The Effect of Money Supply, Inflation Rate, Exchange Rate, and the Business Cycle on Interest Rate: The Case Study of Indonesia

AGUS SALIM
School of Economics, Northeast Normal University
Changchun, China
MOCHAMMAD RIDWAN G.
Department of Economics, Universitas Gadjah Mada
Yogyakarta, Indonesia
IGNATIUS ABASIMI
School of Economics, Northeast Normal University
Changchun, China

Abstract:

Since the post-crisis in 1997-1998, that has an enormous effect on the high inflation rate, which affects the interest rate volatility of Asian economies, particularly Indonesia. Therefore, the determination of interest rates is not only influenced by inflation but also the sharing of factors that can cause a bank to determine the size of the interest rate, whether it is deposits, savings, or credit. The purpose of this study is to analyze the effect of macroeconomic variables on the interest rate volatility in Indonesia. We used ordinary least square to estimates the quarterly data from 2002: I to 2017: I. The estimation result finds that the dynamic in the money supply, inflation rate, and the exchange rate of the IDR vis-à-vis USD has a positive and significant effect on the interest rate volatility. However, the business cycle has an inverse effect on the interest rate volatility in Indonesia.

Keywords: interest rate volatility, macroeconomic determinants, OLS, business cycle, Indonesia

1. INTRODUCTION

The monetary crisis began with the decline in the Indonesian Rupiah vis-a-vis the US Dollar has destroyed the joints of the economy, including banking. Inflation is one of the effects of a prolonged economic crisis that hit a country. Where there is a sharp increase in prices that takes place continuously in an extended period, which is followed by increasingly declining real value of a country's currency (Brailsford, Penm, and Lai 2006; Chow and Kim 2006). In general, the causes of the economic crisis in Indonesia were not caused by weak economic fundamentals, but because of the declining Rupiah exchange rate against the US Dollar. Short-term private foreign debt since the early 1990s has accumulated very mostly, which is primarily unprotected against foreign currencies. It is what then adds pressure to the Indonesian rupiah exchange rate because there is not enough foreign exchange to pay maturing debts and interest.

Around the middle of 1997, the problem of inflation and the exchange rate crisis intensified because the inflation rate had reached double digits at around 11.05 percent and caused the value of the Rupiah to plummet. This crisis will result in the burden of corporate debt, primarily foreign currency debts, whose financing depends on the bank to become substantial because the banks have difficulty providing daily operational liquidity (Cavoli 2010; Haughton and Iglesias 2012). As a result, bad loans arise, which directly and indirectly disrupt (in large amounts and even stop) bank operations. Naturally, investors or savers would prefer to hold the dollar currency compared to the rupiah because besides having a relatively small risk, there are also several profitable returns.

The monetary crisis that occurred in 2007 due to the decline in the value of the Indonesian rupiah vis-a-vis the United States dollar has a significant influence on the economy in Indonesia, including banking. It affects domestic inflation. Inflation is a condition where there is a sharp increase in prices (absolute) which takes place continuously in a long period of time which is followed by a decline in the real (intrinsic) value of a country's currency (Chow and Kim 2006; R. Huang and Ratnovski 2011; Toyoshima 2012; Tumwine et al. 2018). In order to prevent the monetary crisis, one alternative approach taken is to implement a monetary control system

that is characterized by the policy of raising interest rates on bank deposits by the government. The government's policy to raise bank deposit interest rates is undoubtedly influenced by many factors, in addition to being influenced by macroeconomic conditions, banking performance is also a consideration in determining the level of bank deposit rates.

Duarte (2008) explains that many studies show that investors or savers are so appreciative of the difference in bank interest rates that are so large in the country with foreign interest. It is related to the perception of those who see that the quite significant difference in interest rates that occurred in the period after the crisis, is seen as a place for profitable investment and good corporate value because it offers a considerable level of profit for them (Chou 2018; Sensoy and Sobaci 2014). It is what then led to the invasion and flight of capital abroad (capital flight) on a large scale.

One of the efforts made by the banks to help the government in dealing with inflation is to suppress the money supply both in the narrow and broad sense or economic liquidity. The effect of this policy, both private banks and state banks are competing to raise interest rates (Haughton and Iglesias 2012; Kiptui 2014). With the hope that the interest given by banks to the public is the main attraction for the public to save their money in the bank, while for banks, the higher the amount of society that can be collected, will increase the ability of banks to finance their operational operations, which are mostly in the form of providing loans to the public.

It is not uncommon for banks to set covert interest rates, namely deposit rates that are given higher than those formally informed through the mass media in the hope that the raised interest rates will cause the amount of money in circulation to decrease because people prefer to save rather than turn their money around productive sectors or save them in cash at home (Bhattarai 2011; Obeng and Sakyi 2017; Saunders and Schumacher 2000; Tumwine et al. 2018). Conversely, if interest rates are too low, the amount of money circulating in the community will increase because people will prefer to rotate their money in sectors that are considered productive. Hainz, Horvá th, and Hlavá cˇek (2014) reveal that high-interest rates will encourage savers to save their funds in banks rather than invest them in the production sector or industry that has a higher

level of risk. Thus, the inflation rate can be controlled through an interest rate policy (Fang et al. 2012; Fornari et al. 2002; Kim and Sheen 2000; Kiptui 2014; Tennant and Folawewo 2009). However, in reality, Ozdemir and Altinoz (2012) reveal that the determination of interest rates is not only influenced by inflation, but also the sharing of factors that can cause a bank to determine the size of the interest rate whether it is deposits, savings or credit. Thus our purpose is to examine the effect of money supply, inflation rate, exchange rate, and economic growth on the interest rate volatility in Indonesia.

The result shows that all of the macroeconomic variables have a significant effect on the interest rate volatility in Indonesia. Moreover, to this end of this section, we introduce the next section is the literature review. In section 3, we present the analysis method. The empirical result and discussions are provided in section 4. Finally, we conclude the result in section 5.

2. LITERATURE REVIEW

The studies of the relationship between macroeconomic variables and the interest rate improved due to the transition of economies. The interest rate has linkages to the volatility of other macroeconomic variables. The good news of macroeconomic variables would encourage the public's expectation of the interest rate increase. Kim and Sheen (2000) examine the effect of macroeconomic news on interest rate volatility in the US and Australia. They find that monetary policy announcement has a significant effect on interest rate both in the short-run and long-run. The conditional volatility of the Australian interest rate changes was also significantly influenced by lagged US interest rate shocks, as well as by surprises in US macroeconomic announcements.

Interest rate volatility is also determined by other external country's variables, which is the exchange rate. Chow and Kim (2006) study the effect of exchange rate movement on interest rates in Indonesia, Korea, Philippines, and Thailand after the Asian Financial Crisis. The used bivariate vector auto regression-generalized autoregressive conditional heteroskedastic (VAR-GARCH) to estimate the weekly data stream from 1 January 1990 to 30 April 2005. The result shows that there is evidence in the post-crisis period that an

increase in exchange rate variability affects the short-term decrease in interest rate volatility. However, they did not find a robust long-term relationship between exchange rate flexibility and interest rate variability.

The study of interest rate determinants developed due to the variability of interest rate in the financial sector. Y. Huang, Chen, and Camacho (2008) analyze the determinants of the Japanese Yen interest rate swap spread. They used a smooth transition vector autoregressive (STVAR) impulse response function model to estimate weekly data from August 8, 1997, to April 15, 2005. The result shows that the government bond model is indicated as a transition variable control of the smooth transition from high to low volatility regime. Overall, their result describes an effect on the shorter maturity spreads, whereas the term structure shocks play an essential role in the longer maturity spreads.

Bhattarai (2011) tests the impact of the exchange rate and money supply on macroeconomic variables, especially the impact on interest rate in the UK. The analysis based on the indirect lest square (ILS), two stages least square (2SLS), and three stages least square (3SLS) to estimate quarterly data from 1970.II to 2006.I. The result shows that the money supply has a positive and significant effect on the interest rate. It means that higher liquidity in the financial system, a higher interest rate. However, the exchange rate has an inverse effect on the interest rate. A higher exchange rate of the UK pounds vis-à-vis the US dollar will deteriorate the volatility of interest rate in the UK.

Fang et al. (2012) study the impact of macroeconomic surprises on interest rate swap spreads in Australia during the economic expansion and contraction periods. They employed exponential generalized autoregressive conditional heteroskedasticity (EGARCH) specification to analyze the daily closing mid-rates from DataStream over the period January 3, 1995, to January 31, 2007. The result shows that there is a different effect of the macroeconomic announcement on swap spread based on the size of the state of the economy. The inflation rate has a significant effect on the swap spreads across all maturities during the contraction and remains the critical news announcement through the business cycle in Australia.

Smales (2013) analyzes the impact of macroeconomic announcements on interest rate futures in the case of Australia and its reaction towards the global financial crisis in 2007-2008. The analysis uses big frequency data on Australian interest rate futures (30-day interbank, 90-day bank bill, and 3- and 10- year government bond future) over the period from January 6, 2004, to December 31, 2010, with a total of 1,795 trading days. The result shows that consumer price index and gross domestic product have a positive and significant effect on the volatility of 30-day interbank, 90-day bank bill, and 3- and 10- year government bond futures in Australia. Moreover, the GFC has significantly affected the response of Australian interest rate futures to major macroeconomic announcements.

Kiptui (2014) analyzes the determinants of the interest rate spread uses the banking perspective in Kenya. The analysis employs two methods, such as decomposition technique and panel data analysis. The decomposition analysis combines data from income statements and consolidated balance sheets of commercial banks to analyze the spread. The result shows that GDP growth and exchange rate variability have a positive and significant effect on the interest rate spread in Kenya. It means that an increase in the GDP and exchange rate would increase the spread of interest rates due to the excellent condition of the economy. Moreover, an appreciation of exchange rate instability/variability (measured in standard deviations from mean) by 1 percent results in an upward adjustment of interest margins by 0.06 percent.

3. RESEARCH METHOD

3.1. Data Source

The following analysis used data includes quarterly data from 2002: I to 2017: I due to the availability of the data. The original dataset is mainly obtained from the official site of the International Monetary Fund (IMF), the Organization for Economic Co-operation and Development (OECD), and the Indonesian Statistical Bureau. The dependent variable is the interest rate. The independent variables are money supply which represented by M2, consumer price index to represent the inflation rate, the exchange rate between Indonesia and the US, namely Indonesian Rupiah (IDR) vis-à-vis US dollar (USD)

and total GDP of Indonesia and China as a proxy of growth rate in both countries. To ensure the stationary of the data, we applied a logarithmic form for all macroeconomic variables except the interest rate and inflation rate.

3.2. Empirical Model

The main purpose of this study is to examine the effect of money supply, inflation, exchange rate, and growth rate on the interest rate in Indonesia. We adapted the previous macroeconomic model from the study of Obeng and Sakyi (2017). We improved the model by applying the exchange rate variable, as suggested by Kim and Sheen (2000), and the GDP growth rate to represent the business cycle, as suggested by Kiptui (2014). The original model of this study is outlined by equation (1):

$$IR_t = \alpha + \beta_1 logMS_t + \beta_2 INF_t + \beta_3 logER_t + \beta_4 logGDP_t + \beta_5 IR_{t-1} + \varepsilon_t \quad (1)$$

Where IR_t represents the interest rate volatility, and the $logMS_t$ is broad money (M2) to represent the money supply. The INF_t represents the inflation rate in Indonesia. $LogER_t$ is the value of IDR vis-à-vis USD to represent the exchange rate. The $logGDP_t$ is the GDP growth rate to represent the business cycle in Indonesia, and ε_t is the disturbance term.

Table 1. Summary of Data Sources and Measurement

Variable	Data	Description	Source	Expectation
IR_t	The interest rate of the money market	Indicator of the rate of return in ASEAN-5 countries	International Financial Statistic of the International Monetary Fund (IMF)	
$logMS_t$	Broad money (M2)	Money supply	Organization for Economic Co-operation and Development (OECD)	-
INF_t	Consumer price index	Indicator of the inflation rate	International Financial Statistic of the International Monetary Fund (IMF)	+
$logER_{i,j,t}$	the Indonesian Rupiah vis-á-vis the US dollar	Indicator of the type of the US bank reaction to response the liability shock in	International Financial Statistic of the International Monetary Fund (IMF)	-

		the home country		
$\log GDP_t$	Real GDP	The indicator of the business cycle in Indonesia	World Bank	+
IR_{t-1}	The interest rate of the money market	Indicator of the rate of return in ASEAN-5 countries	International Financial Statistic of the International Monetary Fund (IMF)	+

The interest rate is represented by the interest rate of the money market in percent per annum is obtained from the official site of the International Financial Statistic of the International Monetary Fund (IMF). Broad money using M2 of Indonesia to represent the money supply, and we gained this data from the Organization for Economic Co-operation and Development (OECD). The consumer price index as a proxy of the inflation rate gained from the International Financial Statistic of the International Monetary Fund (IMF). The exchange rate of the Indonesian Rupiah *vis-á-vis* the US dollar has also obtained from the official site of the International Monetary Fund (IMF).The real gross domestic product (GDP) variables are measured in the current US dollar in which obtained from the official site of the World Bank. Since the data provided in yearly frequency, we employed the linear interpolation method. This data used to explain the business growth cycle in both home and host countries.

3.3. Estimation Strategy

The estimation begins with a descriptive statistical analysis of the data used in this study. We estimate the model of equation (1) use the ordinary least square (OLS) by comparing the result of t-statistic for partial analysis and F-statistic for simultaneous analysis. The estimation also reports the result of diagnostic tests such as serial correlation, heteroskedasticity, normality, and Ramsey-RESET test for functional form. We also apply for the recursive stability tests based on the CUSUM and CUSUMQ tests.

Table 2. Correlation Matrix

Correlation	IR_t	$logMS_t$	INF_t	$logER_{i,j,t}$	$logGDP_t$
IR_t	2.911395				
	1.000000				
$logMS_t$	-0.738491	0.306272			
	-0.782062	1.000000			
INF_t	2.848930	-0.764656	10.55634		
	0.513895	-0.425262	1.000000		
$logER_{i,j,t}$	-0.103705	0.060461	-0.075203	0.021665	
	-0.412920	0.742235	-0.157251	1.000000	
$logGDP_t$	-0.357671	0.144527	-0.328702	0.029409	0.069269
	-0.796458	0.992256	-0.384393	0.759134	1.000000

(Source: Author's Computation Using E-views 10)

4. RESULT AND DISCUSSION

4.1. Statistic Descriptive Analysis

The analysis begins from the summary statistic of data that used to estimate the equation (1). Generally, we employed the same number of observations for every five variables. However, the lag of interest rate is generated from the dependent variable. Some of the variables are converted into the logarithmic due to the different high spread. The summary statistic of each variable is presented in Table 2.

Table 3. Summary Statistic of Variable

Variable	Obs.	Mean	Maximum	Minimum	Std. Dev.
IR_t	57	13.60895	18.42000	11.44000	1.721448
$logMS_t$	57	4.526627	5.389020	3.670101	0.558338
INF_t	57	6.854737	17.78000	2.590000	3.277933
$logER_{i,j,t}$	57	9.210476	9.536104	9.040888	0.148500
$logGDP_t$	57	14.53211	14.97554	14.04646	0.265530

(Source: Author's Computation Using E-views 10)

According to table 3 above, the data spread among variables are quite high. The minimum value of interest rate and other macroeconomic variables have different spreads. The mean of each variable is quite far from each other, especially for money supply. Table 3 above also reports the standard deviation for each variable that has high spread, especially between the inflation rate exchange rate variables. Thus,

we decided to apply the logarithmic terms for the high spread variables such as money supply, exchange rate, and gross domestic product, to decrease the enormous difference spread among variables estimated.

4.2. Empirical Analysis and Discussion

Determinants of the interest rate in Indonesia are mainly estimated through the ordinary least square (OLS. We analyze the effect of money supply, inflation rate, the exchange rate of IDR vis-à-vis USD, and the business cycle on the volatility of interest rate in Indonesia The result of the estimation of equation (1) is presented in table 5. The following explanation is the result of diagnostic tests such as serial correlation, heteroskedasticity, normality, and Ramsey-RESET test for functional form. We also apply for the recursive stability tests based on the CUSUM and CUSUMQ tests.

Table 3. Summary Statistic of Variable

No.	Diagnostic Tests	Results
1.	Serial correlation	142.0155
		(0.0000)
2.	Heteroskedasticity	9.850144
		(0.0000)
3.	Normality	0.731809
		(0.6936569)
4.	Ramsey-RESET	1.637457
		(0.2065)

(Source: Author's Computation Using E-views 10)

The result of diagnostic tests such as serial correlation, heteroskedasticity, normality, and Ramsey-RESET test for the functional form is presented in table 4. We test for serial correlation using the Breusch-Godfrey Serial Correlation LM Test. The F-statistic of the serial correlation test is 142.0155, with the value of probability is 0.0000, which lower than the critical value 0.05. It implies that our model does not pass the serial correlation test. For the heteroskedasticity test, we employed the Breusch-Pagan-Godfrey for heteroskedasticity. The result of F-statistic is 9.850144, with a probability of 0.0000, which lower than our critical value 0.05. Thus, we conclude that our model fails to pass the heteroskedasticity test.
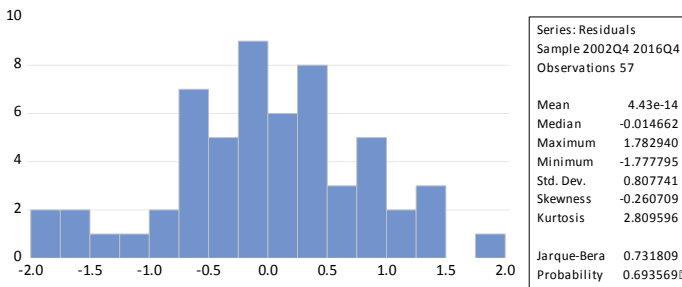
	Series: Residuals
	Sample 2002Q4 2016Q4
	Observations 57
	Mean 4.43e-14
	Median -0.014662
	Maximum 1.782940
	Minimum -1.777795
	Std. Dev. 0.807741
	Skewness -0.260709
	Kurtosis 2.809596
	Jarque-Bera 0.731809
	Probability 0.693569

Figure 1. Histogram Normality (Source: Author's Computation Using E-views 10).

The result F-statistic for normality test is 0.731809 with probability is 0.693569, which higher than critical value 0.05. The result implies that our model use data that normally distributed. Therefore our estimation is for a random variable underlying the data set to be normally distributed. Moreover, our result of the Ramsey RESET test shows that the F-statistic is 1.637457 with the probability test is 0.2065 with higher than our critical value 0.05. The result implies that our model is well-functioned.
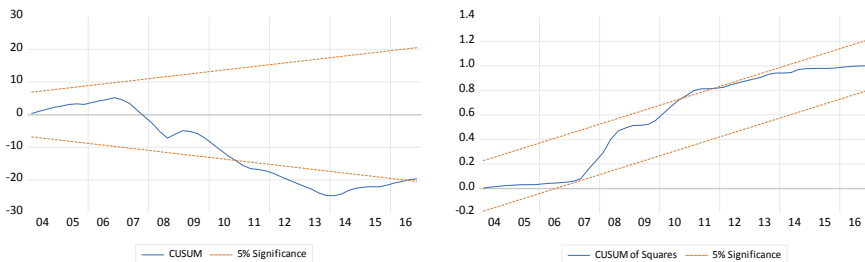

Figure 2. The result of the CUSUM and CUSUMQ test
(Source: Author's Computation Using E-views 10).

Figure 2 above explains that the model fails to pass the cumulative sum (CUSUM) and cumulative sum of square (CUSUMQ). Both of the CUSUM and CUSUMQ lines are crossing the 0.05 significance line. Thus we conclude that our model estimates are not stable. The result of R-squared presented in table 5 is 0.762895, which means 76.2895 of independent variables such as money supply, inflation rate, exchange rate, and the business cycle affect the interest rate in Indonesia. The

result of the F-test is 46.04561, with the probability of F-test 0.000000, which lower than our critical value 0.05. It implies that all of the independent variables have a significant effect on the volatility of interest rate in Indonesia.

Table 5. The estimation result of OLS

No.	Variable	t-statistic
1.	C	188.2039***
		(44.44310)
2.	$logMS_t$	4.821453***
		(1.750757)
3.	INF_t	0.136209***
		(0.040785)
4.	$logER_{i,j,t}$	4.761336***
		(1.190872)
5.	$logGDP_t$	-16.59826
		(3.680185)
F-statistic		46.04561***
		[0.000000]
Adjusted R^2		0.762895

Figures reported in the parenthesis ( ) are the standard error. An asterisk ***, **, and * indicate rejection of the null hypothesis at 1, 5, and 10 percent of significance level, respectively (Source: Author's Computation Using E-views 10).

Table 5 presents the estimation result of the equation (1) by using the ordinary least square (OLS). The coefficient estimates of the money supply variable are 4.821453, which has a positive and significant effect on the interest rate. It implies that a one-point increase in the money supply in public, it would be responded by 4.5 times an increase in the interest rate. Our result supports the study of Bhattarai (2011), who tests the impact of the exchange rate and money supply on macroeconomic variables, especially the impact on interest rate in the UK. However, it differs from the study of Obeng and Sakyi (2017), who reveals that the money supply does not correlate with the volatility of interest rate in the long-run.

The result of the inflation rate's coefficient is 0.136209, which has a positive and significant effect on the volatility of the interest rate at a 1 percent level of significance. The result implies that an increase in one point in the inflation rate due to the increase of money supply in Indonesia would push the Central Bank of Indonesia (Bank

Indonesia) to increase the interest rate of around 13.6209 percent. This result has similar thought to the study of Bhattarai (2011), Fang et al. (2012), Kim and Sheen (2000), and Smales (2013) that the dynamic of the inflation rate in a country has a positive and significant effect on the volatility of the interest rate.

According to the impact of foreign affairs on the domestic interest rate in Indonesia, we employ the exchange rate variable. We follow the study of Bhattarai (2011), Chow and Kim (2006), and Kiptui (2014) that the exchange rate correlates with the volatility of the interest rate. According to the result of the exchange rate is 4.761336, which means that it has a positive and significant effect. It implies that an increase in the exchange rate of the IDR vis-à-vis USD around 1 point, it would be responded by the increase of the interest rate in Indonesia around 4.7 times. Our finding is similar to the result of Chow and Kim (2006) and Kiptui (2014). However, it differs from the finding of Bhattarai (2011), who found that an increase in the exchange rate variable will decrease the interest rate variable.

We follow the study of Kiptui (2014) and Smales (2013) that GDP has a significant effect on the interest rate. Since we use the GDP variable as a proxy of the business cycle in Indonesia, the result of the coefficient of GDP variable is -16.59826 with has a negative and significant effect. The result implies that an increase in the business cycle, around 1 percent, will decrease the interest rate in Indonesia around 16.6 points. Our finding does not support the previous finding of Fang et al. (2012), Kiptui (2014), Smales (2013), and Tennant and Folawewo (2009) who conclude that an increase in the business cycle will be responded by the similar sign or increase in the interest rate volatility.

5. CONCLUSION

The consensus of the study of the interest rate determinants, we need to estimates the effect of money supply, inflation rate, exchange rate, and the business cycle on the volatility of the interest rate in Indonesia both partially and simultaneously. We improve the study of Obeng and Sakyi (2017) that analyze the effect of macroeconomic variables on the interest rate volatility in Ghana. Our result suggests that all of the macroeconomic variable estimates have a significant

effect on the interest rate. The appreciation of the IDR vis-à-vis USD variable indicates an increase in the exchange rate will push the authority to improve the interest rate value. However, the business cycle suggests an inverse relationship between the GDP and the interest rate in Indonesia. The result indicates that an increase in the business cycle would be followed by the decreasing in the interest rate in Indonesia.

REFERENCES

1. Bhattarai, Keshab. 2011. "Impact of Exchange Rate and Money Supply on Growth, Inflation and Interest Rates in the UK." *International Journal of Monetary Economics and Finance* 4 (4): 355. doi:10.1504/IJMEF.2011.043400.
2. Brailsford, Tim, Jack H. W. Penm, and Chin Diew Lai. 2006. "Effectiveness of High Interest Rate Policy on Exchange Rates: A Reexamination of the Asian Financial Crisis." *Journal of Applied Mathematics and Decision Sciences* 2006 (September): 1–9. doi:10.1155/JAMDS/2006/35752.
3. Cavoli, Tony. 2010. "What Drives Monetary Policy in Post-Crisis East Asia? Interest Rate or Exchange Rate Monetary Policy Rules." *Journal of Asian Economics* 21 (5): 456–65. doi:10.1016/j.asieco.2010.03.010.
4. Chou, Yu-Hsi. 2018. "Understanding the Sources of the Exchange Rate Disconnect Puzzle: A Variance Decomposition Approach." *International Review of Economics & Finance* 56 (July): 267–87. doi:10.1016/j.iref.2017.10.029.
5. Chow, Hwee Kwan, and Yoonbai Kim. 2006. "Does Greater Exchange Rate Flexibility Affect Interest Rates in Post-Crisis Asia?" *Journal of Asian Economics* 17 (3): 478–93. doi:10.1016/j.asieco.2006.04.005.
6. Duarte, Jefferson. 2008. "The Causal Effect of Mortgage Refinancing on Interest Rate Volatility: Empirical Evidence and Theoretical Implications." *Review of Financial Studies* 21 (4): 1689–1731. doi:10.1093/rfs/hhm062.
7. Fang, Victor, A.S.M. Sohel Azad, Jonathan A. Batten, and Chien-Ting Lin. 2012. "Business Cycles and the Impact of Macroeconomic Surprises on Interest Rate Swap Spreads: Australian Evidence." In *Contemporary Studies in Economic and Financial Analysis*, edited by Jonathan A. Batten and Niklas Wagner, 94:379–98. Emerald Group Publishing Limited. doi:10.1108/S1569-3759(2012)0000094018.

8. Fornari, Fabio, Carlo Monticelli, Marcello Pericoli, and Massimo Tivegna. 2002. "The Impact of News on the Exchange Rate of the Lira and Long-Term Interest Rates." *Economic Modelling* 19 (4): 611–39. doi:10.1016/S0264-9993(00)00073-0.

9. Hainz, Christa, Roman Horva´ th, and Michal Hlava´ cˇek. 2014. "The Interest Rate Spreads in the Czech Republic: Different Loans, Different Determinants?" *Economic Systems* 38 (2014): 43–54. doi:10.1016/j.ecosys.2013.10.002.

10. Haughton, Andre Yone, and Emma M. Iglesias. 2012. "Interest Rate Volatility, Asymmetric Interest Rate Pass through and the Monetary Transmission Mechanism in the Caribbean Compared to US and Asia." *Economic Modelling* 29 (6): 2071–89. doi:10.1016/j.econmod.2012.06.034.

11. Huang, Rocco, and Lev Ratnovski. 2011. "The Dark Side of Bank Wholesale Funding." *Journal of Financial Intermediation* 20 (2): 248–63. doi:10.1016/j.jfi.2010.06.003.

12. Huang, Ying, Carl R. Chen, and Maximo Camacho. 2008. "Determinants of Japanese Yen Interest Rate Swap Spreads: Evidence from a Smooth Transition Vector Autoregressive Model." *Journal of Futures Markets* 28 (1): 82–107. doi:10.1002/fut.20281.

13. Kim, Suk-Joong, and Jeffrey Sheen. 2000. "International Linkages and Macroeconomic News Effects on Interest Rate Volatility — Australia and the US." *Pacific-Basin Finance Journal* 8 (1): 85–113. doi:10.1016/S0927-538X(99)00027-X.

14. Kiptui, Moses C. 2014. "Determinants of Interest Rate Spread: Some Empirical Evidence from Kenya's Banking Sector." *International Business Research* 7 (11): p94. doi:10.5539/ibr.v7n11p94.

15. Obeng, Samuel Kwabena, and Daniel Sakyi. 2017. "Macroeconomic Determinants of Interest Rate Spreads in Ghana." *African Journal of Economic and Management Studies* 8 (1): 76–88. doi:10.1108/AJEMS-12-2015-0143.

16. Ozdemir, Nilufer, and Cuneyt Altinoz. 2012. "Determinants of Interest Rate Pass-through for Emerging Market Economies: The Role of Financial Market Structure." *International Advances in Economic Research* 18 (4): 397–407. doi:10.1007/s11294-012-9377-9.

17. Saunders, Anthony, and Liliana Schumacher. 2000. "The Determinants of Bank Interest Rate Margins: An International Study." *Journal of International Money and Finance* 19 (6): 813–32. doi:10.1016/S0261-5606(00)00033-4.

18. Sensoy, Ahmet, and Cihat Sobaci. 2014. "Effects of Volatility Shocks on the Dynamic Linkages between Exchange Rate, Interest Rate and

the Stock Market: The Case of Turkey." *Economic Modelling* 43 (December): 448–57. doi:10.1016/j.econmod.2014.09.005.

19. Shin, Yongcheol, Byungchul Yu, and Matthew Greenwood-Nimmo. 2011. "Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework." *SSRN Electronic Journal*, 61. doi:10.2139%2Fssrn.1807745.

20. Smales, Lee A. 2013. "IMPACT OF MACROECONOMIC ANNOUNCEMENTS ON INTEREST RATE FUTURES: HIGH-FREQUENCY EVIDENCE FROM AUSTRALIA: Impact of Macroeconomic Announcements." *Journal of Financial Research* 36 (3): 371–88. doi:10.1111/j.1475-6803.2013.12015.x.

21. Tennant, David, and Abiodun Folawewo. 2009. "Macroeconomic and Market Determinants of Interest Rate Spreads in Low- and Middle-Income Countries." *Applied Financial Economics* 19 (6): 489–507. doi:10.1080/09603100701857930.

22. Toyoshima, Yuki. 2012. "Determinants of Interest Rate Swap Spreads in the US: Bounds Testing Approach to Cointegration." *Applied Financial Economics* 22 (4): 331–38. doi:10.1080/09603107.2011.613757.

23. Tumwine, Sulait, Samuel Sejjaaka, Edward Bbaale, and Nixon Kamukama. 2018. "Determinants of Interest Rate in Emerging Markets: A Study of Banking Financial Institutions in Uganda." *World Journal of Entrepreneurship, Management and Sustainable Development* 14 (3): 267–90. doi:10.1108/WJEMSD-10-2017-0070.