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DETERMINANTS OF LENDING INTEREST RATES GRANTED TO COMPANIES IN CROATIA

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SUMMARY

Active bank interest rates are the key determinant of company's financial results, economic situation and cash flow. They set company's competitive position and affect the entire national economy. The paper tends to expand knowledge of company granted loan interest rates level as well as of their key setting determinants. Therefore, a comparison of company loan interest rates in Croatia and selected European countries was made as well as interest rate trends examined in the context of their correlation with various factors. A significant deviation of individual variable values for Croatia in comparison with calculated fair values for all countries within the defined scope was found. A strong correlation matrix connection was established between company loan interest rates and some macroeconomic variables as well as banking sector variables in observed countries, including Croatia. Research results may contribute to a better understanding of interest rate trends as well as various factors and be useful in designing appropriate changes in regulation and economic policy of financial mediation.

Key words: *interest rates, interest spread, net interest margin, interest rates determinants*

1. INTRODUCTION

In economic terms, the economy is especially affected by lending interest rates for companies. This is especially true for those economies which significant company funding source relies on a bank loan. Active interest rates imposed by banks significantly affect production, employment and GDP trends,

in general. They are an indicator of the financial and real sectors. They affect the entrepreneurial endeavour, financial results and cash flows of both a company and banks.

Compared to the 1990s, lending interest rates have decreased in Croatia. Nevertheless, their level has remained a subject of numerous discussions. The empirical research of interest rate trends has been conducted in numerous countries on various samples, by implementing similar as well as diverse methodologies and variable scopes. These researches have often resulted in different findings. This confirms the complexity of impact of numerous factors on active lending interest rate trends.

Building on the current research, this paper aims at expanding the knowledge of lending interest rate levels for companies in Croatia as well as their key trend indicators. With such a purpose in mind, their level is compared to the lending interest rate levels for companies in the selected European countries. The correlation between interest rates and various factors is also examined. For the purpose of achieving the objective of this paper, the research has primarily been focused on looking for an answer to three key research questions. The first question concerns the lending interest rate level for companies in Croatia compared to such interest rates in the selected countries. The second question regards the position of Croatia in the selected scope of the countries according to variables which might serve as determinants of lending interest rates for companies. The third research question relates to determining the connection of observed variables with the lending interest rate level for companies in all the countries under international comparison, including Croatia. Answers to these questions, which fulfil the objective set by this paper and are reflected in obtained findings, might contribute to a better understanding of financial conditions and performance of the Croatian economy. It would lead to designing appropriate regulatory changes as well as changes of the economic policy in financial mediation.

The paper is structured in the following way: the Introduction is followed by a theoretical framework described in Chapter 2 and the research methodology in Chapter 3. Chapter 4 gives the international comparison of lending interest rates in Croatia and the selected European countries. Chapter 5 explores the selected determinants of lending interest rates for companies in Croatia and the selected countries. Research findings are summarized in the final Chapter 6.

2. THEORETICAL FRAMEWORK

The lending interest rate is the cost of loan i.e. the ratio obtained by dividing a commitment fee by the loan amount (Rose, 2003:211). Interest rates de-

crease with the increase of loanable funds in relation to their demand. And vice versa, they increase as the funds decrease. The interest rate level changes with the changes in inflation expectations and a business cycle. It rises in times of expansion and a slowdown during the economic contraction (Koch, 1995: 235).

Lending interest rates are primarily determined by factors affecting loan supply and demand. Loan and interest rate supply depends on total deposits and other sources of bank funds, the cost of their acquisition, and risks to which banks are exposed in their lending activities. They also depend on the regulation cost, bank's operating costs and the fee paid to owners for the capital invested i.e. the profit margin. Each of the above specified element depends on the effect of various factors. Loan demand depends on the very interest rate. However, it also depends on the expectation regarding economic activites and price trends, which are also a subject of various impacts. Therefore, the examination of active lending interest rates must start from the fact that they are affected by numerous factors. It is not easy to group them as a whole, even in theory, in light of numerous various interdependencies of their effects. The empirical research conducted to-date on various samples and periods, by applying several ecometric procedures and a diverse scope of variables, resulted in different findings, which confirms that the active lending interest rate effect falls under a very complex research area.

The empirical research of determinants of lending interest rates used different approaches. Determinants of net interest rate margins were most frequently examined. Rose (2003: 159) defines the net interest rate margin as an indicator obtained by dividing a difference between the interest rate income and the interest rate expenses by total assets (or alternatively by the so-called ***income-earning*** asset). Some papers examined determinants of the interest rate spread. The interest rate spread is most often defined as a difference between lending interest rates and average deposit interest rates.

The empirical research of determinants of lending interest rates are often based on a pure spread approach applied by Ho and Saunders (1981) in the research of determinants of net interest rate margins (see e.g. Saunders and Schumacher, 2000, Hawtrey and Liang, 2008, Agoraki, 2009, Georgievska et al., 2011, Männasoo, 2012). According to this approach, the basic function of a bank is to transform savings into loans in a timely manner and consider the interest rate margin a premium which covers thereto related risks, of which the interest rate risk is the most significant. Apart from the approach introduced by Ho and Saunders (1981), other models and procedures were also applied in the research of determinants of interest rates, interest margins, interest rate spreads and banking profitability. Research findings differ depending on the structure of independent variables, models and procedures used as well as a

sample and the observation period. The scope of such findings can be shown in an overview of basic findings resulting from such a research.

Ho and Saunders (1981) examined determinants of interest rate margins by using the example of the USA in the period between 1976 until 1979. They found that the interest rate margins are affected by the management aversion to risk, the size of the transaction, a degree of market competition and the interest rate variability. The examination of determinants of interest rate margins and banking profitability was conducted by using data for eighty countries in the period from 1988 until 1995 by Demirgüç-Kunt and Huizinga (1999). According to their findings, interest rate margins and banking profitability are determined by not only banking specific variables but also macroeconomic conditions, bank taxation, regulation of deposit insurance and the financial structure. Saunders and Schumacher (2000) examined determinants of net interest rate margins on a large sample of banks from the USA and six selected European countries (Germany, Spain, France, Great Britain, Italy, Switzerland) in the period from 1988 until 1995. They found the following to affect interest rate margins: the level of bank capitalisation, market structure and interest rate volatility. Brock and Suarez (2000) showed on the sample including seven selected countries (Argentina, Bolivia, Chile, Columbia, Mexico, Peru and Uruguay) that during the 1990s, bank spreads were determined by a bank-related liquidity, capital risks, interest rate volatility, inflation and the GDP growth on the macroeconomic level. By using data from 72 countries in the period from 1995 until 1999, Demirgüç-Kunt et al. (2004) showed a significant impact of the regulation, market concentration and inflation on bank margins. Using the five EU countries sample (Germany, France, Great Britain, Italy and Spain) for the period from 1993 untis 2000, Maudos and de Guevara (2004) found that a decrease of net interest rate margin is connected with the increase of market share and a concentration degree as well as with lowering the interest rate risk, credit risk and operating costs. Čihák (2004) analysed determinants of active lending interest rates and the interest rate spread in Croatia for the period between 1999 until 2003. He found that bigger banks have lower active interest rates and interest rate spreads, which increase as the bad debt provision increases. He also found that the banks with higher liquidity have lower interest rates and spreads. However, interest rates and spreads are not equally affected by capital adequacy. Credit growth is lower for banks with higher active interest rates. Active interest rate changes have a positive effect on interest rate changes on the cash market and deposits. Athanasoglou et al. (2006) examined determinants of bank profitability on the example of selected Southern and Eastern European countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, Serbia and Montenegro) for the period between 1998 until 2002. They found that the profitability is significantly influenced by

most bank specific variables. Financial reforms and improvements of bank balance sheet structures were also found to be an important determinant of their profitability. Apart from the above, they also show a positive impact of the concentration on bank profitability. Claeys and Vander Vennet (2008) carried out a comparison of determinants of lending interest rate margins in Central and Eastern European countries with the Western European countries for the period between 1994 until 2001. According to their findings, significant determinants of interest rate margins in both country groups are the following: concentration, operating efficiency, capital adequacy and risk management. Apart from the above, they also showed that foreign banks strengthened the competition in Central and Eastern European countries and that interest rate margins in these countries were reduced due to increased efficiency. Hawtrey and Liang (2008) examined determinants of interest rate margins on the sample of 14 OECD countries and found that the interest rate margin is affected by: insufficient competition, cost inefficiency, risk aversion, interest rate volatility, credit risk, opportunity risk and deposit interest rates. Schwaiger and Liebig (2009) examined determinants of interest rate margins for the period between 2000 until 2006 in Central and Eastern European countries, members of the EU, and Croatia. They found that the credit risk is the most important determinant of interest rate margins in those countries. They also found that lower operating costs, efficiency increase, economic development and financial deepening result in lower net interest rate margins. They also found that lower interest rate margins were affected by a bigger share of foreign banking ownership. By examining determinants of interest rate margins in the Czech Republic in the period from 2000 until 2006, Horváth (2009) found that lower interest rate margins are connected with higher efficiency, price stability, bank size and bigger capital adequacy. For the period between 1995 until 2006 (i.e. for two sub-periods: from 1995 until 2000 and from 2001 until 2006), Kasman et al. (2010) examined net interest rate margins in then new EU member countries from Central and Eastern Europe as well as candidate countries. They found a negative correlation between the bank size and management efficiency on one side and the net interest rate margin on the other. According to their findings, mergers and acquisitions increase banking efficiency, while economies of scale contribute to lowering the interest rate spread. They showed an insignificant effect of macroeconomic variables in the period from 2001 until 2006 i.e. a probable decrease of differences among countries in the process of convergence. Dietrich and Wanzenried (2011) examined determinants of bank profitability before and during the crisis i.e. in the periods between 1999 until 2006 and from 2007 until 2009 on the sample encompassing Swiss commercial banks. They found that profitability was primarily determined by operating efficiency, loan growth, cost of funding

sources, business model and effective tax rate. Before the crisis, ownership was irrelevant in terms of bank profitability. However, in the post-crisis period, state-owned banks became more profitable than privately owned ones. The pre-crisis market structure was an important determinant of bank profitability, which ceased to be the case in the post-crisis period. Georgievska et al. (2011) examined determinants of active lending interest rates and the interest spread in Macedonia in the period from 2001 until 2009. It was found that active lending interest rates were primarily affected by the bank size and a market share, and somewhat less by the deposit interest rate and non-performing loans. Furthermore, it was also found that a difference between domestic and foreign interest rates had a significant impact as well. A bank size and a market share as well as a difference between domestic and foreign interest rates had an overwhelming effect on interest rate spreads as well, while the effect of other determinants was less clear. The Croatian National Bank (2011) examined the link between the country risk premium and the lending interest rate for companies in Croatia, Bulgaria, Lithuania, Poland and Slovakia in the period from 2003 until 2011. It was found that these countries first experienced a decrease of interest rate margin in the times of the crisis, which then soon regained their pre-crisis levels. It was found that the interest rate margins in Croatia from 2009 on have increased to the level higher than the pre-crisis margin levels, which was explained by prolonged recession, increased risks and lower bank profitability. Männasoo (2012) defined the following key determinants of the interest rate spread in Estonia from 1998 until 2011: a degree of risk aversion and the market structure of the banking sector. Dumičić and Ridzak (2013) examined determinants of the net interest rate margin in Central and Eastern European countries (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) in the period between 1999 until 2010. It was found that prior to 2008, net interest rate margins were decreasing primarily due to heavy capital sourcing, stable macroeconomic environment (low inflation and low short-term interest rates) and a reduced share of non-performing loans in a bank's balance sheet. On the other hand, economic growth and increased public debt facilitated banks charging higher margins resulting from the high loan demand. During the crisis, fast public debt growth and an increase of macroeconomic risks accompanied by a reduced capital inflow affected the increase of margins, while other factors, including low demand (due to weak economic performances), increased capitalization and a significant growth of non-performing loans affected margin lowering. It was also found that the increase of banking efficiency resulted in margin lowering. The Croatian Banking Association (2013) performed a comparison of interest rate trends in Croatia and ten EU members (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland,

Romania, Slovakia and Slovenia) and examined determinants of interest rate trends in Croatia. It was found that average levels of active lending interest rates for five loan types offered to companies and to the retail sector in Croatia in 2007, 2009 and 2013 were primarily under the average for this group of countries i.e. only those loan interest rates for companies above the said average were considered an exemption. According to these findings, interest rates were dominantly affected by the cost of banking sources, while the shocks from passive interest rates were not fully transferred into changed loan interest rates. According to this research, lending interest rates for companies reacted even more strongly to the cost attack than lending interest rates in the retail sector. The research also found that the lending interest rate margin decreases with the cost increase of banking funding sources and vice versa, while the interest rate margin decrease is additionally significantly affected by cost efficiency and bank asset quality.

3. RESEARCH METHODOLOGY

The research of determinants of interest rates, interest rate margins, interest rate spreads and bank profitability conducted to date used various models and procedures. Depending on the above as well as the structure of independent variables, a research sample and the selected observation period, research findings differ. The availability of relevant and reliable data for international comparisons was often a limiting factor in these researches. Short time series with annual data were not sufficient to ensure a reliable basis for the correlation interpretation even with the use of the most sophisticated models, and even less for identifying variable causality. In light of the above, findings resulting from such a research were often interpreted with appropriate caution.

The research conducted in this paper was focused on gaining an insight into the lending interest rate levels for companies in Croatia and their interconnection with various variables i.e. determinants. Therefore, lending interest rates for companies in Croatia are compared to the rates in the countries selected for international comparison. Under the research of the various variable interconnections i.e. interest rate determinants, their changes and levels are first compared to the changes and levels in the companies selected for international comparison, and then jointly with the level of the interest rates in Croatia and the selected countries. The scope of the countries selected, named the EU-8 for the purpose of this paper, includes the following: Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania, Slovakia and Slovenia. The selection of potential interest rate determinants is based on the current research described under the theoretical framework chapter and the research of the high interest rate sample in Croatia in 1990s (Krnić, 1998/1999). Their final

scope, however, is also set by the possibility of providing them with reliable data. These were the reasons why some determinants, which would otherwise fall under this scope, were left out from this research. Apart from these, some variables were also left out, which might, together with the use of the paper named sources, imply an additional collection of bank performance data within the banking sectors of the selected countries. Depending on available data, the research included variables which reflected the macroeconomic environment of individual banking sectors as well as variables which jointly reflect the performance of a banking sector of each of the country from the defined scope. Short- and long-term lending interest rates for companies were taken as dependent variables. Interest rates and determinants of lending interest rates for companies included in the research, abbreviations used in data processing and interpretation and data source information are given in Table 1 below.

Table 1: The scope of lending interest rates and interest rate determinants for companies encompassed by the research

Variables	Abbreviation	Source of data
Dependent variables		
Interest rates on short-term loans for companies	*pkskk*	*ECB. CNB*
Interest rates on long-term loans for companies	*pksdk*	*ECB,CNB*
Independent macroeconomic variables		
GDP growth rate	*sbdp*	*Eurostat*
Inflation rate	*sinf*	*Eurostat*
Three-month interest rate on cash market	*stnt*	*Eurostat*
Public debt in GDP %	*ddbdp*	*Eurostat*
Bond yield	*pobv*	*Eurostat*
CDS (Credit default swap) spread	*scds*	*Deutsche Bank*
Independent banking variables		
Deposit interest rates	*ksdep*	*World Bank*
Interest rate spread	*kspr*	*World Bank*
A share of capital in assets	*ukapi*	*World Bank*
A share of non-performing loans	*unkr*	*World Bank*
A share of top 5 banks in total assets	*5bank*	*CNB, ECB*
HHI– Herfindahl-Hirschmannov index	*hfind*	*CNB, ECB*
Capital adequacy	*adkap*	*Raiffeisen Bank*
Return on equity	*ROE*	*Raiffeisen Bank*
Return on assets	*ROA*	*Raiffeisen Bank*

Source: Author

Having in mind that the research was conducted on short time series and annual data, data processing used basic descriptive statistics measures. The interest rate and the observed variable comparison was carried out by using the

arithmetic mean (AVERAGE)[1], the lowest (MIN) and the highest (MAX) variable values, the mean value (MEDIAN) and standard deviation. Correlation coefficients were calculated for examining the interest rates and the selected variables/determinants correlation, shown in the correlation matrix.

4. LENDING INTEREST RATES – INTERNATIONAL COMPARISON

This chapter uses basic data on lending interest rate trends for companies during a multi-year period as its starting point. Short-term lending interest rates for companies in Croatia and the selected countries in the period from 2005 until 2012 along with basic descriptive statistics measures are shown in Table 2 below.

Table 2: Short-term lending interest rates for companies in Croatia and the selected countries for the period 2005 until 2012

	2005	2006	2007	2008	2009	2010	2011	2012
Bulgaria	-	-	***8.8***	***9.8***	***9.8***	***9.1***	***8.7***	***7.8***
Czech Republic	***3.9***	***4.0***	***4.7***	***5.4***	***4.3***	***3.8***	***3.6***	***3.3***
Croatia	***6.6***	***6.2***	***6.5***	***7.5***	***8.2***	***8.2***	***7.6***	***7.0***
Hungary	***9.4***	***8.7***	***9.8***	***10.9***	***11.8***	***8.9***	***9.1***	***9.6***
Poland	***7.2***	***6.0***	***6.0***	***7.1***	***6.2***	***6.1***	***6.3***	***6.7***
Romania	-	-	***12.2***	***15.2***	***17.5***	***12.0***	***10.1***	***9.5***
Slovakia	***3.3***	***3.9***	***5.0***	***5.5***	***3.6***	***3.4***	***3.8***	***3.2***
Slovenia	***4.0***	***4.1***	***5.3***	***6.2***	***5.6***	***5.6***	***5.6***	***5.5***
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
EURZONE	***4.3***	***4.8***	***5.7***	***6.1***	***4.0***	***3.5***	***4.0***	***4.0***

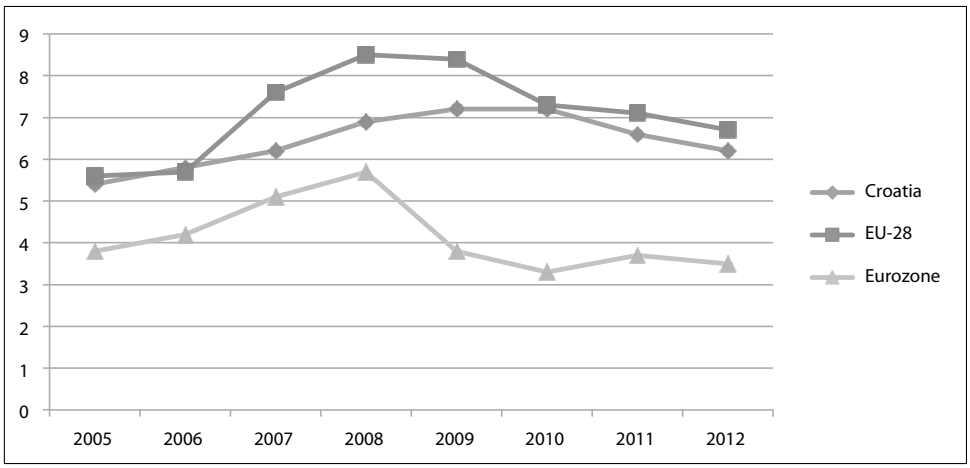
In case of the EUROZONE, own rate calculations were made based on the monthly rate average. The EU-8 misses the 2005 and 2006 data for Bulgaria and Romania. Having completed all calculations, results were rounded up.

Source: ECB, CNB. Author.

Graph 1 shows short-term lending interest rates for companies in Croatia and the selected countries in the period from 2005 until 2012.

[1] Hereinunder, the arithmetic mean is replaced by the term 'average', 'average value' and alike, while the term 'median' is used instead of mean value.

Graph 1: Short-term lending interest rates for companies in Croatia and selected countries for the period 2005 until 2012



In case of the EUROZONE, own rate calculations were made based on the monthly rate average. The EU-8 misses the 2005 and 2006 data for Bulgaria and Romania
Source:ECB, CNB. Author.

Short-term lending interest rates for companies in Croatia were above the average in the selected countries in 2005, 2006, 2010, 2011 and 2012. However, during the entire observed period, they were above the mean value i.e. the median calculated for the EU-8 selected countries. Short-term lending interest rates for companies in Croatia and other EU-8 countries were significantly above average rates of the Eurozone countries throughout the observed period.

Long-term lending interest rates for companies in Croatia and the selected countries used for the international comparison for the period between 2005 until 2012 together with basic descriptive statistics measures are given in Table 3 below.

Table 3: Long-term lending interest rates for companies in Croatia and selected countries for the period 2005 until 2012

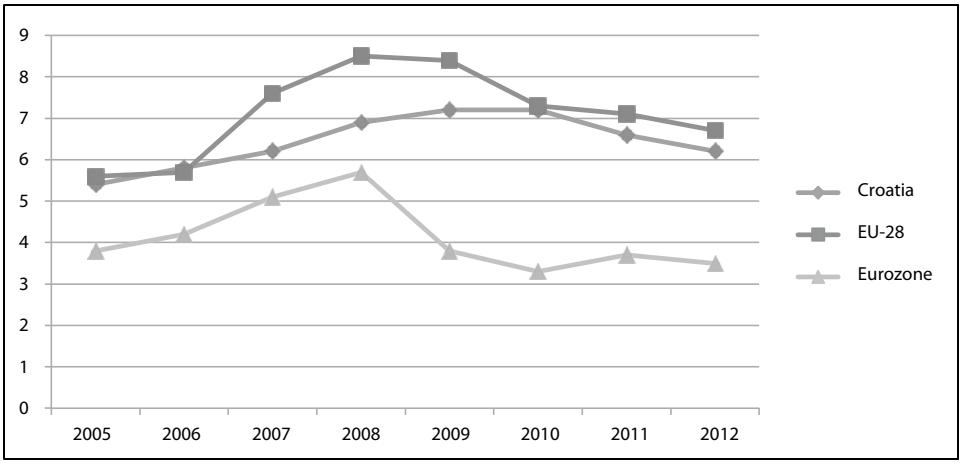
	2005	2006	2007	2008	2009	2010	2011	2012
Bulgaria	-	-	***9.9***	***10.7***	***10.8***	***10.3***	***9.9***	***8.9***
Czech Republic	***4.2***	***4.2***	***4.8***	***5.7***	***4.6***	***4.2***	***4.0***	***3.8***
Croatia	***5.4***	***5.8***	***6.2***	***6.9***	***7.2***	***7.2***	***6.6***	***6.2***
Hungary	***9.9***	***9.1***	***10.1***	***11.0***	***12.1***	***9.0***	***9.6***	***10.3***
Poland	***6.6***	***6.6***	***6.6***	***6.7***	***6.6***	***6.6***	***6.7***	***6.5***
Romania	-	-	***12.4***	***14.9***	***17.6***	***12.8***	***10.6***	***9.8***
Slovakia	***3.3***	***4.0***	***5.3***	***5.8***	***3.8***	***3.8***	***4.3***	***3.8***
Slovenia	***4.0***	***4.2***	***5.3***	***6.0***	***4.3***	***4.5***	***5.0***	***4.5***

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
EURZONE	***3.8***	***4.2***	***5.1***	***5.7***	***3.8***	***3.3***	***3.7***	***3.5***

Lending interest rates with the 1-5 year maturity were taken as long-term interest rates. In case of the EUROZONE, own rate calculations were made based on the monthly rate average. The EU-8 misses the 2005 and 2006 data for Bulgaria and Romania. Having completed all calculations, results were rounded up.
Source: ECB, CNB. Author.

Graph 2 shows long-term lending interest rates for companies in Croatia and the selected countries for the period between 2005 until 2012.

Graph 2: Long-term lending interest rates for companies in Croatia and selected countries for the period 2005 until 2012



In case of the EUROZONE, own rate calculations were made based on the monthly rate average. The EU-8 misses the 2005 and 2006 data for Bulgaria and Romania.
Source: ECB, CNB. Author.

Long-term lending interest rates for companies in Croatia were near the EU-8 average, except in 2006, when they were above the arithmetic mean of the selected countries. However, during the major part of the observed period, these rates were above the median calculated for the EU-8 countries. Throughout the observed period, the interest rates in Croatia and other EU-8 countries were significantly above the average Eurozone rates.

5. DETERMINANTS OF LENDING INTEREST RATES IN CROATIA AND SELECTED COUNTRIES

This chapter examines the Croatian position in the EU-8 according to the lending interest rate level for companies as well as observed variable values. Apart from the above, the correlation matrices show the correlation between interest rates and observed variables for Croatia and other EU-8 countries.

Based on the data provided in Tables 2 and 3 in the previous chapter, Table 4 shows calculated average values of short- and long-term lending interest rates for companies in Croatia and the selected countries for the period between 2005 until 2012. Apart from the aforementioned, basic descriptive statistics measures were also calculated in relation to these rates. Data given in Table 4 represents a basis for examining the correlation between those average interest rates and average macroeconomic variable values as well as the EU-8 banking sector variable values.

Table 4: Average short- and long-term lending interest rates in Croatia and selected countries for the period 2005 until 2012

	pkskk	Pksdk
Bulgaria	*9.0*	*10.1*
Czech Republic	*4.1*	*4.4*
Croatia	***7.2***	***6.4***
Hungary	*9.8*	*10.1*
Poland	*6.5*	*6.6*
Romania	*12.8*	*13*
Slovakia	*4.0*	*4.3*
Slovenia	*5.2*	*4.7*
AVERAGE	*7.33*	*7.45*
MIN	*4.0*	*4.3*
MAX	*12.8*	*13.0*
MEDIAN	***6.85***	***6.5***
STDEV	*2.86*	*3.03*
EUROZONE	*4.55*	*4*

Source: Own calculations based on the ECB and CNB data in tables 2 and 3.

Data given in Table 4 shows that average short-term lending interest rates for companies in Croatia in the period between 2005 until 2012 were near the EU-8 average, although somewhat below, but also above the median calculated for the EU-8 countries. Long-term lending interest rates for companies in Croatia in the same period were below the EU-8 average, while almost at the

same median level for the same county scope. However, such calculated short- and long-term lending interest rates for the observed period in Croatia and the EU-8 were significantly above such Eurozone rates.

To examine the correlation between average short- and long-term lending interest rates in Croatia and other EU-8 countries and the macroeconomic and banking sector variables of these countries, average variable values were calculated on the basis of multi-year data.

Table 5 shows averages of macroeconomic variable values for Croatia and other EU-8 countries for the period from 2004 until 2012, whereby the CDS spread variable was used as per its position on 13 March 2014. The table also provides basic descriptive statistics measures, which facilitate the comparison of calculated average variable values between Croatia and other EU-8 countries.

Table 5: Macroeconomic variables for Croatia and selected countries

	sbdp	sinf	stnt	ddbdp	pobv	scds
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***
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 of macroeconomic variables was calculated for the period from 2004 until 2012, if not otherwise stated. The CDS spread (BP) ***-–scds*** *according to the position on 13 March, 2014. Source: Eurostat data and own average calculations were used for macroeconomic variables for the observed period. The CDS spread (BP), abbreviated as 'scds' was provided by Deutsche Bank.*

As visible from Table 5 above, in the period 2004 until 2012, Croatia was second to Hungary to achieving the lowest GDP growth rate. In the same period, only the Czech Republic had a lower rate of inflation than Croatia. The average three-month rate on the cash market in Croatia was at the EU-8 median level i.e. below the arithmetic mean of the rates in these countries. Croatia's public debt in a percentage of the GDP was significantly above the EU-8

average and the calculated median of the countries within the scope. Risk-expressing variables i.e. the bond yield and the CDS spread were above the arithmetic mean and the median of the EU-8 countries, while the CDS spread for Croatia was twice as high than the EU-8 level according to March 2014 data. This shows that in relation to the research of the correlation between lending interest rate for companies and macroeconomic variables, a special attention should be focused on those variables which values deviate more significantly from the EU-8 average and the median. These include: the rate of GDP growth, public debt and risks reflected by the bond yield and CDS spreads.

Table 6 shows average banking sector variable values for Croatia and other EU-8 countries for the period 2004 until 2012. Capital adequacy and average ROE and ROA values were given for variables in the period 2008 until 2012. Apart from the above, the table also includes basic descriptive statistics measures which facilitate the comparison of calculated average variable values between Croatia and other EU-8 countries.

Table 6: Banking variables for Croatia and selected countries

	ksdep	kspr	ukapi	unkr	5bank	hfind	adkap	ROE	ROA
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 banking sector variables was calculated for the period 2004 until 2012, if not otherwise stated. Capital adequacy indicator (adkap), ROE and ROA were calculated as averages in the period 2008 until 2012.

Source: World Bank. The calculation of average indicators for the share of 5 biggest banks in total banking sector assets (5 bank) and the Herfindahl index (hfind) was based on the ECB 2004-2007 (2010), and the ECB 2008-2012 data (2013). Data regarding Croatia were provided by the CNB. Capital adequacy (adkap), ROE and ROA data used in calculating indicators were provided by Raiffeisen Research (2013).

Table 6 shows that average deposit interest rates in Croatia in the observed period were below the EU-8 arithmetic mean and the median, while the average interest rate spread was higher than not only the arithmetic mean and the median but also than all other EU-8 countries. The average capital/asset ratio was also above the EU-8 arithmetic mean and the median and the highest in all EU-8 countries. The same applies to the banking sector capital adequacy despite the average share of non-performing loans in the total lending volume during the observed period in the Croatian banking sector being significantly above the EU-8 arithmetic mean and the median i.e. very close to the highest share. The share of top 5 banks in total assets and the Herfindahl-Hirschmann index show that the highest banking sector concentration of all EU-8 countries in the observed period occured in Croatia (more on the relation between concentration and competition in banking sectors in Krnić and Radošević, 2014). Having the highest capital/asset ratio, in the observed period of the financial and economic crisis, the banking sector had a somewhat lower return on equity than the average of the EU-8 countries as well as the above-average return on assets (more in Krnić, 2013). Table 6 data indicate the need for additional correlation research of the above stated as well as other (left out herein) banking sector variables and lending interest rate trends for companies in Croatia.

To gain insight into the correlation between average short- and long-term lending interest rates and macroeconomic and banking sector variables of said countries, Table 7 shows the correlation matrices for the EU-8 countries based on the average variable values for the multi-year period. Correlation coefficients higher than 0.5 are singled out in the matrix text.

Various correlation degrees of observed macroeconomic and banking sector variables with interest rates can be identified from the correlation matrices as well as mutual correlations between all independent variables. Paying attention solely to identifying the correlation between interest rates and variables, observed in this paper as their determinants, a strong correlation between several variables/determinants and interest rates can be observed.

When observing determinants of the short-term lending interest rates, a strong positive correlation is found between them and the following variables: the rate of inflation, three-month interest rate on the cash market, bond yield and deposit interest rate. A medium strong positive correlation exists between short-term lending interest rates and a share of non-performing loans, while there is a weak negative correlation between interest rates and concentration measures.

Table 7: Correlation variable matrix – determinants of lending interest rates for companies in

Croatia and selected countries

A. CORRELATION MATRIX OF DETERMINANTS OF SHORT-TERM LENDING INTEREST RATES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1															
2	-0,21	1														
3	**0,92**	0,03	1													
4	**0,92**	-0,19	**0,77**	1												
5	-0,05	-0,46	-0,22	0,19	1											
6	**0,88**	-0,35	**0,71**	**0,97**	0,39	1										
7	0,38	-0,86	0,11	0,44	0,37	**0,52**	1									
8	**0,85**	-0,10	**0,88**	**0,95**	0,09	**0,83**	0,24	1								
9	0,46	-0,10	0,33	0,13	**-0,53**	0,24	0,37	0,08	1							
10	0,45	-0,46	0,26	0,44	0,20	0,24	**0,82**	0,28	**0,55**	1						
11	**0,61**	-0,16	0,32	0,47	0,16	**0,64**	0,46	0,29	0,44	**0,58**	1					
12	-0,41	-0,27	-0,42	-0,26	-0,08	-0,33	0,35	-0,39	0,35	0,36	-0,39	1				
13	-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			
14	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		
15	-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	
16	-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. CORRELATION MATRIX OF DETERMINANTS OF LONG-TERM LENDING INTEREST RATES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1															
2	-0,11	1														
3	**0,96**	0,03	1													
4	**0,86**	-0,19	**0,77**	1												
5	-0,09	-0,46	-0,22	0,19	1											
6	**0,83**	-0,35	**0,71**	**0,97**	0,39	1										
7	0,25	**-0,86**	0,11	0,44	0,37	**0,52**	1									
8	**0,84**	-0,09	**0,88**	**0,95**	0,09	**0,83**	0,24	1								
9	0,41	-0,10	0,33	0,13	**-0,53**	0,24	0,37	0,08	1							
10	0,36	-0,46	0,26	0,44	0,20	**0,52**	**0,82**	0,28	**0,55**	1						
11	**0,53**	-0,16	0,32	0,47	0,16	0,64	0,46	0,28	0,44	**0,58**	1					
12	-0,47	-0,27	-0,42	-0,26	-0,08	-0,33	0,35	-0,39	0,35	0,36	-0,39	1				
13	-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			
14	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		
15	-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	
16	-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

Meaning of ordinal numbers in the matrix:

pkskk pksdk	*sbdp*	*sinf*	*stnt*	*ddbdp*	*pobv*	Scds	ksdep
1	*2*	*3*	*4*	*5*	*6*	7	8
kspr	ukapi	unkr	5bank	hfind	adkap	ROE	ROA
9	10	11	12	13	14	15	16

Source: Own calculation based on data in tables 4, 5 and 6.

When observing long-term lending interest rate determinants, a strong positive correlation can be noticed between them and the following variables: inflation rate, three-month interest rate on the cash market, bond yield and deposit interest rate. There is a medium strong positive correlation between long-term lending interest rates and a share of non-performing loans, while a somewhat average strong negative correlation exists between interest rates and concentration measures.

6. CONCLUSION

This paper aimed at expanding the knowledge of the lending interest rate level for companies and their key determinants. The achievement of said goal included finding the answer to set research questions. The paper compared the lending interest rate level for companies in the EU-8 countries. The position of Croatia in EU-8 was set in line with variable values i.e. determinants of lending interest rates for companies as well as the correlation between interest rates and observed variables in the countries of interest. It was found that values of some variables for Croatia deviate more from calculated average values for all other countries from the defined scope. A strong connection is determined by correlation matrices between lending interest rates for companies and a part of macroeconomic variables as well as banking sector variables in the observed countries, including Croatia. A strong positive correlation is determined between short-term lending interest rates and the rate of inflation, three-month interest rate on the cash market, bond yield and deposit interest rate. A medium positive correlation was determined between the abovementioned interest rates and a share of non-performing loans. A weak negative correlation was defined between interest rates and concentration measures. A strong positive correlation was also determined between long-term lending interest rates and a rate of inflation, three-month interest rate on the cash market, bond yield and deposit interest rates. A medium positive corelation was identified between long-term lending interest rates and a share of non-performing loans, while a negative medium correlation was determined between interest rates and concentration measures.

This research findings substantially confirm the results from previous researches on the correlation of individual variables and interest rate trends, having in mind that the correlation strength differs due to differences in the countries observed, observation periods and used procedures. It would be useful to single out only the Croatian data in further research and compare such obtained correlation matrices with data herein for the entire scope of the EU-8 countries. Croatia's potential specificities might thus be identified by variable correlations. It would certainly be useful to conduct the research of other potentially important determinants, which have not been a part of this nor any earlier reserach. It is preconditioned by obtaining reliable and internationally comparable bigger data series on such variables. It would probably result in further useful findings under the assumption of using appropriate econometric procedures and conducting quality research.

To the extent in which the obtained findings confirmed results from previous researches and expanded knowledge on the interest rate levels in Croatia and their determinants, the expected scientific contribution of this paper is also confirmed as per providing the basis for appropriate regulatory and economic policy-related changes regarding financial mediation.

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DETERMINANTE BANKOVNIH KAMATNIH STOPA NA KREDITE PODUZEĆIMA U HRVATSKOJ

SAŽETAK RADA

Aktivne kamatne stope banaka ključna su determinanta financijskih rezultata, ekonomskog stanja i novčanih tokova poduzeća. Određujukonkurentsku poziciju poduzeća i utječu na ukupnu nacionalnu ekonomiju.Cilj je rada proširiti spoznaje o razini kamatnih stopa na kredite poduzećima te o ključnim determinantamanjihova formiranja. U tu je svrhu provedena usporedba kamatnih stopa na kredite poduzećimau Hrvatskoj i odabranim europskim zemljama te istraženokretanje kamatnih stopau kontekstu njihove povezanosti s različitim čimbenicima.Utvrđeno je da vrijednosti pojedinih varijabli za Hrvatsku znatnije odstupaju od izračunanih prosječnih vrijednostiza sve zemlje iz definiranog obuhvata.Između kamatnih stopa na kredite poduzećima i dijela makroekonomskih varijabli, kao i varijabli bankovnih sektorapromatranih zemalja, uključujući i Hrvatsku, u korelacijskim je matricama utvrđena jaka veza. Nalazi istraživanja mogu pridonijeti boljem razumijevanju povezanosti kretanja kamatnih stopa i različitih čimbenika te mogu biti korisni u osmišljavanju odgovarajućih promjena u regulaciji i ekonomskoj politci na području financijskog posredovanja.

Ključne riječi: *kamatne stope, kamatni spread, neto kamatna marža, determinante kamatnih stopa*