Journal of Applied Economics and Business

OPEN ACCESS ARTICLE

THE DETERMINANTS OF INTEREST RATES IN THE KINGDOM OF SAUDI ARABIA: AN ARDL APPROACH (1985-2020)

Arwa Althobaiti

Department of Economics, School of Analytics and Finance, Southern Illinois University, Carbondale IL

Abstract

This paper investigates the key factors influencing interest rates in the Kingdom of Saudi Arabia (KSA) over the period 1985-2020. The study utilises an Autoregressive Distributed Lag (ARDL) model, which is best suited for capturing both short-run and long-run impacts of independent variables. The study explores the impact of multiple factors including money supply (M3), exchange rate index (Exc), oil prices (Oilp), stock market index (SMI), consumer price index (CPI), and the London interbank offered rate (LIBOR), and U.S. interest rate indexes (LIBOR) on the dependent variable, i.e., the interest rate on deposits in SAR. Our findings demonstrate a significant influence of the dollar exchange rate and the US interest rate (LIBOR) on the deposit interest rate in KSA in the long term. In the short term, the results reveal an insignificant negative impact of the change in the deposit interest rate of the money supply. These results reflect the realities of the Saudi Arabian economy, which is heavily influenced by external variables due to its open nature. This study provides valuable insights for policymakers, financial institutions, and investors in understanding and predicting interest rate movements in the KSA.

INTRODUCTION

Monetary policy is a set of measures that is carried out by the Central Bank through controlling money to achieve political and economic goals. Monetary policy uses a set of tools, namely, the interest rate and reserve ratio. Therefore, the interest rate is one of the most important monetary policy tools in the contemporary economy. It is called the interest rate if we are talking about the borrowing rate of society members and institutions from commercial banks. The Central Bank (the Saudi Arabian Monetary Agency) can adjust the interest rate. As for some Gulf countries, where the currency is pegged to the dollar, the monetary policy and the interest rate are determined by the US

Central Bank to suit the American economy, and this policy may conflict at times with the objectives. The economic policy of the Kingdom of Saudi Arabia and given the linkage of the Saudi riyal exchange rate to the US dollar, the options for those who set Saudi monetary policies are limited, because local interest rates are significantly affected by the interest rates set by the US Federal Reserve. Therefore, interest rates rose in parallel with the interest rate of the US Reserve Bank between 1998-2001, and also during 2004-2007, when interest rates rose to reach 5.5%, and this measure was taken by the Central Bank Because of inflation (Saudi Arabian Monetary Agency, 2015), Saudi domestic interest rates (represented by the Saudi interbank rate SIBOR) are affected by the US Federal Reserve interest rate in addition to the domestic demand for credit (and the London interbank rate LIBOR). So, through what we previously found that the interest rate is one of the most important tools that maintain the stability of the economy and help in economic growth. This importance constitutes a motive for studying interest rates and their determinants and the most important theories that came in (Al-Qahtani, 2015).

RESEARCH QUESTIONS

What factors determine the interest rate in Saudi Arabia?

What are the size and type of factors that determine the rate of interest?

DATA AND METHODOLOGY

This paper is trying to identify the most important factors that affect interest rates in the Kingdom of Saudi Arabia during the period 1985-2020 using annual data. Data is collected from the Saudi Arabian Monetary Agency, the Annual Statistic 2020, and the Federal Reserve Bank of St. Louis. The dependent variable is interest rate (Ir) on deposits in SAR. The independent variables are money supply (M3), Exchange rate index (Exc), oil prices (Oilp), Stock market index (SMI), consumer price index (CPI) and LIBOR, US interest rate indexes (LIBOR).

The study applied the autoregressive distributed lag (ARDL) approach. The ARDL model is considered the best econometric method compared to others. Since the ARDL approach allows the variable to be stationary at I (0) or integrated of order I (1) from Dickey Fuller (ADF) test, which is a unit root test. Therefore, based on the study objective, ARDL is a better model than others to catch the short-run and long-run impact of independent variables.

LITERATURE REVIEW

Andrea, B. & David, F. (2014): "The rise in interest rates will be limited with the global economy heading to its natural course." In this study, several aspects were discussed, and the most important was the current interest rate situation and future expectations for

it in the global economy. The study mentioned several factors that affect real interest rates and led to their decline, which led to a decline in interest rates, as follows: Saving rates increased between the years 2007-2010, which in addition to it increased the demand for assets (portfolios) and bonds in exchange for shares. As for investment, it has declined since the outbreak of the global financial crisis, and therefore interest rates around the world decreased from the early eighties from 5.5% until it reached 0.33% between the years 2008-2012. It was concluded that the two most important reasons that led to the decline in interest rates are as follows: the glut of savings arising from the emerging market economies, especially China, and the shift of investors to assets with all fixed incomes such as bonds instead of stocks.

Omar, et al., (2013): "Determinants of Interest Rates in the State of Kuwait". This study explains the most important variables that affect interest rates and the direction of this effect, as it aims to clarify how to use the response function to suit the needs of monetary policy in the State of Kuwait. As for the standard aspect, the co-integration method was used, and the causal crimes were selected. The study reached several results, the most important of which is knowing the behavior of interest rates in both the short and long term. There is a large part of inflation that cannot be controlled in the State of Kuwait, so it was concluded that money supply, exchange rate, oil prices, real estate asset prices, and financial asset prices are among the main determinants of the interest rate.

Abayomi and Adebayo (2010): "Determinants of Interest Rates in Nigeria". This study touched on clarification of the most important domestic and foreign factors that determine the interest rate in Nigeria. This study elaborates the impact and relative importance of various domestic and external factors that determine domestic interest rates. This was done through the use of quarterly data during the period 2000-2008, by following a standard approach using the co-integration method, Johansson and the error correction vector in addition to VAR 4. The model was estimated using the following variables: average market interest rates, Nigeria's real GDP, money supply M2, the consumer price index, and the exchange rate. The study reached several results, the most important of which is that there are two mutual integration relationships, and there is a significant relationship with the money supply and the exchange rate, and that the increase in the money supply causes an increase in interest rates.

Al-Omar, (2006): "Determinants of Interest Rates Behavior in the State of Kuwait". This study clarifies the most important local factors that affect the behavior of local interest rates, which are the interest rate on dinar deposits, the interest rate on dollar deposits, the discount rate to be the main tool for monetary policy, bank balances with the Central

Bank to reflect banks' liquidity, the exchange rate of the dinar against the dollar. This study uses quarterly data from 1993-2006, and five local variables, by following the autoregressive method VAR. It reached several results, and the most important is that local factors contribute between 49-65% in the behavior of local interest rates on dollar and dinar deposits, respectively, and that the discount rate comes at the forefront of these factors, then bank balances with the Central Bank. Finally, the exchange rate of the dinar against the dollar, in addition to the fact that local interest rates are directly affected by the discount rate and inversely by both bank balances with the Central Bank and the dinar exchange rate. This indicates that there is a room for monetary policy to influence local variables despite the openness of the Kuwaiti economy.

Al-Farhan, (2002): "Determinants of interest rates in the Jordanian economy". The study covers the period 1990-2000 and derives its theoretical framework mainly from the ideas of the Keynesian school. It uses the descriptive statistical analysis method in data presentation and standard analysis, represented by the ordinary least squares method. The study used the following economic variables: nominal money supply, nominal government spending, international interest rate, foreign currency exchange rate. The study achieved a number of results, and the most important are: the interest rate is negatively affected by changes in the money supply, either in the financial aspect. Interest rates on facilities, in relation to external variables, the domestic interest rate is affected by the economic variables external represented by the international interest rate, the foreign exchange rate, which reflects the reality of the Jordanian economy, which is considered an open economy.

The previous studies can be summarized. We find that the measurement methods used in the studies varied between co-integration tests, autoregressive tests, and ordinary least squares. We also note that there is a diversity in the variables used in the studies, and it is noticeable that there is a repetition of some variables due to their great impact on interest rates, such as the exchange rate variable and the money supply variable. While two studies focused on the determinants of interest rates in the State of Kuwait, and a study that spoke on the determinants of interest rates in Jordan, in this study the focus will be on the determinants of interest rates, but in the Kingdom of Saudi Arabia in addition to using data for a different period and different variables.

EMPIRICAL ANALYSIS

This section aims to analyze the variables that were used in the study, and to reach the most important factors that determine the interest rate, using certain indicators such as the exchange rate, oil prices, the general index, money supply index and the stock market index, based on some of the studies that used some of those indicators in measuring the relationship. These variables will be characterized and analyzed in the Kingdom of Saudi

Arabia. Table 1 shows the correlation coefficients between the interest rate on bank deposits and the factors affecting it.

TABLE 1. SIMPLE CORRELATION COEFFICIENTS BETWEEN THE INTEREST RATE ON BANK DEPOSITS AND THE INDEPENDENT VARIABLES

	IR	EXC	M3	OILP	CPI	SMI	LIBOR
IR	1.000000	0.157866	-0.82551	-0.63462	-0.81366	-0.75548	0.780447
EXC	0.157866	1.000000	0.089658	-0.074584	0.021201	-0.100179	-0.022318
M3	-0.82551	0.089658	1.000000	0.553625	0.959372	0.689500	-0.84074
OILP	-0.63462	-0.074584	0.553625	1.000000	0.605791	0.596029	-0.60878
CPI	-0.81366	0.021201	0.959372	0.605791	1.000000	0.596157	-0.84164
SMI	-0.75548	-0.100179	0.6895	0.596029	0.596157	1.000000	-0.587967
LIBOR	0.780447	-0.022318	-0.84074	-0.60878	-0.84164	-0.587967	1.000000

It is noticed from the correlation matrix that the inverse relationship between the deposit interest rate (1) with the money supply (M3), oil prices (OILP), the consumer price index index (CPI) and the stock market index (SMI), while the relationship is positive between the deposit interest rate and the real exchange rate (EXC) and the US LIBOR interest rate (LIBOR).

As mentioned earlier, it is also noted that the other independent variables have negative and positive relationships with each other. Based on the coefficients of the correlation matrix between variables, it is noted that there is a close correlation between the broad concept of money supply index (M3) and the consumer price index (CPI), so that the linear correlation coefficient is close to 1, where we note that the linear correlation coefficient between them is 0.95, which is the ratio large is close to 1.

After conducting the time series Stability Diagnostics tests, we use ARDL model. One of the most important features of this test is that the time series of variables are not required to be of the same degree, so we can apply it if the time series are a mixture of degrees of integration. It is stationary in the first or integral differences of the first degree (1) I and stationary at the level (0) I. The test method depends on the estimation of the equation of the ARDL model as follows:

$$\begin{aligned}\Delta lnI_t &= \delta + \beta_1 lnI_{t-1} + \beta_2\, lnM3_{t-1} + \beta_3 lnOilP_{t-1} + \beta_4 lnER_{t-1} \\ &+ \beta_5 lnLIBOR_{t-1} + \beta_6 lnSMI_{t-1} + \sum_{i=1}^{n} \gamma_{1i}\, \Delta lnI_{t-i} \\ &+ \sum_{t=0}^{n} \gamma_{2i}\, \Delta lnM3_{t-i} + \sum_{t=0}^{n} \gamma_{3i}\, \Delta lnOilP_{t-i} \\ &+ \sum_{t=0}^{n} \gamma_{4i}\, \Delta lnER_{t-i} + \sum_{t=0}^{n} \gamma_{5i}\, \Delta lnLIBOR_{t-i} \\ &+ \sum_{t=0}^{n} \gamma_{6i}\, \Delta lnSMI_{t-i} + u_t\end{aligned}$$

From the previous equation, where the symbol Δ indicates the first differences of the variable, and $\boldsymbol{\delta}$ indicates the secant, and $\boldsymbol{u_t}$ indicates the random error. The ARDL model shows that the interest rate on bank deposits can be explained by the lagging value of the dependent variable that was introduced to measure the adaptation of interest rates to changes that occur in the independent variables, and the lagging values of the independent variables, and therefore the ARDL model helps us to know the effects of short and long term. The ARDL test depends on two stages: testing the existence of a long-term relationship between the variables, then we move to the second step through which you can estimate the parameters of the long-term equilibrium and the short-term parameters of the error correction model.

To test the existence of the long-term equilibrium relationship between the variables. It is important to calculate two statistics, the first (f) test and the null hypothesis that the parameters of the lagging levels are all equal to zero, meaning that there is no long-term relationship, and the alternative hypothesis says that there is a long-term equilibrium relationship, and this means that the parameters do not equal Zero.

This test is based on critical values of the integration test, then we consider that if the calculated value of (F) is greater than the upper limit of the critical values. We reject the null hypothesis that there is no long-term equilibrium relationship. But if the calculated (F) value is less than the minimum critical values, we accept the null hypothesis. As for the second test, it is a statistic calculation (t), which is based on testing the null hypothesis that the parameter of the decelerated dependent variable is zero, that is, there is no long-term equilibrium relationship. The test results are illustrated by Table 2.

TABLE 2. F-BOUNDS TEST

F-statistic		t-Statistic
4.666241		7.014815
critical values 5% Level		
upper limit	lower limit	
3.28	2.27	

From the previous table the calculated statistical value (F) (4.666241) is greater than the upper limit values (3.28) at a significant level of 5%, so it rejects the null hypothesis that says that there is no long-term equilibrium relationship. The t-test is significant, and this confirms the existence of a long-term equilibrium relationship. Then, to obtain the estimations of the long-term parameters of the ARDL model, with lag times equal to 2 were selected according to the Schwartz criterion.

TABLE 3. ARDL LONG RUN FORM AND BOUNDS TEST (LONG-TERM PARAMETERS)

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
LOG(EXC)	4.421065	2.745617	1.610226	0.1216
LOG(LIBOR)	0.824979	0.433026	1.905149	0.0699

It is concluded from the Table 3 that the most important variables that affect interest rates in the Kingdom of Saudi Arabia in the long term, and the results can be interpreted as follows:

There is a positive effect of change in the interest rate on deposits from the dollar exchange rate in the long term, where the partial flexibility of the dollar exchange rate in relation to the interest rate on deposits reached 4.421 in the long term. This means that the increase in the dollar exchange rate by 4.4% will lead to an increase in the interest rate on deposits by 1% in the long term, which indicates that the rise in the dollar exchange rate contributes positively to the increase in the interest rate on deposits. Since the exchange rate is one of the external variables, it becomes clear that the domestic interest rate is affected by external economic variables, which reflects the reality of the Saudi economy, which is considered an open economy. Also, this result agrees with the study of Al-Farhan (2002).

There is a positive effect of change in the interest rate on deposits from the US interest rate LIBOR in the long term, where the partial flexibility of the interest rate of LIBOR in relation to the interest rate on deposits reached 0.824 in the long term. This means that the increase in the interest rate of LIBOR by 0.82% will lead to an increase in the interest rate on deposits by 1% in the long term, which indicates that the rise in interest rates for LIBOR contributes positively to the increase in the interest rate on deposits. Since the US interest rate is one of the external variables, it becomes clear that the domestic interest rate is affected by external economic variables, which reflects the reality of the Saudi economy, which is considered an open economy.

ARDL Long Run equation:

$$LnIr_t = 12.9211 + 4.4211Ln\ EXC_t + 0.8798Ln\ M3\_\$_t + 0.5058LnOILP_t$$

$$- 4.2604LnCPI_t - 0.2399LnSMI_t - 0.8250LnLIBOR_t$$

TABLE 4. ARDL ERROR CORRECTION REGRESSION (SHORT-TERM PARAMETERS)

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
DLOG(IR(-1))	0.420435	0.108742	3.866347	0.0008
DLOG(EXC)	-1.068419	0.711978	-1.50064	0.1477
DLOG(M3_$)	-4.715892	0.838635	-5.6233	0.0000
DLOG(LIBOR)	-0.09624	0.120573	-0.79819	0.4333
COINTEQ(-1)*	-0.494414	0.070481	-7.01482	0.0000

It is concluded from Table 4 that the most important variables that affect interest rates in the Kingdom of Saudi Arabia in the short term, and the results can be interpreted as follows:

We note that the error correction term or adjustment coefficient (1-) ECM has appeared with a negative sign and less than or significant. There is an insignificant negative impact of the change in the interest rate on deposits from the money supply in its expanded concept in the short term, as the partial flexibility of money supply in its expanded concept in relation to the interest rate on deposits reached (-4.71) in the short term. This means that the increase in money supply in its concept an expanded 0.5% will lead to a 1% decrease in the deposit rate in the short term. It is a convergent result between the long and short term.

REFERENCES

Abayomi, O., & Adebayo, M. (2010). Determinants of interest rates in Nigeria: An error correction model. Journal of Economics and International Finance, 2(12), 261-271.

Andrea, B., & David, F. (2014). Perspectives on Global Real Interest Rates. International Monetary Fund.

Omar, Muhammad, et al., (2013). Determinants of Interest Rates in Kuwait. The Arab Journal of Administrative Sciences, Kuwait, 13(3), 385-400.

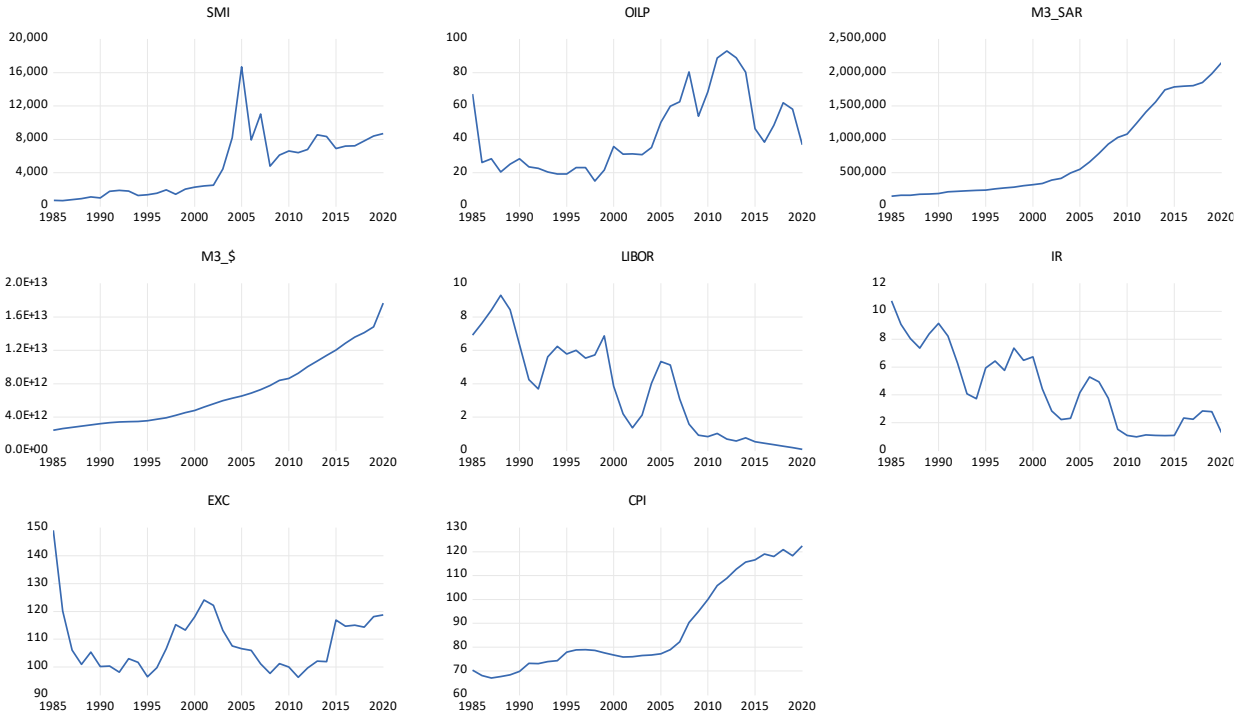
Al-Omar, H. (2006). Determinants of Interest Rates Behavior in Kuwait. Journal of Gulf and Arabian Peninsula Studies, 135, 2008-186.

Al-Farhan, O. (2002). Determinants of the interest rate in the Jordanian economy, an applied study for the period 1990-2002. Master's thesis, College of Graduate Studies, University of Jordan.

Saudi Arabian Monetary Agency, Annual Statistic 2020.

Federal Reserve Bank of St. Louis.

APPENDIX 1



Null Hypothesis: D(LCPI) has a unit root			
Exogenous: Constant			
Lag Length: 1 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.405005	0.1481
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LEXC) has a unit root			
Exogenous: Constant			
Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.883717	0.0004
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LIR) has a unit root Exogenous: Constant Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.533472	0.0132
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LLIBOR) has a unit root Exogenous: Constant Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.958642	0.0045
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LM3_$) has a unit root Exogenous: Constant Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.892148	0.3318
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LOILP) has a unit root Exogenous: Constant Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.356956	0.0016
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LSMI) has a unit root Exogenous: Constant Lag Length: 1 (Fixed)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.552403	0.0126
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Covariance Analysis: Ordinary
Date: 12/05/21 Time: 16:48
Sample: 1985 2020
Included observations: 36
Covariance

Correlation	LIR	LEXC	LM3_$	LOILP	LCPI	LSMI	LLIBOR
LIR	0.552822						
	1						
LEXC	0.01076	0.008403					
	0.157866	1					
LM3_$	-0.350259	0.00138	0.325646				
	-0.825511	0.026382	1				
LOILP	-0.244698	-0.00017	0.199428	0.268938			
	-0.634615	-0.00362	0.673888	1			
LCPI	-0.122699	0.00027	0.109097	0.067492	0.041135		
	-0.813662	0.014508	0.942622	0.641685	1		
LSMI	-0.515361	-0.01056	0.465828	0.330006	0.138505	0.84177	
	-0.755478	-0.1256	0.889725	0.693584	0.744327	1	
LLIBOR	0.736594	-0.0169	-0.67131	-0.38239	-0.24017	-0.82002	1.611329
	0.780447	-0.14521	-0.92674	-0.58089	-0.93287	-0.7041	1

ARDL Long Run Form and Bounds Test
Dependent Variable: DLOG(IR)
Selected Model: ARDL(2, 1, 1, 0, 0, 0, 1)
Case 2: Restricted Constant and No Trend
Date: 12/05/21 Time: 20:38
Sample: 1985 2020
Included observations: 34
Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.388365	15.53622	-0.411192	0.6849
LOG(IR(-1))*	-0.494414	0.153263	-3.225913	0.0039
LOG(EXC(-1))	2.185838	1.096452	1.993556	0.0587
LOG(M3_$(-1))	-0.435003	0.845240	-0.514650	0.6119
LOG(OILP)**	-0.250091	0.173366	-1.442559	0.1632
LOG(CPI)**	2.106384	1.548500	1.360274	0.1875

LOG(SMI)**	0.118609	0.209578	0.565943	0.5772
LOG(LIBOR(-1))	0.407881	0.144407	2.824533	0.0099
DLOG(IR(-1))	0.420435	0.172910	2.431533	0.0236
DLOG(EXC)	-1.068419	1.077518	-0.991555	0.3322
DLOG(M3_$)	-4.715892	1.737490	-2.714198	0.0127
DLOG(LIBOR)	-0.096240	0.195264	-0.492872	0.6270

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXC)	4.421065	2.745617	1.610226	0.1216
LOG(M3_$)	-0.879835	1.755614	-0.501155	0.6212
LOG(OILP)	-0.505832	0.347064	-1.457464	0.1591
LOG(CPI)	4.260362	3.897532	1.093092	0.2862
LOG(SMI)	0.239898	0.445140	0.538927	0.5953
LOG(LIBOR)	0.824979	0.433026	1.905149	0.0699
C	-12.92107	32.21627	-0.401073	0.6922

EC = LOG(IR) - (4.4211*LOG(EXC) -0.8798*LOG(M3_$) -0.5058*LOG(OILP)
+ 4.2604*LOG(CPI) + 0.2399*LOG(SMI) + 0.8250*LOG(LIBOR) -12.9211)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.666241	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
			Finite	
Actual Sample Size	34		Sample: n=35	
		10%	2.254	3.388
		5%	2.685	3.96
		1%	3.713	5.326
			Finite	
			Sample: n=30	
		10%	2.334	3.515
		5%	2.794	4.148
		1%	3.976	5.691

ARDL Error Correction Regression
Dependent Variable: DLOG(IR)
Selected Model: ARDL(2, 1, 1, 0, 0, 0, 1)
Case 2: Restricted Constant and No Trend
Date: 12/05/21 Time: 21:12
Sample: 1985 2020
Included observations: 34
ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(IR(-1))	0.420435	0.108742	3.866347	0.0008
DLOG(EXC)	-1.068419	0.711978	-1.500636	0.1477
DLOG(M3_$)	-4.715892	0.838635	-5.623295	0.0000
DLOG(LIBOR)	-0.096240	0.120573	-0.798188	0.4333
CointEq(-1)*	-0.494414	0.070481	-7.014815	0.0000
R-squared	0.715779	Mean dependent var		-0.057716
Adjusted R-squared	0.676576	S.D. dependent var		0.333323
S.E. of regression	0.189562	Akaike info criterion		-0.353144
Sum squared resid	1.042083	Schwarz criterion		-0.128679
Log likelihood	11.00345	Hannan-Quinn criter.		-0.276595
Durbin-Watson stat	2.170785			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.666241	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99