems stemming from the presence of specific unobservable effects. Moreover, dependent variable delays were introduced in order to capture the dynamic character of each of them. Estimating model parameters was preceded by the Hansen test monitoring the correctness of applied instruments and AR(1) and AR(2)

tests for the presence of autocorrelation of residues of the first and second order.

Four models verifying the sources of change in the size of granted foreign currency loans in European countries were subject to estimation in order to verify the primary hypotheses:

1. A model estimating the influence of factors specific to the banking sector on credit demand:

$$CUR\_LOANS_{i,t} = CUR\_LOANS_{i,t,j} + LENDING\_RATE_{i,t} + CREDIT\_MARGIN_{i,t} + \mu_{i,t} = \varepsilon_{i,t} \quad (1)$$

2. A model estimating the influence of changes in the interest rate level on foreign currency credit:

$$CUR\_LOANS_{i,t} = CUR\_LOANS_{i,t,j} + LT\_RATE_{i,t} + EUR\_SPREAD_{i,t} + USD\_SPREAD_{i,t} + CHF\_SPREAD_{i,t} + \mu_{i,t} = \varepsilon_{i,t} \quad (2)$$

3. A model estimating the influence of the volatility of currency exchange rates on the level of foreign currency credit:

$$CUR\_LOANS_{i,t} = CUR\_LOANS_{i,t,j} + EURCHF\_VOL_{i,t} + EURUSD\_VOL_{i,t} + \mu_{i,t} = \varepsilon_{i,t} \quad (3)$$

4. A model estimating the influence of economic factors on the level of foreign currency credit:

$$CUR\_LOANS_{i,t} = CUR\_LOANS_{i,t,j} + UNEMPL_{i,t} + GDP\_REAL_{i,t} + \mu_{i,t} = \varepsilon_{i,t} \quad (4)$$

Where:

$i$  – variable for successive countries as observed over period  $t$ ,  $j$  – order of variable delay,  $CUR\_LOANS_{i,t}$  – logarithm of the level of foreign currency loans granted as of the end of the year in a currency other than the domestic one,  $LENDING\_RATE_{i,t}$  – annual change in loan interest rate,  $CREDIT\_MARGIN_{i,t}$  – annual change in the margin on the interest calculated on the basis of credit assets by book value,  $LT\_RATE_{i,t}$  – annual long-term interest rate change on the basis of the profitability of ten-year treasury bonds,  $EUR\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for EUR,  $CHF\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for CHF,  $USD\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for USD,  $EURCHF\_VOL_{i,t}$  – annual variability in the EUR/CHF exchange rate cal-

culated as the standard deviation for daily rates of the rate of return over a period of one year,  $EURUSD\_VOL_{i,t}$  – annual variability in the EUR/USD exchange rate calculated as the standard deviation for daily rates of the rate of return over a period of one year,  $UNEMPL_{i,t}$  – domestic unemployment rate,  $GDP\_REAL_{i,t}$  – real gross domestic product growth rate,  $\mu_{j,i}$  – group effect, and  $\varepsilon_{i,t}$  – random component.

Estimating panel regression coefficients was preceded by descriptive statistics and a correlation matrix. The results of the descriptive statistics are presented in Table No. 1.

	Number of observations	Average	Median	Standard deviation	Minimum	Maximum	Skewness
CUR_LOANS	167	974454.10	226283.00	1538607.22	3380.00	6722997.00	2.23
LN_CUR_LOANS	167	12.25	12.33	2.07	8.13	15.72	-0.11
LENDING_RATE	167	4.70	4.28	2.09	1.68	12.65	1.66
CREDIT_MARGIN	167	1.82	1.62	0.82	0.19	4.57	1.23
LT_RATE	167	4.29	3.82	2.39	0.59	21.14	2.77
EUR_SPREAD	167	0.58	0.19	2.52	-3.41	17.80	2.55
USD_SPREAD	167	0.46	0.05	2.46	-3.33	17.62	2.73
CHF_SPREAD	167	1.58	1.41	2.64	-3.09	18.95	2.13
EURCHF_VOL	167	0.06	0.04	0.04	0.02	0.16	1.34
EURUSD_VOL	167	0.10	0.10	0.02	0.06	0.14	0.22
UNEMPL	167	7.16	6.90	3.22	1.10	18.30	0.87
GDP_REAL	167	1.16	1.50	3.19	-9.10	8.40	-0.66

Legend:  $CUR\_LOANS_{i,t}$  – logarithm of the level of foreign currency loans granted as of the end of the year in a currency other than the domestic one,  $LENDING\_RATE_{i,t}$  – annual change in loan interest rate,  $CREDIT\_MARGIN_{i,t}$  – annual change in the margin on the interest calculated on the basis of credit assets by book value,  $LT\_RATE_{i,t}$  – annual long-term interest rate change on the basis of the profitability of ten-year treasury bonds,  $EUR\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for EUR,  $CHF\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for CHF,  $USD\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for USD,  $EURCHF\_VOL_{i,t}$  – annual variability in the EUR/CHF exchange rate calculated as the standard deviation for daily rates of the rate of return over a period of one year,  $EURUSD\_VOL_{i,t}$  – annual variability in the EUR/USD exchange rate calculated as the standard deviation for daily rates of the rate of return over a period of one year,  $UNEMPL_{i,t}$  – domestic unemployment rate,  $GDP\_REAL_{i,t}$  – real gross domestic product growth rate.

Tab. 1. Descriptive Statistics of the Variables for Twenty-Seven European Countries over the Years 2003–2014. Source: Own study.



	LOANS	L_RATE	MARGIN	LT_IR	EUR_SPREAD	USD_SPREAD	CHF_SPREAD	EURCHF_VOL	EURUSD_VOL	UNEMP	GDP_REAL
LOANS	1.00										
L_RATE	-0.20*** (0.00)	1.00									
MARGIN	-0.34*** (0.00)	0.32*** (0.00)	1.00								
LT_IR	-0.21*** (0.00)	0.49*** (0.00)	0.18* (0.01)	1.00							
EUR_SPREAD	0.20*** (0.00)	0.45*** (0.00)	0.18* (0.01)	0.98*** (0.00)	1.00						
USD_SPREAD	0.19*** (0.00)	0.43*** (0.00)	0.23** (0.00)	0.97*** (0.00)	0.97*** (0.00)	1.00					
CHF_SPREAD	0.19*** (0.00)	0.47*** (0.00)	0.14 (0.05)	0.97*** (0.00)	0.99*** (0.00)	0.94*** (0.00)	1.00				
EURCHF_VOL	-0.03 (0.64)	0.12* (0.05)	0.09 (0.21)	0.32*** (0.00)	0.40*** (0.00)	0.43*** (0.00)	0.40*** (0.00)	1.00			

EURUSD_VOL	0.01	-0.12*	0.04	0.17**	0.29***	0.20***	0.31***	0.23***	1.00		
	(0.89)	(0.05)	(0.57)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
UNEMPL	-0.14*	0.12*	0.06	-0.26***	-0.29***	-0.36***	-0.24***	-0.14*	-0.41***	1.00	
	(0.01)	(0.05)	(0.43)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)		
GDP_REAL	0.03	-0.10**	0.24	0.22**	0.09***	0.13***	0.11**	0.11***	0.22**	0.13**	1.00
	(0.29)	(0.05)	(0.17)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.02)	(0.00)	

Legend:  $CUR\_LOANS_{i,t}$  – logarithm of the level of foreign currency loans granted as of the end of the year in a currency other than the domestic one,  $LENDING\_RATE_{i,t}$  – annual change in loan interest rate,  $CREDIT\_MARGIN_{i,t}$  – annual change in the margin on the interest calculated on the basis of credit assets by book value,  $LT\_RATE_{i,t}$  – annual long-term interest rate change on the basis of the profitability of ten-year treasury bonds,  $EUR\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for EUR,  $CHF\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for CHF,  $USD\_SPREAD_{i,t}$  – difference in the 6M interest rate level for the domestic Interbank market and the EURIBOR 6M interest rate for USD,  $EURCHF\_VOL_{i,t}$  – annual variability in the EUR/CHF exchange rate calculated as the standard deviation for daily rates of the rate of return over a period of one year,  $EURUSD\_VOL_{i,t}$  – annual variability in the EUR/USD exchange rate calculated as the standard deviation for daily rates of the rate of return over a period of one year,  $UNEMPL_{i,t}$  – domestic unemployment rate,  $GDP\_REAL_{i,t}$  – real gross domestic product growth rate; the parentheses present the *p-value*: \*  $p < 0.05$ , \*\*  $p < 0.01$ , and \*\*\*  $p < 0.001$ .

Tab. 2. Matrix of Correlations for Variables from Models (1)–(4) for Twenty-Seven European Countries for the Years 2003–2014. Source: Own study.

The following observations regarding market risk over the 2003–2014 period may be made on the basis of the data presented in Table No. 1: a difference between the domestic currency and CHF ( $\text{CHF\_SPREAD} - 1.58$  as compared with  $\text{EUR\_SPREAD} - 0.58$ ) that is significantly higher than the other differences. At the same time, it should be stressed that over the examined period the currency exchange rates were characterized by relatively low variability ( $\text{EURCHF\_VOL} - 0.06$  and  $\text{EURUSD\_VOL} - 0.10$ ). This may serve as significant encouragement for selecting financing in foreign currencies. Additionally, if one takes into account the high share of the lending margin in the average level of the credit interest rate, then it may be concluded that in striving to lower their costs of financing, borrowers selected the riskier, but cheaper solution.

The indicated suppositions are also confirmed by the estimated correlation coefficients of the dependent variable with the independent variables of the model. The correlation matrix for the variables used in the study for the twenty-seven European countries over the years 2003–2014 makes up Table No. 2. Foreign currency credit volumes are additionally correlated with the size of the spread between the domestic and foreign interest rates as well as the level of economic growth. In other words, foreign currency debt has a favorable economic environment and this is the reason for its growth. On the other hand, a negative correlation is seen between the level of foreign currency credit and its cost.

## 5. Research Results

Table No. 3 presents the results of panel regression estimated for twenty-seven European countries over the years 2003–2014. In total, five models were estimated for various sets of independent variables, which is noted in the table headings (Model 1 – Model 5). Model 1 provides an estimate of specific banking sector factors on credit demand, Model 2 provides an estimate of the influence of changes in interest rate levels on credit demand, Model 3 provides an estimate of volatility in currency exchange rates on the level of foreign currency credit, Model 4 provides an estimate of economic factors on the level of foreign currency credit, and Model 5 takes into account all of the analyzed sources. The two first lines show the relation between the dependent variable and its values appropriately delayed by 1  $\text{CUR\_LOANS}(-1)$  and 2  $\text{CUR\_LOANS}(-2)$  periods. The applied statistics and tests are presented in the lower section of Table No. 3.

The results of the estimates of sources of change in levels of foreign currency loans taken out in the countries of Europe demonstrate that their level is significantly determined by factors specific to the banking sector of the given country. Growth in loan interest rate  $[-0.008]$  as well as of the lending margin  $[-0.003]$  lowered the volume of the sum of granted credit.

## Sources of Foreign Currency Debt in European Countries

	Model 1	Model 2	Model 3	Model 4	Model 5
CUR_LOANS (-1)	1.360*** (0.15)	1.354*** (0.10)	1.714*** (0.05)	1.354*** (0.02)	0.762 (0.54)
CUR_LOANS (-2)	-0.367* (0.15)	-0.361*** (0.10)	-0.716*** (0.05)	-0.541*** (0.02)	0.173 (0.51)
LENDING_RATE	-0.008** (0.01)				-0.162** (0.06)
CREDIT_MARGIN	-0.033* (0.02)				-0.090 (0.06)
LT_INTEREST		0.017 (0.02)			-0.105*** (0.03)
EUR_SPREAD		-0.113 (0.08)			-0.680** (0.23)
USD_SPREAD		-0.009 (0.02)			0.013 (0.15)
CHF_SPREAD		0.098** (0.05)			0.733** (0.28)
EURCHF_VOL			-0.059 (0.13)		0.695 (1.09)
EURUSD_VOL			-0.730** (0.25)		-6.259* (2.72)
UNEMPL				-0.022 (0.02)	-0.018 (0.03)
GDP_REAL				0.018** (0.01)	0.009* (0.00)
CONSTANT	0.142 (0.14)	-0.038 (0.11)	0.109** (0.04)	0.080* (0.23)	2.080** (0.78)
Number of observations	145	214	219	219	107
Number of countries	18	25	27	27	15
Number of instruments	143	110	42	42	107
AR(1)	-1.7	-2.5	-2.5	-1.5	-1.4
<i>p-value</i>	0.1	0.0	0.0	0.0	0.0
AR(2)	-0.6	-1.0	-0.6	-0.9	-1.5
<i>p-value</i>	0.5	0.3	0.6	0.5	0.1
Sargan test	152.8	178.3	38.3	17.3	130.1
<i>p-value</i>	0.2	0.0	0.4	0.7	0.0
Hansen test	15.2	17.7	22.5	19.4	0.6
<i>p-value</i>	1.0	1.0	1.0	1.0	1.0

Legend: The values presented in the parentheses show the standard error, where the level of significance of the p-value is shown with stars: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , as appropriate.

Tab. 3. Results of Estimates of Models (1)–(4) Verifying Sources of Change in Foreign Currency Credit in European Countries over the Years 2003–2014. Source: Own study.

There is nothing surprising in the fact that more expensive credit becomes less accessible to households and businesses. However, looking more broadly at this phenomenon, growing credit costs encourage, or even force, borrowers to seek cheaper offers. In this case, it is the use of financing in foreign currency. In its turn, the model (compare with Model 2) estimating the impact of change in foreign currency credit interest rates confirms the frequently used argument explaining the causes behind growth in foreign currency debt: an increase in the spread between credit interest rates in foreign and domestic currency stimulate demand for the first. However, it should be noted that the model's estimates show that over the 2003–2014 period this rule was confirmed exclusively for differences in interest rate between Swiss francs and the domestic currency [0.098]. In the remaining cases this relation is negative and statistically insignificant (compare with EUR\_SPREAD  $-0.113$ , and USD\_SPREAD  $-0.009$ ). A successive factor determining the taking out of a foreign currency loan should be currency exchange rate risk. In line with the estimates of Model 3, it turns out that the level of foreign currency credit fell in accordance with the volatility of the rate for EUR/CHF [ $-0.059$ ] and EUR/USD [ $-0.730$ ], respectively. This is a relation that is statistically significant and the strongest in the examined group of explanatory variables. It is on this basis that it may be concluded that for the average household or the average business in Europe, exchange rate risk is an important determinant in the selection of financing. Changes in the economy (Model 4) measured by the real GDP and in this case periods of growth, fostered foreign currency borrowing [0.018] and had a positive impact, while the reverse was true of growth in unemployment rate [ $-0.022$ ].

Overall, research into the sources of change in the level of foreign currency loans in European countries over the years 2003–2014 confirmed the hypothesis as initially stated. This brings us closer to the conclusion that growth in foreign currency debt was determined by a calculation of the costs of financing (lending margin and interest). Taking on liabilities in foreign currency was indeed dependent on the volatility of exchange rates and was procyclical in character (compare with Model 5).

## **6. Conclusions**

In summing up, it should be noted that the high share of foreign currency credit in the overall credit amount may have a systemic impact and generate conditions facilitating the transfer of unfavorable phenomena among sectors. Moreover, growth in foreign currency credit campaigns shows procyclic tendencies, which can have a negative effect on the price of assets. Credit risk generated by foreign currency credit particularly stems from market risk because the volatility of currency exchange rates influences the level of interest payments and interest costs for borrowers. This situa-

tion is especially dangerous when depreciation of the domestic currency is coupled with growth in foreign interest rates. In such cases, in countries with a floating exchange rate, there is a growing risk of default by borrowers. This risk especially pertains to legal entities and private individuals who do not have foreign currency revenues and do not secure foreign currency risk using derivative instruments. Unsecured entities (usually households and small and medium enterprises active on the domestic market) are especially threatened by currency mismatch because they have no natural security in the form of revenues in foreign currency.

Growth in lending campaigns may also lead to the emergence of speculative bubbles on asset markets, which may cause an increased lack of resilience to crisis in the financial and real sectors. When a similar phenomenon touches many entities, the situation takes on a systemic dimension. The channel for infection in the case of material risk as stemming from foreign currency credit may be additionally stimulated by the interference of financial groups.

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