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INTEREST RATES AND ECONOMIC GROWTH: STRENGTH OF THE NEXUS

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***ABSTRACT**: In this article, the authors analyse the interest rates - growth nexus in the Croatian economy contrasting the standard growth theory assumption. Solow-Swan growth model implies positive correlation between the interest rates and growth. However, using quarterly data from 1996 to 2013 for Croatia, a negative correlation between the interest rates and growth has been found. Slower economic growth is associated with the higher interest rates regimes. Only a weak effect of GDP on interest rates on deposits is isolated in line with the results found by Caroll and Summers (2014) and Bosworth (2014). The nexus between the interest rates and growth is a fact that must be thoroughly investigated to improve the standard growth theories disregarding this important relationship.*

***KEYWORDS**: interest rates, growth, Solow-Swan, nexus, subset VAR, Croatia.

***JEL classification**: E40, E47, E43, O47.

Introduction

Interest rates – growth nexus have been studied in economics under different theoretical and empirical frameworks for quite a long time. The real factor productivity impact on the capital market (classical interest theory), supply and demand for money (liquidity preference theory), supply of loanable funds and demand for credit (loanable funds theory), expected short term interest rates (rational expectation theory), expected inflation and the natural interest rate (Fisher/Keynes effect, fluctuations in the price of gold, gold country's gold stocks and gold purchasing power (Barsky-Summer effect)), and changes in the inflation targeting/anchoring policy (Cogley-Sargent-Surico effect) are the main theories addressing the interest rates determinants. Prices and long term interest rates are mutually dependent indirectly causing each other via Price – Money purchasing power – Liquidity – Expected short term interest rate – Long term interest rate mechanism that are identified in this study. Study results of Croatia confront the expected positive correlation between the interest rates and growth as implied by the Solow-Growth model. Negative correlation exists between the interest rates and growth with interest rates being an important growth determinant. Though the output growth cannot explain the volatility in credit interest rates, but it can certainly explain registered variance in deposit interest rates.

Understanding the relation behind the nominal long term interest rates, price level, and output growth is important, since the interest rate is a major driver of any national economy. Since, interest rates' channel and direct flows of financial funds from savers to borrowers are strongly affecting country's future growth, development, and national wealth; is the reason why the classical, liquidity preference, loanable funds, and rational expectation theories do study the interest rates for many centuries now. Interest rates – growth nexus has an important role in explaining the true nature of the interest rates.

This research attempts to discover the true nature of the interest rates – growth nexus for transitional economies. Essentially, it responds to the call for a new perspective on the interest rates – growth positive correlation as implied in the standard growth theories (Solow-Swan growth model). In addition, this paper is not delimited to one principal factor (theory)

behind the nexus, but also looks at many other factors (inflation, financial deepening, domestic savings, etc.) that were neglected or under-researched in the other earlier studies.

The paper uses subset VAR techniques to examine the linkages between the interest rates and growth. It improves the previous contributions in terms of its coverage and the econometric approach, which allows simultaneity among the variables.

The findings of this paper are expected to have practical importance for policy makers (inflation and interest rates targeting). The authors of this article do hope that the results will increase researchers' awareness on the importance of the interest rates – growth nexus, and encourage them to new, more advanced studies on the subject.

The structure of the paper is as follows. Section 1 briefly reviews the relevant literature. Section 2 presents the data and the econometric framework. Section 3 reports on the empirical findings from the subset VAR analysis. The last section summarizes the main findings.

1. Literature Review

Interest rates – growth nexus under debt burden have been studies in Ford and Laxton (1999) showing that the debt level is an important interest rate determinant. Barro and Xavier (1990) find global factors more important in relation to a country's GDP as a factor of influence on the interest rates. Desroches and Francis (2007) isolate other factors (national and international) as real interest rate determinants rather than the country's GDP. Blanchard and Summers (1984) identify four real interest rates factors: reduction in savings, increases in profitability, contractionary monetary policies, and portfolio shifts. Ahrend *et al.* (2006) accompanying the work of Brzoza-Brzezina and Cuaresma (2008) find GDP as a domestic factor that has important effects on the real interest rates. However, GDP importance as the real interest rates determinant varies significantly among the different economies. Bozoklu (2013) examines the causality between the money and income using short-term interest rates finding bidirectional causality. The Fisher effect for Croatia was tested in Benazić (2013).

Gibson (1923) tried to explain the interest rates and prices relationship by looking at the "sympathetic" movement between the course of commodity prices and the course of the yield on British Consols 1820-1922 (long term interest rate or LR latter in the text). The price of a stock (first class securities) following his economic reasoning is determined indirectly through the cost of living. A rise in the cost of living is followed by a rise in the yield of high-class fixed interest-bearing stocks – *Gibson Law*. Keynes (1930) was puzzled by the relationship between the long-term interest rates and the level of wholesale prices that Gibson uncovered. Strongly believing in the long-term interest rates and general price level change (inflation) link, Keynes forged the term Gibson paradox. Fase (1972) presents evidence on the Gibson paradox existence in the Netherlands for the period 1901-1971. He finds Gibsons' paradox to hold under observed period. Van den End (2011) found weak statistical evidence for the mean reversion of the long-term interest rates for Netherland 1800-2010.

Wicksell (1936) use two-rate differential theory (money and natural interest rate) to explain the long run dynamics between the prices and the interest rates (Wicksell *et al.*, 1936a). The banks overshooting/underbidding of natural interest rates impacts the prices, which in turn over the expected inflation influences the nominal interest rate in the long run. Harrod-Keynes effect Clayton *et al.*, (1971) looked at the real interest rate and prices relationship assuming no relation between the prices and nominal rates. Barsky and Summers (1988) offer a different perspective from the gold standard mechanism point of view with reciprocal dynamics between the gold price and price level accounting for changes in real

interest rate. The dynamic relationship between the real interest rates and prices can be explained by the negative equilibrium relationship between the relative price of gold and the real interest rates. Shiller and Siegel (1977) explain historical movement in the real interest rates and prices as a consequence of unanticipated price change on wealth redistribution mechanism affecting the nominal denominated assets interest rate. Sargent (1973) finds interest and prices to be mutually dependent by using the spectral analysis technique, thus, disproving the Fisher's (1930) theory of the paradox. In a recent article, Cogley *et al.* (2011) detect inflation targeting/anchoring, i.e., the changes in the monetary policy behind the reappearance of the Gibson paradox after 1995 in the USA. Fiscal policy's impact on the interest rates is studied in Rădulescu and Druica (2014).

The relationship between the retail trade and short-term interest rates in Croatia was studied in Benazić (2014) with an interest rates margin and interest rates link in Serbia explored in Marinković and Radović (2014). The possible link between the interest rates and oil shocks are addressed in Semko (2013).

The past studies on interest rates - growth have concentrated on identifying one principal factor explaining the phenomenon ignoring possible nonlinear behaviour in interest rates or prices. Consequently, such a complex phenomenon cannot be fully understood and explained on such research ground.

2. Data and Methodology

The primary goal of this paper is to analyse the relationship between the interest rates and economic growth in Croatia. Since, the Croatian money market is undeveloped; therefore, a Croatian National Bank's (CNB) role in determining the official interest rate, which then affects commercial bank interest rates, is very limited.

This is a consequence of:

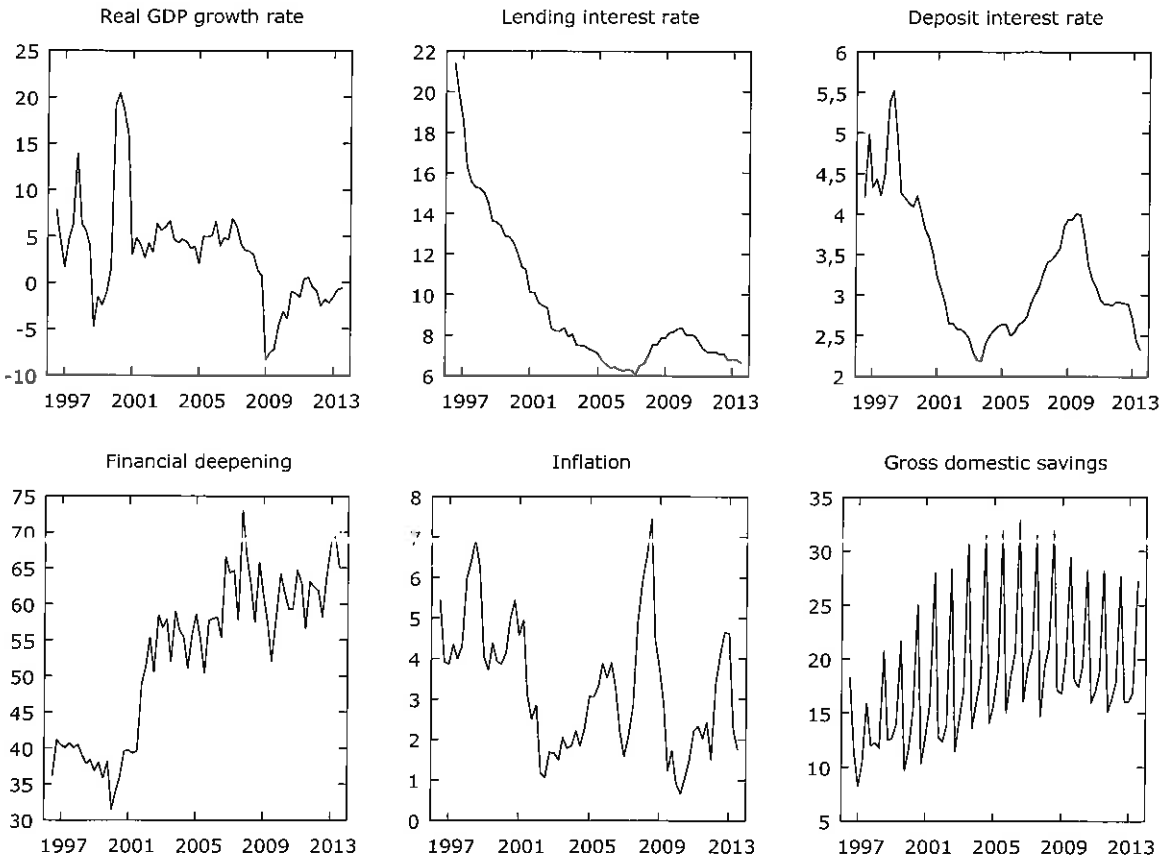
1. Money market illiquidity and volatility of the money market interest rate.
2. Under-representation of the money market compared to the other sources of funds.
3. Complex interaction between the regulatory costs and market costs of funds (Croatian Banking Association, 2008).

Ineffectiveness is as well arising from the banking contracts that contain clauses on variable interest rates according to the decisions of bank management (Croatian Banking Association, 2007). Finally, there are other constraints that hinder the formation of the official interest rates and those are related to the fact that Croatia is a small and open economy, highly euroized, import-dependent with high external debt. Under such conditions, the role of CNB in determining the interest rates and stimulating the economic growth through the interest rate transmission channel is quite limited. Accordingly, this analysis will not include money market interest rates, but the commercial bank interest rates for which it is assumed that have an impact on the economic growth in Croatia.

For this purpose VAR (Vector Autoregressive) model with subset restrictions is estimated. Data are analysed on a quarterly basis from September 1996 to September 2013, and their movements can be perceived within the *Figure 1*. The data expressed in national currency are retrieved from the International Monetary Fund (International Financial Statistics – IFS, 2014) database and Croatian National Bank's (CNB, 2015) official website[1]. The real GDP growth rate is real growth rate of GDP (RGDP); lending rate is represented by the

[1] Data on nominal GDP and data on nominal household and government final consumption expenditure for the period from September 1996 till March 1997 are taken from Mikulić and Lovrinčević (2000).

interest rate on kuna credits indexed to foreign currency (INT_c)[2]; the deposit rate is represented by the interest rate on deposits in foreign currency (INT_d)[3]; the inflation is inflation rate calculated from the Consumer price index and measures the macroeconomic instability (INF); financial deepening is the ratio of money (M1) to nominal GDP (FIN), while the gross domestic savings[4] is the ratio of gross domestic savings to nominal GDP. The chosen variables are similar to Obamuyi and Olorunfemi (2011), but the methodology used in this paper is quite different.



Source: IFS and CNB.

Figure 1. **Real GDP Growth Rate, Lending Interest Rate, Deposit Interest Rate, Financial Deepening, Inflation and Gross Domestic Savings (%)**

It is visible that both interest rates achieve downward trend, GDP growth and inflation stagnate while the financial deepening and domestic savings have upward trend till 2008 and after that they stagnate. Almost all series have visible brakes in the period before 2000 and

[2] Data on the interest rate on kuna credits indexed to foreign currency are taken as a proxy variable for the interest rate on credits, since CNB does not announce the overall average interest rate on the credits of Croatian banks. According to CNB data, the kuna credits indexed to foreign currency have the largest share in total credits.

[3] Data on the interest rate on deposits in foreign currency are taken as a proxy variable for the interest rate on deposits, since CNB does not announce the overall average interest rate on deposits of Croatian banks. According to CNB data, the deposits in foreign currency have the largest share in total deposits.

[4] Gross domestic savings are calculated as nominal GDP less final consumption expenditure (total consumption), while the final consumption expenditure represents the sum of household final consumption expenditure (private consumption) and general government final consumption expenditure (general government consumption).

during 2008. The reasons for that in the period before 2000 may be found in the second banking crisis and in the introduction of VAT, while in the period during 2008, the main reason is the spillover effect of global crisis on the Croatian economy.

3. Empirical Analysis and Results

As it has already been said, in order to analyse the relationship between the interest rates and economic growth in Croatia, the VAR model with subset restrictions will be estimated. Typically, VAR methodology mainly consists of the forecast error variance decomposition and impulse response functions. Before defining the VAR model, it is necessary to examine the properties of time series, i.e., the degree of integration, as it is well known that the models with nonstationary series can lead to wrong conclusions and problems (Österholm, 2005). In order to do so, the extended Dickey-Fuller ADF test (Dickey, Fuller, 1979), Phillips and Perron PP test (Phillips, Perron, 1988), and KPSS test (Kwiatkowski *et al.*, 1992) are considered.

In order to eliminate the influence of seasonal factors, all series were seasonally adjusted[5]. Results of unit root test are shown in *Table 1*.

Table 1. Unit root tests

Variable and test	Level		First difference	
	Constant	Constant and trend	Constant	Constant and trend
ADF test	t-stat.			
RGDP	-2.636670	-4.633885	-6.378242	-6.321417
INT_c	-8.957818	-5.721735	-4.457807	-5.039895
INT_d	-1.267934	-1.724507	-2.682338	-2.817892
FIN	-0.930451	-1.933318	-8.390477	-8.325439
INF	-2.959799	-3.293728	-5.802568	-5.746236
SAV	-2.455397	-0.465965	-8.329867	-9.154299
PP test	Adj. t-stat.			
RGDP	-2.844250	-3.336097	-7.118580	-7.062792
INT_c	-6.852782	-4.557176	-4.252227	-4.854480
INT_d	-1.228906	-1.472746	-8.312656	-8.230860
FIN	-0.920474	-1.948225	-8.390968	-8.325832
INF	-2.956051	-3.113966	-6.630462	-6.570769
SAV	-2.219640	-2.535112	-12.90614	-16.57307
KPSS test	LM-stat.			
RGDP	0.620998	0.081731	0.025932	0.026229
INT_c	0.818424	0.270263	0.789692	0.182590
INT_d	0.392061	0.185816	0.122875	0.121778
FIN	0.940303	0.143175	0.065261	0.063350
INF	0.321506	0.093174	0.035927	0.031784
SAV	0.818087	0.260861	0.359849	0.108110

Notes: for the implementation of ADF test, the Schwarz Bayesian criterion has been implemented. ADF test critical values (MacKinnon, 1996); constant: 1% level (-3.49), 5% level (-2.89), 10% level (-2.58); constant and trend: 1% level (-4.04), 5% level (-3.45), 10% level (-3.15). PP test critical values (MacKinnon, 1996): constant: 1% level (-3.49), 5% level (-2.89), 10% level (-2.58); constant and trend: 1% level (-4.04), 5% level (-3.45), 10% level (-3.15). KPSS asymptotic critical values (Kwiatkowski *et al.*, 1992); constant: 1% level (0.739), 5% level (0.463), 10% level (0.347); constant and trend: 1% level (0.216), 5% level (0.146), 10% level (0.119).

Source: own calculations.

Although ADF and PP tests indicate possible stationarity of interest rate on credits in levels, the insight to *Figure 1*, KPPS test, and additionally performed ACF and PACF

[5] Using the Arima X12 method.

autocorrelation functions rejects this possibility[6]. Therefore, for the purposes of this analysis, it can be concluded that GDP growth and inflation are integrated of order I(0), i.e., they are stationary in levels, while interest rates, financial deepening, and domestic savings are integrated of order I(1), i.e., they become stationary after differencing.

Based on these assumptions, the following unrestricted VAR model is estimated:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + \cdots + CD_t + u_t, \quad (1)$$

where $y_t = (y_{1t},\ldots,y_{Kt})$ is a vector of K endogenous variables, D_t is a vector of deterministic variables including constant and specified dummy variables, u_t is K-dimensional vector of residuals, while A and C are matrices of parameters of the model[7].

The vector of endogenous variables includes four lags of each variable, i.e., GDP growth, interest rates, financial deepening, inflation and domestic savings, while the vector of deterministic variables includes constant and several dummy variables for the breaks in the period before 2000 and during 2008.

VAR model with subset restrictions is estimated using a Top-Down (TD) sequential elimination algorithm, i.e., the procedure developed by Brüggemann and Lütkepohl (2001), which starts from the last regressor in the equation and checks if deleting it, improves the criterion value (for this purposes the HQ criterion is used). In that case, it is eliminated. Otherwise, it is maintained. Then the second last regressor is checked and so on. This procedure depends on the ordering of the variables in the model and, hence, in the equation. The diagnostic tests of the estimated VAR model with subset restrictions are shown in *Table 2* and suggest that the model is adequately estimated.

Table 2. VAR model with subset restrictions diagnostic tests (joint and individual tests)

Serial correlation	**Portmanteau test (4 lags):** test statistic: 111.2171, p-value: 0.1373; adjusted test statistic: 115.8421, p-value: 0.0821, df: 96.0000 **LM type test (4 lags):** LM statistic: 115.5043, p-value: 0.9612, df: 144.0000
Normality	**Doornik & Hansen test (4 lags):** joint test statistic: 3.4891, p-value: 0.9910, df: 12.0000; skewness only: 1.6025, p-value: 0.9524; kurtosis only: 1.8866, p-value: 0.9298 **Lütkepohl test (4 lags):** joint test statistic: 7.5920, p-value: 0.8161, df: 12.0000; skewness only: 1.2716, p-value: 0.9732; kurtosis only: 6.3204, p-value: 0.3883 **Jarque Bera test (4 lags):** u1: teststat: 0.3573, p-Value(Chi^2): 0.8364; skewness: 0.1827; kurtosis: 3.0215 u2: teststat: 6.3290, p-Value(Chi^2): 0.0422; skewness: -0.3096; kurtosis: 4.4107 u3: teststat: 0.3880, p-Value(Chi^2): 0.8237; skewness: -0.0500; kurtosis: 2.6319 u4: teststat: 0.3578, p-Value(Chi^2): 0.8362; skewness: 0.0631; kurtosis: 2.6562 u5: teststat: 0.0391, p-Value(Chi^2): 0.9806; skewness: 0.0495; kurtosis: 2.9303 u6: teststat: 0.2318, p-Value(Chi^2): 0.8906; skewness: -0.1367; kurtosis: 3.1105
ARCH	**ARCH-LM test (4 lags):** u1: teststat: 5.8085, p-Value(Chi^2): 0.2139; F stat: 1.6078, p-Value(F): 0.1854 u2: teststat: 2.5873, p-Value(Chi^2): 0.6291; F stat: 0.6760, p-Value(F): 0.6115 u3: teststat: 6.5470, p-Value(Chi^2): 0.1619; F stat: 1.8372, p-Value(F): 0.1348 u4: teststat: 0.2943, p-Value(Chi^2): 0.9902; F stat: 0.0739, p-Value(F): 0.9898 u5: teststat: 0.7137, p-Value(Chi^2): 0.9496; F stat: 0.1806, p-Value(F): 0.9475 u6: teststat: 3.7835, p-Value(Chi^2): 0.4361; F stat: 1.0095, p-Value(F): 0.4105 **Multivariate ARCH-LM test (2 lags):** VARCHLM test statistic: 908.8118, p-value(chi^2): 0.2585, df: 882.0000

Notes: "u" stands for the residuals.

Source: own calculations.

[6] The results are not shown in order to preserve space.

[7] The JMulTi (Lütkepohl, Krätzig, 2004) and Gretl (Cottrell, Lucchetti, 2007) econometric software is used for the multiple time series analysis.

The analysis continues with orthogonalized forecast error variance decomposition using a Cholesky decomposition, which shows the importance of the volatility of some variable in time in explaining the volatility of other variables in the model. The results are presented in *Table 3*.

Table 3. Orthogonal forecast error variance decomposition (Cholesky ordering in %)

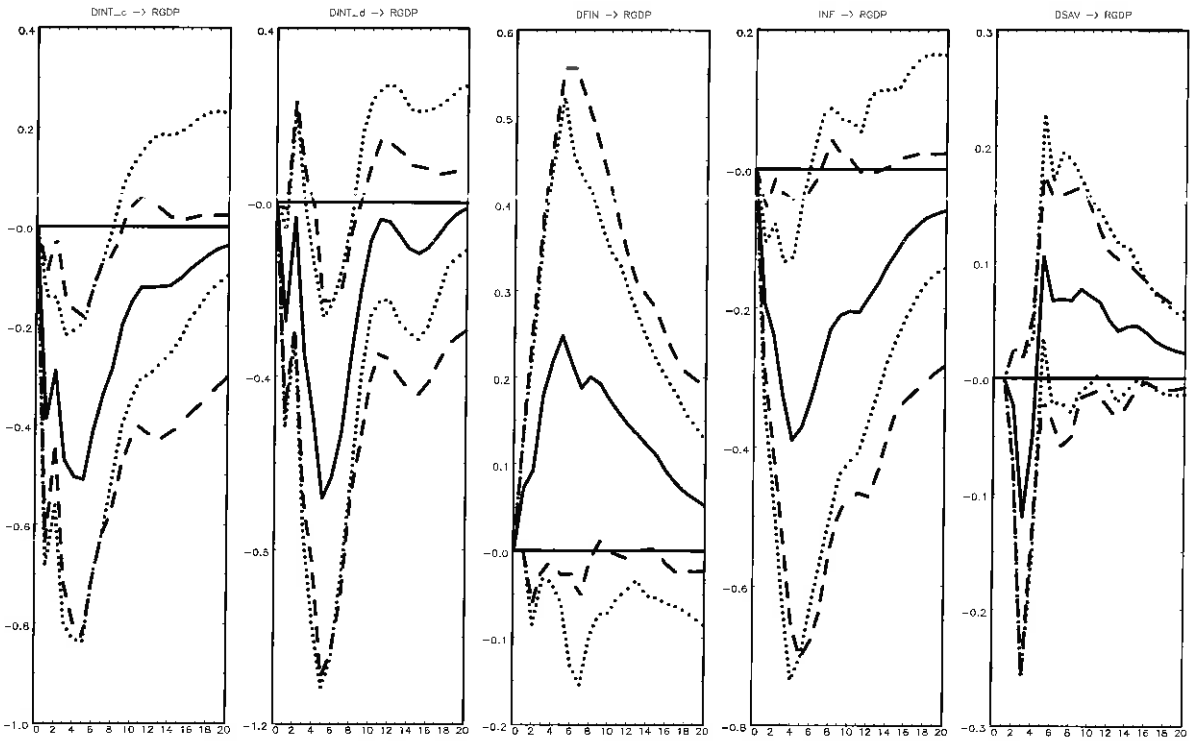
Variance decomposition of RGDP						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	86	7	3	1	3	0
8	65	11	14	2	6	0
12	64	11	14	3	7	0
16	63	11	14	3	7	1
20	63	11	14	4	8	1
Variance decomposition of DINT_c						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	2	71	8	6	10	3
8	6	65	8	6	9	4
12	8	64	9	6	9	4
16	8	63	9	6	9	4
20	8	63	9	6	9	4
Variance decomposition of DINT_d						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	8	9	79	0	2	2
8	8	9	79	0	2	2
12	8	9	79	0	2	2
16	8	9	79	0	2	2
20	8	9	79	0	2	2
Variance decomposition of DFIN						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	12	14	4	65	0	4
8	12	14	4	65	0	5
12	12	14	4	65	0	5
16	12	14	4	65	0	5
20	12	14	4	65	0	5
Variance decomposition of INF						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	1	5	1	18	73	2
8	2	5	3	21	63	5
12	2	6	8	20	60	5
16	2	6	8	19	59	5
20	3	6	8	19	59	5
Variance decomposition of DSAV						
Horizon (quarters)	**RGDP**	**DINT_c**	**DINT_d**	**DFIN**	**INF**	**DSAV**
4	14	8	2	6	1	69
8	21	9	2	6	3	60
12	21	9	3	6	3	59
16	21	9	3	6	3	59
20	21	9	3	6	3	59

Notes: Cholesky ordering: RGDP, DINT_c, DINT_d, DFIN, INF, DSAV

Source: own calculations.

The results indicate that the interest rate on credits and deposits explain most of the variance of GDP growth, excluding its shocks. The interest rate on deposits and the inflation explain most of the variance of interest rate on credits, excluding its shocks, while the GDP growth and interest rate on credits explain most of the variance of interest rate on deposits, excluding its shocks. The same is valid for the financial deepening. However, the financial deepening and the interest rate on deposits explain most of the variance of inflation, excluding its shocks. Finally, the GDP growth and the interest rate on credits explain most of the variance of domestic savings, excluding its shocks.

The analysis proceeds with the orthogonalized impulse response functions, which are used to investigate the dynamic interactions among the endogenous variables. The orthogonalized impulse responses are based on an innovation of size one standard deviation in the transformed model, i.e., a model where the matrix of residuals is orthogonalized using a Cholesky decomposition. As the primary goal of this paper is to analyse the relationship between the interest rates and economic growth in Croatia, *Figure 2* shows the impulse responses of GDP growth to a shock in interest rates, financial deepening, inflation, and domestic savings.



Source: own calculations.

Figure 2. **VAR Model with the Subset Restrictions orthogonal Impulse Responses with Efron (- - -) and Hall (• • •) with 95% Confidence Intervals**

An increase in the interest rates and inflation instantaneously reduces the GDP growth, while an increase in financial deepening is increasing it. On the other hand, an increase in domestic savings has almost no impact on the GDP growth. It is noticeable that the confidence intervals are relatively large, indicating the lower reliability of impulse responses. However, this is expected, since the period used in the analysis is relatively short, while the

number of variables in the model is relatively large. Furthermore, this is the primary disadvantage of the analysis. Finally, the obtained results are in line with the forecast error variance decomposition.

Therefore, according to the forecast error variance decomposition and impulse response functions results of the VAR model with subset restrictions, it can be concluded that the interest rates have statistically significant and negative impact on the GDP growth in Croatia.

Conclusions

Study results in this paper show the existence of negative correlation between the interest rates and growth in Croatia. The countercyclical effect of the interest rates in Croatia is mild in the short run reaching the peak in 6 quarters period. In longer period, the countercyclical effects slowly die out. The obtained results are in line with Hansen and Seshadri (2013) finding a -0.20 correlation coefficient between the interest rates and productivity growth.. The results of this paper show that the output growth is high during a low interest rate regime. High interest rates trigger low productivity growth causing low output growth. Statistical evidence showed slower GDP growth in Croatia and implies higher interest rates. Thus, the obtained empirical results are in contrast to the study results of Laubach and Williams (2003), and Summers (2014). Secular stagnation is a fact in the Croatian economy, and this issue should be addressed promptly. Moreover, this study results follow the results of Goldman Sachs (2014), Carroll and Summers (1991), and Bosworth (2014), founding weak or no positive correlation between the economic growth and short-term interest rates (on credits) in Croatia. Further research on the link between the interest rates and economic growth, following the one of Bosworth (2014), are needed to trace the causality between these two important domestic and international factors.

Acknowledgment

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RYŠIO TVIRTUMAS TARP PALŪKANŲ NORMOS IR EKONOMIKOS AUGIMO

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SANTRAUKA

Svarbu suprasti santykį tarp nominalių ilgalaikių palūkanų normų, kainų lygio ir gamybos augimo, nes palūkanų normos yra pagrindinis nacionalinę ekonomiką skatinantis veiksnys. Palūkanų normos kanalas ir finansinių lėšų tiesioginiai srautai iš tapytojų skolininkams ženkliai veikia valstybės augimą, vystymąsi ir nacionalinį turtą. Dėl šios priežasties jau daugelį amžių tradicinės likvidumo pirmenybės, skolintinų lėšų ir racionalių lūkesčių teorijos tyrinėja palūkanų normas. Palūkanų normos – augimo ryšiai, kurie vadina svarbų vaidmenį aiškinant tikrąją palūkanų normos esmę. Šio tyrimo rezultatai parodė, kad lėšų augimas ženklus, kai palūkanų normos žemos. Aukšta palūkanų norma sukelia silpną produktyvumo augimą. Statistiniai rezultatai atskleidė, kad lėtesnis BVP augimas Kroatijoje reiškia aukštesnes palūkanų normas. Taigi gauti empiriniai rezultatai prieštarauja Laubach, Williams (2003) ir Summers (2014) rezultatams. Pasauliečių stagnacija yra būdinga Kroatijos ekonomikai, tačiau ši problema turėtų būti skubiai išspręsta. Tyrimas taip pat apžvelgė Goldman Sachs (2014), Carroll, Summers (1991) ir Bosworth (2014) rezultatus, nurodant silpną arba jokios koreliacijos nebuvimą tarp ekonominio augimo ir (kreditų) trumpalaikių palūkanų normų Kroatijoje. Tolesnis ryšių tarp palūkanų normų ir ekonominio augimo tyrimas, sekant Bosworth (2014) pavyzdžiu, yra reikalingas tam, kad būtų galima nustatyti priežastinį ryšį tarp šių dviejų svarbių vietinių ir tarptautinių veiksnių.

REIKŠMINIAI ŽODŽIAI: palūkanų norma, augimas, Solow-Swan modelis, ryšiai, VAR, Kroatija.