Category: preliminary communication

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Interest Rates on Corporate Loans in Croatia as an Indicator of Imbalance Between the Financial and the Real Sector of National Economy

Abstract:

Interest rates on corporate bank loans in Croatia are rarely discussed in terms of interdependence of the functioning between the financial and the real sectors of national economy. The aim of this paper is to expand knowledge of the level of interest rates on corporate loans in Croatia and their determinants, as well as of the relationship between interest rates and the pace of economic activity. For this purpose, interest rates and interest rate spreads in Croatia are compared to rates and spreads in selected European countries. The paper explores the correlation of interest rates with a variety of potential factors and compares the level of interest rates and spreads with an average growth rate of economic activity. It was found that interest rates on corporate loans in Croatia were approximately at the same average level of the selected countries within the analyzed period, whereas interest rate spreads were above the average of those countries. However, interest rates on corporate loans and interest rate spreads in the selected countries are significantly above the average of the Eurozone. In between interest rates on corporate loans and a part of the macroeconomic variables as well as the variables of the banking sectors of the analyzed countries, including Croatia, a strong connection within the correlation matrices is identified. Along with the high interest spreads, the second-lowest rate of economic growth is achieved in Croatia (after Hungary) within the analyzed period.

Keywords:

interest rate, interest rate spread, bank loans, financial intermediation and economic activity

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Introduction

In economies where the bank loan is a significant source of corporate financing, interest rates significantly affect the movement of production, employment and overall gross domestic product. They affect entrepreneurial ventures and economic activity, financial results and cash flows of companies and banks. They represent a synthetic indicator of condition and trends in the financial and the real sector.

Interest rates on corporate bank loans in Croatia have been at a very high level for a significant part of the last twenty years. Nevertheless, this problem has been rarely discussed so far in terms of interdependence of the functioning between the financial and the real sphere of national economy. Therefore, in defining the objective of this work starts and from that aspect of research. The aim of this paper is to expand knowledge of the level of bank interest rates on corporate loans in Croatia, their determinants, as well as of the interconnection between interest rates and the development of economic activities. For this purpose interest rates and interest rate spreads in Croatia are being compared to the rates and spreads in selected European countries. The paper investigates the correlation between interest rates and a variety of potential factors and compares the level of interest rates and spreads to an average growth rate of economic activity. The research questions posed in this study are important for understanding the current economic situation in Croatia, as well as for the design of the necessary changes. The research findings can contribute to a better understanding of the determinants of interest rate movements and the correlation of financial conditions and performances of the Croatian economy, as well as to developing changes in economic policy and regulation.

The paper is structured as follows: after Chapter 1 in which introductory remarks are presented, the theoretical framework is described in Chapter 2, the survey methodology in Chapter 3. Chapter 4 presents the international comparison of interest rates on bank loans in Croatia and the selected countries. Interest rate spreads in Croatia and the selected countries are outlined in Chapter 5. In Chapter 6 the determinants of interest rates on corporate bank loans in Croatia and the selected countries are being explored. The link between interest rates on bank loans and interest rate spreads and the pace of economic activity in Croatia and the selected European countries is presented in Chapter 7. The research findings are synthesized in the final chapter, Chapter 8.

Theoretical Framework

The costs of financial intermediation are important determinants of the total cost of financing the real economy. Research shows that there is a strong correlation between the cost of financial intermediation and economic growth. The cost of financing has significant impact on investments and allocation of capital, and thus on the growth potential and the pattern of economic activity (for more details see Chapters [1], [2], and [3]). Interest rate spread and net interest margin of banks are commonly used as an indicator of the cost, but also of the efficiency of financial intermediation. The Interest rate spread is defined as the difference between lending rates and deposit rates. The net interest margin is calculated as the difference between interest income and interest expense divided by assets of banks that earn interest. Saunders and Schumacher [4] point out that it is not clear in advance whether high-margins are good or bad in terms of social welfare. Low margins may indicate a relatively competitive banking system with low costs of intermediation and regulatory burdens. On the other hand, relatively high margins may increase the degree of stability of the banking system which is protected against

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macroeconomic shocks through increased profitability and capital. In this context Saunders and Schumacher [4] emphasize the fact that bank closures can bring significant externalities and social costs, referring to Diamonds and Dydvigs study [5].

Determinants of bank interest rates, interest spreads and net interest margins, have often been the subject of economic research in the past decades, starting with the work of Ho and Saunders [6]. From the perspective of banks the net interest margin is determined by internal and external factors and represents an important determinant of their profitability. From the perspective of the real economy it is - along with macroeconomic impacts - the key factor of the level of interest rates for the private sector. A high net interest margin typically refers to less developed financial markets and the lack of efficiency of the banking sector, which unfavorably affects investments and slows down economic activity. The results of this research show that - apart from banks - decision makers of the economic policy also have an important impact on the costs of financial intermediation and thus on the stimulation of economic activity. The implementation of macroeconomic policies aimed at preventing and mitigating risks as well as preserving a stable macroeconomic environment has influence on the costs of financial intermediation (see also Dumičić and Ridzak [7], and CNB [8]). High interest rates on bank loans can be a key cause of poor economic performance (discussed in Krnić [9]) and different macroeconomic imbalances in the economy (discussed in Krnić and Radošević [10]).

Research Methodology

The research in this paper aims to provide an insight into the level of interest rates on bank loans in Croatia, their determinants, as well as the connection between interest rates and the dynamic of economic activities. For this purpose, interest rates on corporate loans in Croatia are compared to the rates in the countries selected for international comparison. A comparison of interest spreads in Croatia and the selected countries is carried out as well. Interest rate spreads can be considered as a determinant of interest rates, but also as an indicator of efficiency of financial intermediation.
In a study of the interdependence of different variables, respectively the determinants of interest rates, their levels and changes are being compared to the changes and levels in the countries selected for the international comparison, and all together with the level of interest rates in Croatia and the selected countries.

The following countries are selected for the study (called the EU-8 in the paper): Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania, Slovakia, and Slovenia. During the process of the selection of potential determinants of interest rates previous researches cited in the theoretical framework are being followed, as well as research of the causes of high interest rates in Croatia in the nineties (presented in Krnić [11]). Their final selection, however, is determined by the possibility of securing reliable data for them. For these reasons, some of the determinants that would otherwise be included in this selection, are not included in this study. Furthermore, variables which would, while using the work of those sources, imply the additional collection of data on the performance of banks within the banking sector of the selected countries, are not included either. The research includes, depending on the available data, the variables reflecting the macroeconomic environment in which each banking sector functions, and the variables that together reflect the performance of the banking sector of each country from the defined selection. Interest rates on corporate short-term loans and interest rates on long-term corporate loans are considered

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dependent variables. The interest rates and determinants of interest rates on corporate loans that were included in the study, along with the symbols used in the processing and interpretation of the results, as well as information on data sources, are shown in Table 1.

Variables	Symbols	Data source
Dependent variables		
Interest rates on short-term corporate loans	*a*	*ECB, CNB*
Interest rates on long-term corporate loans	*b*	*ECB, CNB*
Independent macroeconomic variables		
Growth rate of gross domestic product	*c*	*Eurostat*
Inflation rate	*d*	*Eurostat*
Three-month interest rate on the money market	*e*	*Eurostat*
Public debt in % of GDP	*f*	*Eurostat*
Yield on bonds	*g*	*Eurostat*
CDS (Credit Default Swap) spread	*h*	*Deutsche Bank*
Independent variables of banking sectors		
Interest rates on deposits	*i*	*World Bank*
Interest rate spread	*j*	*World Bank*
Share capital assets	*k*	*World Bank*
Share of bad ("non-performing") loans	*l*	*World Bank*
Share of five largest banks in total assets	*m*	*CNB, ECB*
HHI - Herfindahl-Hirschmann Index	*n*	*CNB, ECB*
Capital Adequacy	*o*	*Raiffeisen Bank*
Return on equity (ROE)	*p*	*Raiffeisen Bank*
Return on assets (ROA)	*r*	*Raiffeisen Bank*

Table 1: Interest rates and determinants of interest rates on corporate loans , Source: Own work, Krnić [12].

Bearing in mind that the research is conducted on the basis of temporally short series and annual data, basic measures of descriptive statistics are used for processing the data. To compare interest rates and the considered variables, the arithmetic mean (AVERAGE), the minimum (MIN) and maximum (MAX) value of the variables, the mean positional value (MEDIAN), and the standard deviation (STDEV) have been calculated (hereafter the arithmetic mean is referred to as "average", "average value", and the like, the high positional value is referred to as "median" only). To study the correlation between interest rates and the selected variables (determinants), the correlation coefficients shown in the correlation matrix have been calculated.

In the research of the correlation between interest rates and interest rate spreads and the dynamics of economic activity, the levels of interest rates and spreads are compared to the average rates of GDP growth in Croatia and the countries selected for the international comparison.

The paper represents a continuation of the studies outlined in the theoretical framework, as well a compilation and reinterpretation of a study on the level of interest rates and interest spreads, on determinants of interest rates movement, and on the correlation between interest rates and the dynamics of economic activity, conducted in Krnić [11], [12] and [13].

The advantage of the chosen methodology is that it in a simple way allows a comparison of the level of interest rates and spreads as well as the dynamics of economic activities between the analyzed countries on the base of average values. The disadvantage, however, is that this way, without considering all potential determinants, the dimensions of the impact of interest rates and spreads on level and pace of economic activity cannot be determined.

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International comparison of interest rates on bank loans in Croatia and the selected Countries

In this chapter as a starting point for further research base data on interest rates movement on corporate loans in Croatia as well as the averages for all countries within the scope of the EU-8 are presented. Interest rates on short-term corporate loans in Croatia and averages for all countries within the scope of the EU-8 from 2005 to 2012 are shown in Table 2, based on data from the ECB [14], and the CNB [15], and own calculations. For the Eurozone own calculations of the rates, calculated from the average rates reported per month, are shown. The measures of descriptive statistics for the EU-8 have no data for Bulgaria and Romania in 2005 and 2006.

	2005	2006	2007	2008	2009	2010	2011	2012
CROATIA	6,6	6,2	6,5	7,5	8,2	8,2	7,6	7,0
EU-8:								
AVERAGE	5,7	5,5	7,3	8,5	8,4	7,1	6,9	6,6
MIN	3,3	3,9	4,7	5,4	3,6	3,4	3,6	3,2
MAX	9,4	8,7	12,2	15,2	17,5	12	10,1	9,6
MEDIAN	5,3	5,1	6,3	7,3	7,2	7,2	7,0	6,9
STDEV	2,2	1,7	2,5	3,2	4,3	2,7	2,3	2,3
EUROZONE	4,3	4,8	5,7	6,1	4,0	3,5	4,0	4,0

Table 2: Interest rates on short-term corporate loans in Croatia and the EU-8 from 2005 to 2012

Interest rates on short-term corporate loans in Croatia have been above the average rates of the selected countries in 2005 and 2006 as well as in 2010, 2011, and 2012. However, throughout the whole period of the analysis they have been above the median calculated for all countries within the EU-8. Interest rates on short-term corporate loans in Croatia and the other countries within the EU-8 have been significantly above the average rates of the Eurozone throughout the whole analyzed period.

The Interest rates on long-term corporate loans in Croatia and average rates for all countries within the scope of the EU-8 from 2005 to 2012, based on data of the ECB [14], and the CNB [15], and own calculations, are shown in Table 3. Rates on loans from 1 to 5 years were considered long-term rates. For the Eurozone own calculations of the rates, calculated from the average rates reported per month, are shown, too. The measures of descriptive statistics for the EU-8 and for these interest rates have no data for Bulgaria and Romania in 2005 and 2006.

Interest rates on long-term corporate loans in Croatia have been close to the average rates within the EU-8, except in 2006 when they have been above the arithmetic mean of the selected countries. However, throughout a great part of the period of the analysis, those rates have been above the median calculated for the EU-8 countries. Throughout the whole period of the analysis, these interest rates in Croatia and the other countries within the EU-8 have been significantly above the average rates of the Eurozone countries.

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	2005	2006	2007	2008	2009	2010	2011	2012
CROATIA	5,4	5,8	6,2	6,9	7,2	7,2	6,6	6,2
EU-8:								
AVERAGE	5,6	5,7	7,6	8,5	8,4	7,3	7,1	6,7
MIN	3,3	4	4,8	5,7	3,8	3,8	4	3,8
MAX	9,9	9,1	12,4	14,9	17,6	12,8	10,6	10,3
MEDIAN	4,8	5	6,4	6,8	6,9	6,9	6,7	6,4
STDEV	2,21	1,81	2,64	3,15	4,49	3,01	2,46	2,48
EUROZONE	3,8	4,2	5,1	5,7	3,8	3,3	3,7	3,5

Table 3: Interest rates on long-term corporate loans in Croatia and the EU-8 countries from 2005 to 2012

For a more thorough analysis of the comparison of the interest rates in Tables 2 and 3, where nominal interest rates are shown, Table 4 presents the average annual inflation rate (HICP - Harmonized indices of consumer prices - inflation rate - annual average), which Eurostat [16] reports. The Inflation rates for Croatia and the averages for all countries within the scope of the EU-8 are shown separately.

	2005	2006	2007	2008	2009	2010	2011	2012
CROATIA	3,0	3,3	2,7	5,8	2,2	1,1	2,2	3,4
EU-8	3,8	3,9	4,3	6,5	2,6	2,7	3,4	3,6

Table 4: Average annual inflation rates for Croatia and the EU-8 countries for from 2005 to 2012

Table 4 shows that throughout the analyzed period relatively low average rates of inflation have been reported and that the inflation rates in Croatia have been below the average rates in the EU-8. Therefore, the nominal interest rates shown in Tables 2 and 3 from this aspect can be assessed as appropriate for comparisons. In fact, there is no reason to believe the level of nominal interest rates in Croatia is based on the inflation rates because these rates are below the average of the EU-8 countries.

Figure 1 shows the calculated arithmetic means and median interest rates on short-term and long-term corporate loans in Croatia and the selected countries from 2005 to 2012, based on data from Tables 2 and 3.

Figure 1 indicates that the average interest rates on short-term corporate loans in Croatia from 2005 to 2012 have been close to the average of the EU-8 countries, but still below that average, and also above the median calculated for the EU-8. Interest rates on long-term corporate loans in Croatia in this period have been below the EU-8 average, and almost at the level of the median for this scope of countries. However, the calculated average interest rates on short-term and long-term loans for the analyzed period in Croatia and the EU-8 are significantly above rates like these within the Eurozone.

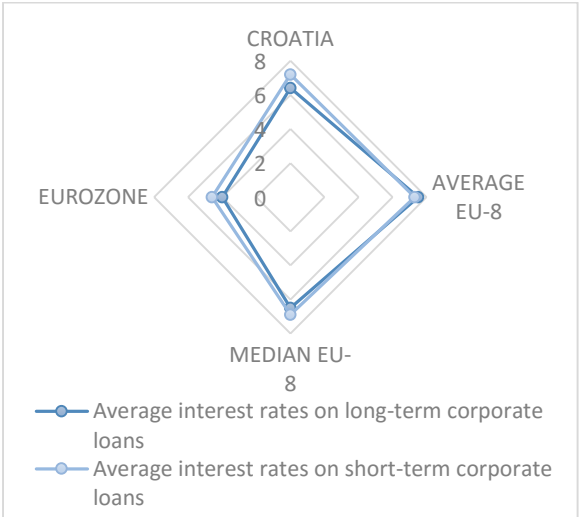

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Figure 1: Average interest rates on short-term and long-term corporate loans in Croatia and the selected countries from 2005 to 2012

When considering these comparisons it is essential to take into account that the bank interest rates on loans underlie the influence of complex activity of various factors. They are divided into macroeconomic factors, into the ones associated with the banking sector in general, and into the determinants that are related to individual banks. Thus, the complex structure of the variables and their interconnection often make it difficult to unambiguously identify the causes of movement and level of interest rates on loans.

Interest spreads in Croatia and the selected countries

Interest rate spreads can be considered as indicators of the efficiency of financial intermediation and as indicators of financial conditions in which economic activities take place. Table 5 shows the interest spreads in the banking sector in Croatia (in %) from 2005 to 2012, based on data from the Bulletin [15], and own calculations.

	2005	2006	2007	2008	2009	2010	2011	2012	*A*
1. C1	9,91	9,07	9,32	10,71	11,12	9,90	9,36	9,26	9,8
2. D1	1,58	1,91	2,67	2,92	2,22	1,61	1,88	1,76	2,1
3. SPREAD (1 - 2)	8,33	7,16	6,65	7,79	8,90	8,29	7,48	7,50	7,8
4. C2	6,18	6,30	6,73	7,73	8,28	7,78	7,15	6,54	7,1
5. C3	5,29	5,65	6,79	7,08	6,98	6,38	6,49	5,08	6,2
6. D2	3,99	3,67	3,98	4,09	3,01	2,91	2,86	2,38	3,4
7. D3	2,61	2,94	3,44	3,97	3,98	3,09	2,90	2,84	3,2
8. SPREAD (4 - 6)	2,19	2,63	2,75	3,64	5,27	4,87	4,29	4,16	3,7
9. SPREAD (5 - 7)	2,68	2,71	3,35	3,11	2,90	3,27	3,59	2,24	3,0
10. SPREAD (4 - 7)	3,57	3,36	3,29	3,76	4,30	4,69	4,25	3,70	3,9

C1 = Kuna credits not indexed D1 = Kuna deposits not indexed; C2 = Kuna loans indexed to foreign currency; C3 = Loans in euros; D2 = Kuna deposits indexed to foreign currency; D3 = Foreign currency *deposits;* SPREAD = Interest spread; *A = AVERAGE.*

Table 5: Interest rate spreads in the banking sector in Croatia from 2005 to 2012

The interest rate spread, defined as the difference between interest rates on Kuna credits not indexed and interest rates on Kuna deposits not indexed, has been at a very high level throughout the whole analyzed period. The interest rate spread calculated as the difference between interest rates on Kuna credits indexed and interest rates on Kuna deposits indexed has been the largest just during the recession within the analyzed period. The case is similar with the interest rate spread calculated from the difference between interest rates on Kuna credits indexed and interest rates on foreign currency deposits.

Table 6 shows a comparison of the interest spreads in Croatia and the EU-8 countries from 2005 to 2012 according to the World Development Indicators [18]. When interpreting the comparison of interest spreads it should be taken into account that for some years data are missing for Poland, Slovakia, and Slovenia.

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	2005	2006	2007	2008	2009	2010	2011	2012
CROATIA	9,5	8,2	7,0	7,2	8,4	8,6	8,0	7,6
EU-8:								
AVERAGE	6,14	5,01	4,76	4,09	5,55	6,06	5,58	5,62
MIN	3,4	0,6	2,3	0,3	4,5	2,7	2,1	3,7
MAX	13,2	9,2	7	7,2	8,4	8,6	8	7,6
MEDIAN	4,6	4,5	4,5	4,6	5,2	6,8	5,8	5,8
STDEV	3,20	2,55	1,82	2,34	1,31	2,08	2,09	1,42
Without data: for Poland from 2007 to 2012, for Slovakia from 2009 to 2012, and for Slovenia from 2010 to 2012								

Table 6: Interest rate spreads in Croatia and the EU-8 from 2005 to 2012

Table 6 shows that interest rate spreads in Croatia in all years of the analyzed period is above the arithmetic mean and above the medians calculated for the countries within the scope of the EU-8. These differences are significant, especially if one takes into account that the calculated average of the EU-8 includes the data for Croatia.

Determinants of interest rates on bank loans in Croatia and the selected countries

To investigate the correlation between average interest rates on short-term and long-term loans in Croatia and the other EU-8 countries and macroeconomic variables and variables of the banking sector of these countries, average values of the variables have been calculated on the basis of data from a multi-year period.

In Table 7 the averages of the values of macroeconomic variables for Croatia and the other EU-8 countries are presented from 2004 to 2012. The CDS spread variable is taken on 03/13/2014. Basic measures of descriptive statistics which allow a comparison of the calculated mean values of the variables between Croatian and the other EU-8 countries are also included in the table.

As can be seen from Table 7, Croatia after Hungary generated the lowest growth rate of GDP within the period from 2004 to 2012. During this period, only the Czech Republic had a lower rate of inflation than Croatia. The average three-month money market rate in Croatia was at the level of the medians for the EU-8, respectively below the arithmetic mean of the rates of these countries. The Public debt in % of the GDP in Croatia is significantly above the average of the EU-8 countries and above the calculated median for the countries included in the scope. The variables that reflect the risk, i.e., bond yields and CDS spreads, are above the arithmetic mean and the median of the EU-8 countries, provided the CDS spread for Croatia being more than twice as high as the level of the EU-8, according to the state from March 2014.

	Independent macroeconomic variables					
	c	d	e	f	g	h
Bulgaria	*3,28*	*5,60*	*4,33*	*20,29*	*5,16*	*126*
Czech Republic	*2,84*	*2,56*	*2,17*	*33,64*	*4,03*	*56*
Croatia	*1,02*	*2,87*	*4,90*	*47,15*	*6,03*	*326*

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Hungary	0,88	5,17	8,01	72,33	7,65	246
Poland	4,33	3,13	4,95	50,02	5,75	74
Romania	3,27	6,81	9,29	22,20	7,58	172
Slovakia	4,52	3,31	-	37,34	4,42	79
Slovenia	1,80	2,88	-	33,43	4,50	209
AVERAGE	2,74	4,04	5,61	39,55	5,64	161
MIN	0,88	2,56	2,17	20,29	4,03	56
MAX	4,52	6,81	9,29	72,33	7,65	326
MEDIAN	3,06	3,22	4,93	35,49	5,46	149
STDEV	1,30	1,49	2,37	15,78	1,30	89,04

The average macroeconomic variables are calculated for the period from 2004 to 2012 (unless indicated otherwise). CDS *spreads* (BP) as at 03/13/2014.
Source: For macroeconomic variables according to Eurostat data [16], and own calculations of the average for the analyzed period. CDS spreads (BP) according to Deutsche Bank [19]. Retrieved from Krnić [12].

Table 7: Macroeconomic variables for Croatia and the selected countries

This indicates that while researching the connections between the level of bank interest rates on loans to companies and macroeconomic variables, particular attention should be paid to those variables whose values deviate from the average and the medians calculated for EU-8 more significantly. These are: the growth rate of the GDP, public debt, and the risks reflected by bond yields and CDS spreads.

Table 8 presents the average values of the variables of the banking sector of Croatia and the other EU-8 countries within the period from 2004 to 2012, retrieved from Krnić [12].

	Independent variables of the banking sectors								
	i	j	k	l	m	n	o	p	r
Bulgaria	3,80	6,26	9,28	6,79	53,77	770,22	16,72	9,53	1,12
Czech Republic	1,22	4,60	5,97	4,11	63,29	1062,89	14,72	22,04	1,32
Croatia	2,11	8,27	12,06	8,10	74,53	1351,00	18,04	6,92	1,18
Hungary	6,73	2,67	9,59	6,51	54,03	831,89	13,34	4,42	0,50
Poland	2,93	3,70	7,93	8,47	45,64	600,78	13,10	15,90	1,20
Romania	7,78	8,03	9,41	7,64	55,97	979,11	14,60	2,04	0,18
Slovakia	3,52	3,90	8,82	4,28	69,77	1182,33	13,12	11,08	0,86
Slovenia	3,15	3,90	8,33	5,89	60,54	1257,44	11,54	-1,88	-0,18
AVERAGE	3,91	5,17	8,92	6,47	59,69	1004,46	14,40	8,76	0,77
MIN	1,22	2,67	5,97	4,11	45,64	600,78	11,54	-1,88	-0,18
MAX	7,78	8,27	12,06	8,47	74,53	1351,00	18,04	22,04	1,32
MEDIAN	3,34	4,25	9,05	6,65	58,26	1021,00	13,97	8,23	0,99
STDEV	2,09	1,97	1,61	1,53	8,76	241,71	1,98	7,19	0,52

The average of the variables of the banking sector is calculated for the period from 2004 to 2012 (unless indicated otherwise). Capital adequacy ratio, ROE, and ROA are calculated as averages for the period from 2008 to 2012.
Source: World Bank [18]. For the calculation of the average indicators for the share of the five largest banks in total assets of the banking sector and the Herfindahl index, the data from 2004 to 2007 are derived from theThe data for Croatia are retrieved from the CNB [15] and own calculation. For the calculation of the indicators capital adequacy, ROE, and ROA the data are retrieved from Raiffeisen Research [22]. Retrieved from Krnić [12].

Table 8: The variables of the banking sector for Croatia and the selected countries

For the variables capital adequacy, ROE, and ROA the average values are presented from 2008 to 2012. In addition, the basic measures of descriptive statistics which allow a comparison of the calculated mean values of the variables between Croatia and the other EU-8 countries are included in the table.

As can be seen in Table 8, the average interest rates on deposits in Croatia have been below the arithmetic mean and median for the EU-8, and the average interest rate spread not only above the arithmetic mean and the median, but even the largest of all countries in the EU-8 during the analyzed period.. The average ratio of capital to assets is above the arithmetic mean and median for the EU-8 and the highest of all countries in the EU-8 as well. This also applies to the capital adequacy of the banking sector, despite the fact that the average share of non-performing loans to total loans in the banking sector in Croatia during the analyzed period is significantly above the arithmetic mean and the median of the EU-8 countries, respectively very close to being the largest share.

The share of the five largest banks in total assets and the Herfindahl-Hirschman Index show that in the analyzed period of all the countries in the EU-8 Croatia had the largest concentration in the banking sector within the EU-8 (about the relationship between concentration and competition in the banking sectors, see Krnić and Radošević [10]). With the highest level of the ratio of capital and assets, the banking sector in Croatia has achieved a slightly lower return on equity during the financial and economic crisis than the average of the other EU-8 countries, but as well an above-average return on assets (discussed in Krnić [9]). The data from Table 8 indicate the need for additional research of the connection between the mentioned, but as well other (here omitted) variables of the banking sector and interest rates movements on corporate loans in Croatia.

To gain insight into the connection between the average interest rates on short-term and long-term corporate loans and macroeconomic variables and variables of the banking sector in these countries, Table 9 shows the correlation matrices for the scope of the EU-8 countries, based on the average values of variables for a multi-year period. Correlation coefficients above 0.5 are specifically highlighted in the text of the matrix. From the correlation matrices different degrees of correlation between the analyzed macroeconomic variables and variables of the banking sectors and interest rates, but also correlations among all the independent variables, can be identified. While trying to identify just the correlation between interest rates and the variables analyzed in this work as well as their determinants, a strong correlation between several variables/determinants and interest rates can be noted.

A. The correlation matrix of the determinants of interest rates on short-term loans

	a	c	d	e	f	g	h	i	j	k	l	m	n	o	p	r
a	1															
c	-0,21	1														
d	0,92	0,03	1													
e	0,92	-0,19	0,77	1												
f	-0,05	-0,46	-0,22	0,19	1											
g	0,88	-0,35	0,71	0,97	0,39	1										
h	0,38	-0,86	0,11	0,44	0,37	0,52	1									
i	0,85	-0,10	0,88	0,95	0,09	0,83	0,24	1								
j	0,46	-0,10	0,33	0,13	-0,53	0,24	0,37	0,08	1							

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k	*0,45*	*-0,46*	*0,26*	*0,44*	*0,20*	*0,24*	*0,82*	*0,28*	*0,55*	*1*						
l	*0,61*	*-0,16*	*0,32*	*0,47*	*0,16*	*0,64*	*0,46*	*0,29*	*0,44*	*0,58*	*1*					
m	*-0,41*	*-0,27*	*-0,42*	*-0,26*	*-0,08*	*-0,33*	*0,35*	*-0,39*	*0,35*	*0,36*	*-0,39*	*1*				
n	*-0,36*	*-0,39*	*-0,41*	*-0,11*	*-0,15*	*-0,31*	*0,45*	*-0,30*	*0,31*	*0,30*	*-0,35*	*0,91*	*1*			
o	*0,27*	*-0,22*	*0,16*	*-0,30*	*-0,20*	*0,13*	*0,34*	*-0,18*	*0,77*	*0,54*	*0,33*	*0,36*	*0,13*	*1*		
p	*-0,48*	*0,47*	*-0,42*	*-0,87*	*0,00*	*-0,46*	*-0,68*	*-0,59*	*-0,18*	*-0,56*	*-0,30*	*-0,04*	*-0,31*	*0,18*	*1*	
r	*-0,32*	*0,27*	*-0,33*	*-0,95*	*0,07*	*-0,29*	*-0,33*	*-0,59*	*0,10*	*-0,08*	*-0,00*	*0,10*	*-0,25*	*0,58*	*0,86*	*1*
B. The correlation matrix of the determinants of interest rates on long-term loans																
	b	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	*p*	*r*
b	*1*															
c	*-0,11*	*1*														
d	*0,96*	*0,03*	*1*													
e	*0,86*	-0,19	*0,77*	1												
f	*-0,09*	-0,46	*-0,22*	*0,19*	1											
g	*0,83*	-0,35	*0,71*	*0,97*	*0,39*	1										
h	*0,25*	-0,86	*0,11*	*0,44*	*0,37*	*0,52*	1									
i	*0,84*	-0,09	*0,88*	*0,95*	*0,09*	*0,83*	*0,24*	1								
j	*0,41*	-0,10	*0,33*	*0,13*	*-0,53*	*0,24*	*0,37*	0,08	1							
k	0,36	-0,46	*0,26*	*0,44*	*0,20*	*0,52*	*0,82*	0,28	*0,55*	1						
l	0,53	-0,16	*0,32*	*0,47*	*0,16*	*0,64*	*0,46*	0,28	*0,44*	*0,58*	1					
m	-0,47	-0,27	*-0,42*	*-0,26*	*-0,08*	*-0,33*	*0,35*	-0,39	*0,35*	*0,36*	*-0,39*	1				
n	-0,46	-0,39	*-0,41*	*-0,11*	*-0,15*	*-0,31*	*0,45*	-0,30	*0,31*	*0,31*	*-0,35*	*0,91*	1			
o	0,26	-0,22	*0,16*	*-0,30*	*-0,20*	*0,13*	*0,34*	-0,18	*0,77*	*0,77*	*0,33*	*0,36*	*0,13*	1		
p	-0,40	0,47	*-0,42*	*-0,87*	*0,00*	*-0,46*	*-0,68*	-0,59	*-0,18*	*-0,18*	*-0,30*	*-0,04*	*-0,31*	*0,18*	1	
r	-0,26	0,27	*-0,33*	*-0,95*	*0,07*	*-0,29*	*-0,33*	-0,59	*0,10*	*0,10*	*-0,00*	*0,10*	*-0,25*	*0,58*	*0,86*	1
Specificationof the symbols used in the matrices: see Table 1																

Table 9: Correlation matrices of variables - the determinants of interest rates on corporate loans in Croatia and the selected countries, Source: Own calculation. Retrieved from Krnić [12].

Considering the determinants of interest rates on short-term loans, there is a strong positive correlation between them and the following variables: inflation rates, three-month interest rates on the money market, bond yields, and interest rates on deposits. Between interest rates on short-term loans and the share of non-performing loans there is a medium strong positive correlation, and between interest rates and measures of concentration a slightly negative correlation.

Considering the determinants of interest rates on long-term loans, there is also a strong positive correlation between them and the following variables: inflation rate, three-month interest rates on the money market, bond yields, and interest rates on deposits.

Between interest rates on long-term loans and the share of non-performing loans there is a medium strong positive correlation, and between interest rates and measures of concentration a negative correlation of approximately medium strength.

Correlation between interest rates on bank loans and interest spreads and the pace of economic activity

In this chapter, interest rates and spreads are compared to the dynamics of economic activity in

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Croatia and the countries within the scope of the EU-8 in a multi-year period, based on the calculated arithmetic means and medians.

In Table 10, the average interest rates on short-term and long-term loans are calculated and presented, based on data from the ECB [14] and the CNB [15], the average interest rate spreads based on data from the World Development Indicators [18], and the average growth rates of the gross domestic product (GDP) based on data from Eurostat [16] for the countries within the scope of the EU-8 in a multi-year period.

As can be seen from Table 10, the average interest rates on short-term loans in Croatia are near, respectively slightly below the arithmetic mean, but above the median for the countries within the scope of the EU-8.

The average interest rates on long-term loans in Croatia are below the arithmetic mean, respectively at the same level of the median of countries within the scope of the EU-8. However, the data from Tables 2 and 3 show that the interest rates in the countries within the scope of the EU-8 are significantly above the rates within the Eurozone.

Since the average rate of economic growth in Croatia during the observed period has been close to the lowest within the scope of the selected countries, in future research - besides the analysis of other factors that affect economic growth and based on more detailed analytical background - additionally should be examined, to what extent the level of interest rates has determined the development of economic activity in Croatia.

	Interest rates on short-term loans	Interest rates on long-term loans	Interest rate *spread*	The average growth rate of GDP
Bulgaria	9,0	10,1	6,26	3,28
Czech Republic	4,1	4,4	4,6	2,84
Croatia	7,2	6,4	8,27	1,02
Hungary	9,8	10,1	2,67	0,88
Poland	6,5	6,6	3,7	4,33
Romania	12,8	13,0	8,03	3,27
Slovakia	4,0	4,3	3,9	4,52
Slovenia	5,2	4,7	3,9	1,80
EU-8:				
AVERAGE	7,33	7,45	5,17	2,74
MIN	4,00	4,3	2,67	0,88
MAX	12,8	13	8,27	4,52
MEDIAN	6,85	6,5	4,25	3,06
STDEV	2,86	3,03	1,97	1,30

The calculations are without data for Bulgaria and Romania in 2005 and 2006. The average interest rates on short-term and long-term loans are calculated for the period from 2005 to 2012. The average interest rate spreads and the average GDP growth rates are calculated for the period from 2004 to 2012. The interest rate spreads are calculated without data for Poland from 2007 to 2012, for Slovakia from 2009 to 2012, and for Slovenia from 2010 to 2012.

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Table 10 shows that Croatia has the highest level of interest spreads within the EU-8, and after Hungary the lowest average rate of economic growth as well during the observed period.

Conclusion

The aim of this study was to extend the findings on the level of banks' active interest rates and interest rate spreads in Croatia, as well as to investigate the determinants of interest rates and the correlation between interest rates and the dynamics of economic activity. The main finding of this research is that the level of interest rates on corporate loans in Croatia does not deviate significantly from the average rates in the countries within the scope of the EU-8 during the analyzed period. The interest rate spreads in Croatia, however, are above the average of the EU-8 countries. Furthermore, the interest rates on corporate loans and interest rate spreads within the EU-8 are significantly above the interest rates and interest rate spreads within the Eurozone.

It was found that the values of certain variables for Croatia more significantly deviate from the calculated average values for all countries from the defined scope. A strong correlation between interest rates on corporate loans and part of the macroeconomic variables and as well the variables of the banking sectors of the observed countries, including Croatia, has been identified in the correlation matrices. Between interest rates on short-term loans and inflation rates, three-month interest rates on the money market, bond yields, and interest rates on deposits a very strong positive correlation has been identified, and a medium strong positive correlation between these interest rates and the share of non-performing loans. Between interest rates and measures of concentration a negative correlation of weak intensity has been identified. A strong positive correlation was found between interest rates on long-term loans and inflation rate, three-month interest rates on the money market, bond yields, and interest rates on deposits. A medium strong positive correlation has been identified between interest rates on long-term loans and the share of non-performing loans, and a negative correlation of approximately medium strength between interest rates and measures of concentration.

The results of this research substantially confirm the results of previous research on the correlation between individual variables and interest rate movements except that - due to differences in the scope of the countries, periods of analysis and the procedures used - the strengths of correlation vary.

Although the chosen methodology and data on an annual basis to a large extent are getting answers to the research questions, in interpreting the results requires a certain of caution. Namely, in further research it would be useful to extract data for Croatia only and compare the obtained correlation matrices to the presented results of the EU-8. Thus, possible specifics for Croatia could be identified through the correlations in between the variables. It would in any case be useful to carry out research on other potentially important determinants, which are not included in this research and not in earlier ones either. The prerequisite for this are reliable and internationally comparable larger series of data on these variables. This, in combination with the use of appropriate econometric procedures and the implementation of qualitative research, would probably lead to further useful findings.

Along with the high interest spreads, Croatia during the analyzed period achieved the lowest rate

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of economic growth after Hungary. Since, besides interest rates and spreads, other factors, which have a different impact in each country, play a role, it is not possible to determine the dimensions of the impact of interest rates and interest rate spreads on the pace of economic activities with the help of the selected methodology and without additional analytical data and a more sophisticated processing.

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