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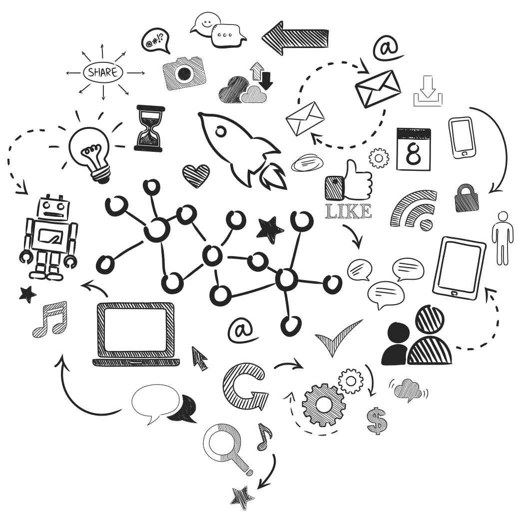

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7

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Abstract

This study investigates the determinants of interest rates for new business loans in Thailand. This study explores the impact of traditional economic indicators and new digital finance variables on lending rates. As such, this study aims to extend the literature on lending rates by means of a wide set of economic indicators, namely commercial bank loans, net traded value, electronic money transactions, and average wages. This study employs the ARIMA, ARIMAX, and ARDL models to suit autoregressive, external, and lagged exogenous impacts. Analysis was performed on monthly data from January 2012 to April 2024 obtained from the Bank of Thailand. The findings show the considerable influence of historical relationships in new business loan interest rates on current rates. Commercial bank loans also have a significantly inverse relationship with interest rates. Given these results, the central and private banks that participate greatly in the finance sector could strategically employ loan volume to offer attractive rates. This would not only promote banks to function more smoothly, but also help the economy grow itself.

Keywords: Interest Rates; ARIMA; ARIMAX; ARDL; Thailand

Introduction

Interest rates play a fundamental role in the financial system and significantly influence economic activities, financial institutions, and policymaking. Defined as the cost of borrowing money, interest rates affect various aspects of the economy, from savings and investments to global trade and monetary policy. These are determined by a complex interplay of factors, including macroeconomic variables, regulatory policies, and market dynamics. Interest rates are important in shaping economic growth, inflation control, and financial stability, making them a key tool for central banks and a crucial determinant in the functioning of financial markets.

Numerous studies have highlighted the significance of interest rates in fostering or curbing economic activity. Lower interest rates typically encourage borrowing, spending, and investment, leading to economic growth (Ali et al., 2023; Cogley, 2020). Conversely, higher rates tend to suppress economic activity by increasing borrowing costs. Central banks leverage interest rates as monetary policy instruments to stabilize inflation and maintain economic balance, underlining their critical role in macroeconomic management (Ali et al., 2023). Additionally, interest rates influence personal finances, business operations, and overall economic productivity by determining the cost of credit, impacting savings decisions, and shaping investment behavior.

Scholars have explored the factors affecting interest rates and their implications across different financial systems. For instance, Ratti and Vespignani (2015) investigated the global drivers of interest rates and identified key factors, such as global monetary aggregates, oil prices, and global output. They emphasize the interconnectedness of interest rates with global economic indicators, including trade-weighted currency values and international prices.

Further exploring the methodologies employed by researchers, Yıldız (2020) analyzed macroeconomic factors affecting bank loan interest rates in Turkey using cointegration tests and the Fully Modified Ordinary Least Squares (FMOLS) method for long-term estimation. Their study revealed that an increase in the exchange rate raises bank loan interest rates, whereas an expanded money supply tends to lower them. Guo et al. (2021) investigated the determinants of peer-to-peer (P2P) loan interest rates in China, emphasizing the influence of private lending interest rates, which emerged as the most significant factor with a positive coefficient.

Despite extensive research on interest rate determinants, several gaps and challenges remain. Previous studies often focus on limited variables or specific economic environments, which may not adequately explain the interest rate evolution. This study addresses these gaps by examining multiple variables, namely, net traded value (NTV), commercial bank loans (CBL), leading economic indices (LEI), electronic money transactions (VEM), and average wages in the non-agricultural sector (AWP), within the context of Thailand. This study employs an integrated approach using ARIMA, ARIMAX, and ARDL models to explore the determinants of interest rates. To achieve these objectives, we have organized the remainder of this paper as follows. The literature review in the next section highlights the theories and empirical research on interest rate determinants. The methodology section details the model. The results section presents the outcomes of the model estimation, followed by a discussion and managerial implications.

Research objective

This study aims to examine the multifaceted determinants of interest rates in Thailand. This study focuses on exploring variables such as net traded value, commercial bank loans, leading economic indices, electronic money transactions, and average wages by utilizing the ARIMA, ARIMAX, and ARDL models.

Literature reviews

This section explores foundational theories and recent empirical studies on the dynamics of interest rate behavior and variability.

Loanable Funds Theory

Loanable Funds Theory, a classical economic concept, explains how interest rates are determined by the dynamics of supply and demand for loanable funds in the economy. It posits that the equilibrium between savings, representing the supply of loanable funds, and investment, representing the demand for such funds, establishes an interest rate (Bertocco, 2013). According to this theory, changes in technology and individual time preferences have an immediate and direct impact on interest rates as they alter both the supply and demand for these funds (Bibow, 2001). This theory states that banks are traditionally viewed as intermediaries, collecting physical resources in the form of deposits from savers and lending them to borrowers (Jakab & Kumhof, 2018). However, this view has encountered significant criticism from various economists, including Keynes, who proposed a more monetary-centered approach to understanding interest rate determination (Bertocco, 2013). Some economists further argue that the loanable funds theory is fundamentally flawed, suggesting that it should be replaced by alternative models such as the financing model. This alternative views banks not merely as intermediaries but also as creators of money, since they generate funds through lending activities rather than solely relying on deposits (Jakab & Kumhof, 2018). Concerning interest rates, Loanable Funds Theory suggests that interest rates serve as a price mechanism that balances the supply and demand for loanable funds within the economy (Bertocco, 2013).

Classical economists analyzed interest rates as real forces governed by the supply and demand dynamics of loanable funds and concluded that factors such as productivity and thrift primarily determine real interest rates. However, notable contradictions within the theory have sparked ongoing debate. Some economists contend that the theory fails to consider financial buffers that play a role in disequilibrium situations, which would affect how interest rates adjust (Bibow 2001).

Monetary Policy Theory

Monetary Policy Theory is a framework that explains how central banks manage the money supply and influence economic outcomes by employing various policy tools. This theory posits that central banks can regulate the economy by adjusting interest rates, controlling money supply, and managing other financial variables to influence macroeconomic objectives, including price stability, economic growth, and financial stability (Duskobilov, 2017). These objectives are achieved through tools such as interest rates, where central banks adjust policy rates to impact borrowing costs, and subsequently, economic activity (Ezeibekwe, 2020). Central banks can also utilize open market operations to control money supply by influencing the quantity of money in circulation and reserve requirements that mandate banks to hold a certain number of reserves to affect interest rates. However, the effectiveness of monetary policy depends on economic conditions, institutional arrangements, and stability in money demand, which are especially important in regions such as monetary unions.

In empirical studies, interest rates are shaped by the complex interplay of various economic factors. Early studies have highlighted the critical role of monetary policy in determining interest rates (Jeng et al., 2009), and central bank communications, which shape inflation expectations, can impact interest rates (Kuncoro, 2021). Furthermore,

7

global economic conditions, fiscal policies, and market expectations in one economy can affect interest rates in others, particularly in interconnected markets (Feldkircher and Tondl, 2020). Research has explored the limitations of monetary policy in low-interest environments, revealing that, although bond rates may decline over time, this trend is not fully passed through to loan rates. The short-run pass-through of policy rates to loan rates diminishes in lower-rate settings, suggesting that the effectiveness of monetary policies in influencing interest rates may be constrained in these scenarios. Additionally, money supply, government expenditure, and market conditions can affect interest rates (Bashir, 2023). The complexity of interest rate determination is further highlighted in studies on transmission mechanisms. It was found that short-term market rates typically respond quickly to policy changes, whereas loan rates demonstrate slower and less efficient adjustments (Lü et al., 2024). Economic growth has been shown to affect interest rates, although this relationship is not always direct or predictable. For instance, Chun and Ardaaragchaa (2024) find that higher GDP growth does not necessarily translate into significant loan growth, indicating that economic expansion may not uniformly affect interest rates. A positive correlation among economic growth, business confidence, and interest rates has also been observed (Hardi et al., 2024). Recent research suggests a relationship between interest rates and inflation (Cochrane 2024).

Methodology

This study applies ARIMA, ARIMAX, and ARDL models to identify the movement and determinants of interest rates on new business loans. The details of these models are as follows.

The ARIMA model is represented as ARIMA (p, d, q), and for time series Y, the ARIMA model (Fattah et al., 2018). is generally expressed as follows:.

$$Y_t = \delta + \sum_{i=1}^{p} \alpha_i Y_{t-i} + \sum_{j=1}^{q} \theta_j \epsilon_{t-j} + \epsilon_t, \quad (1)$$

where p denotes the order of the autoregressive (AR) terms. D is number of differences needed to make the time series stationary. q represents the order of the moving average (MA) terms. δ is a constant term. α represents the autoregressive coefficients. θ represents the moving average coefficients. ϵ stands for a white noise error term with a mean of zero.

The autoregressive integrated moving average with exogenous variables (ARIMAX) is an extension of the ARIMA model that incorporates external variables. The ARIMAX model (Hossain et al., 2021) is expressed as follows:

$$Y_t = \delta + \sum_{i=1}^{p} \alpha_i Y_{t-i} + \sum_{j=1}^{q} \theta_j \epsilon_{t-j} + \sum_{k=1}^{K} \beta_k X_{t-k} + \epsilon_t, \quad (2)$$

where δ is a constant. P is the Order of the autoregressive (AR) part, representing the lagged values of Y. d is the Degree of differencing applied to make the series stationary. q denotes the order of the moving average (MA) part, representing the lagged forecast errors. α express coefficients of the autoregressive terms. ϵ_t is Past forecast errors up to q. θ stands for the coefficients of the moving average terms. β is Coefficients for the external explanatory variables.

The Autoregressive Distributed Lag (ARDL) model is a dynamic econometric approach used for analyzing time-series data and exploring the relationships between variables. It combines autoregressive elements with distributed lag components, allowing for the examination of both short- and long-term effects (Cho et al., 2021; Kripfganz & Schneider, 2023). The general form of the model is as follows.

$$IRL_t = \delta + \sum_{i=1}^{p} \alpha_i IRL_{t-i} + \sum_{j=0}^{q} \beta_j NTV_{t-j} + \sum_{k=0}^{r} \gamma_k CBL_{t-k} + \sum_{l=0}^{s} \theta_l LEI_{t-l} + \sum_{m=0}^{u} \phi_m VEM_{t-m} + \sum_{n=0}^{v} \psi_n AWP_{t-n} + \epsilon_t, \quad (3)$$

where IRL represents the Interest Rate on New Business Loans, while NTV stands for Net Trade Value. CBL refers to Commercial Bank Loans, and LEI denotes the Leading Economic Index. Additionally, VEM signifies the Value of Electronic Money Transactions, and AWP represents the Average Wage in the Non-Agricultural Private Sector. α, β, γ, θ, ϕ, ψ are Coefficients. ò is an Error term. This research utilizes Thailand's monthly data in the period from January 2012 to April 2024 obtained from the Bank of Thailand

Result

This section explores the factors influencing interest rates on new business loans (DLIRL) in Thailand through the ARIMA, ARIMAX, and ARDL models. To meet the basic requirements, this study tested the unit root and autocorrelation, and the results are shown in Table 1 and Figure 1.

Table 1 : Dickey–Fuller test for unit root

Variables	Test statistic	p-value
DLIRL	-14.034	0.000
DLNTV	-9.675	0.000
DLCBL	-13.259	0.000
DLLEI	-13.390	0.000
DLVEM	-13.548	0.000
DLAWP	-18.125	0.000

* P<0.10, ** P<0.05, *** P<0.01

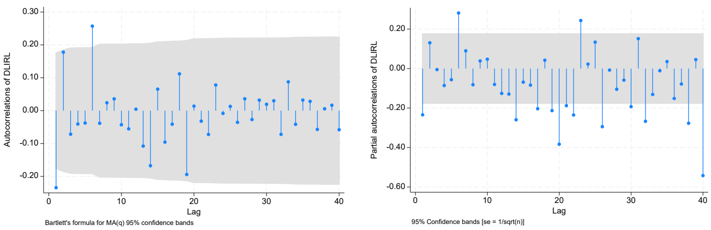

Figure 1 correlogram of DLIRL

From Figure 2, we identify an appropriate ARIMA model, ARIMA (2,1,0), based on the AIC criteria that have the lowest value of -539.1439. Table 2 showed ARIMA (2,1,0) model summary

Table 2 : ARIMA (2,1,0) model summary

Statistic	Value
Log Likelihood	273.5719
Wald chi2(2)	13.1500
Prob > chi2	0.0014

Table 3 : ARIMA (2,1,0) model estimation

Parameter	Coefficient	Std. Err.	z	P>|z|	95 percent Conf. LB	95 percent Conf. UB
_cons	- 0.0016	0.0030	- 0.5400	0.5920	- 0.0074	0.0042
L1.AR	- 0.2025	0.1144	- 1.7700	0.0770	- 0.4267	0.0216
L2.AR	0.1288	0.0494	2.6100	0.0090	0.0320	0.2256
/sigma	0.0271	0.0009	30.4100	0.000	0.0254	0.0289

* P<0.10, ** P<0.05, *** P<0.01

Table 3 identifies the significant coefficients for the autoregressive terms. The first-order autoregressive terms (L1.AR) has a coefficient of -0.2025 with marginal significance (p = 0.077), indicating a slightly negative influence on DLIRL, although not highly significant. The second order term (L2.AR) is positive and significant (coefficient = 0.1288, p = 0.009), suggesting a stronger positive lagged impact on DLIRL. The standard error of the residuals (sigma) was 0.0271, indicating residual variability of the model around the observed values.

The residual test showed that the residuals were not normally distributed and did not exhibit autocorrelation. The Breusch–Pagan/Cook–Weisberg test for heteroscedasticity yielded a chi-square value with a p-value of 0.000, leading to the rejection of the null hypothesis of constant variance. This result indicates the presence of heteroscedasticity in the residuals. Figure 2 presents the actual and predicted values.

In the following, the results from ARIMAX are presented:

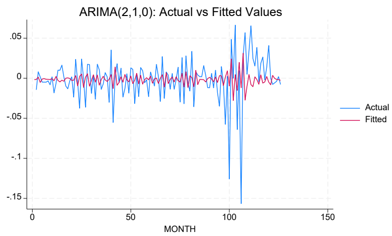

Figure 2 actual and predicted values

Table 4 : ARIMAX full model summary

Statistic	Value
Wald chi-square (7)	8.3900
Probability > chi-square	0.2997

Table 4 presents an assessment of the factors influencing the DLIRL while incorporating external variables. Table 5 reveals that none of the included predictors significantly affected the DLIRL.

Table 5 : ARIMAX full model estimation

Variable	Coefficient	Std. Err.	z	P>|z|	95 percent Conf. Interval Lower	95 percent Conf. Interval Upper
DLNTV D1.	- 0.0007	0046	- 0.1600	0.8760	- 0.0098	0.0084
DLCBL D1.	0.2917	0.6040	0.4800	0.6290	- 0.8921	1.4755
DLLEI D1.	0.8997	1.2833	0.7000	0.4830	- 1.6156	3.4150
DLVEM D1.	- 0.0055	0.1034	- 0.0500	0.9580	- 0.2080	0.1971
DLAWP D1.	0.1550	0.2021	0.7700	0.4430	- 0.2410	0.5511
_cons	- 0.0025	0.0070	- 0.3600	0.7200	- 0.0162	0.0112
AR L1.	- 0.5752	0.4643	- 1.2400	0.2150	- 1.4851	0.3348
AR L2.	- 0.0252	0.2808	- 0.0900	0.9280	- 0.5756	0.5251

* P<0.10, ** P<0.05, *** P<0.01

Table 6 : ARIMAX reduced model summary

Statistic	Value
Log Likelihood	275.0715
Wald chi2(4)	32.590
Prob > chi2	0.000

Table 6 presents a streamlined version of the full model that retains only the most relevant variables. Table 7 highlights the contributions of the selected variables to the DLIRL. Among the included factors, the DLCBL (D1.) had a negative and statistically significant coefficient (-0.1914, p = 0.048), indicating an inverse relationship with DLIRL. This suggests that increases in DLCBL tend to correlate with decreases in DLIRL. Although DLVEM (D1.) shows a negative coefficient (-0.0317) that is not statistically significant at the 5% level (p = 0.075), suggesting a potential but inconclusive influence. The autoregressive terms (L1.AR and L2.AR) are also not significant, implying a limited effect of past values on DLIRL.

Table 7 : ARIMAX reduced model estimation

Variable	Coefficient	Std. Err.	z	P>|z|	95 percent Conf. Interval Lower	95 percent Conf. Interval Upper
DLCBL D1.	- 0.1914	0.0967	- 1.9800	0.0480	- 0.3809	- 0.0019
DLVEM D1.	- 0.0317	0.0178	- 1.7800	0.0750	- 0.0667	0.0033
_cons	- 0.0015	0.0027	- 0.5700	0.5660	- 0.0067	0.0037
L1.AR	- 0.1837	0.0982	- 1.8700	0.0610	- 0.3762	0.0088
L2.AR	- 0.1115	0.0584	1.9100	0.0560	- 0.0030	0.2260
/sigma	0.0263	0.0013	20.7400	0.0000	0.0238	0.0288

* P<0.10, ** P<0.05, *** P<0.01

The residual test for the ARIMAX reduced model showed a deviation from a normal distribution, but did not exhibit significant autocorrelation and rejected the null hypothesis of homoscedasticity. Figure 3 show actual and predicted values.

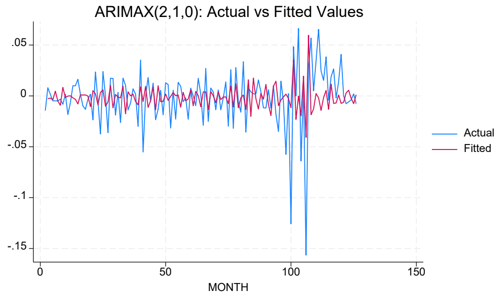

Figure 3 actual and predicted values

The following section presents the results of the ARDL model. The lag-order selection criteria identify the ARDL (2,2,0) model as appropriate.

Table 8 : ARDL (2,2,0) model summary

Statistic	Value
F-statistic	9.8900
Probability > F	0.0000
R-squared	0.3424
Adjusted R-squared	0.3078
Root MSE	0.0239

The ARDL (2,2,0) model summary in Table 8 provides statistical insights into the model's fit and explanatory power. The F-statistic was 9.89 with a p-value of 0.0000, indicating that the model was statistically significant overall. The R-squared value of 0.3424 implies that approximately 34.24 percent of the variability in the dependent variable is explained by the model, whereas the adjusted R-squared value of 0.3078 adjusts for the number of predictors, suggesting a moderately strong fit. The Root

Mean Square Error (Root MSE) was 0.0239, reflecting the average magnitude of the errors between the observed and predicted values in the model.

Table 9 : ARDL (2,2,0) model estimation

Variable	Coefficient	Std. Err.	t	P>|t|	95 percent Conf. LB	95 percent Conf. UB
DLIRL L1.	- 0.2435	0.0903	- 2.7000	0.0080	- 0.4224	- 0.0646
DLIRL L2.	0.1405	0.0893	1.5700	0.1180	- 0.0364	0.3170
DLCBL	- 0.7290	0.1697	- 4.3000	-	- 1.0651	- 0.3928
DLCBL L1.	- 0.5848	0.1815	- 3.2200	0.0020	- 0.9444	- 0.2253
DLCBL L2.	0.3499	0.1858	1.8800	0.0620	- 0.0181	0.7179
DLVEM	- 0.0459	0.0211	- 2.1800	0.0310	- 0.0876	- 0.0042
_cons	0.0040	0.0027	1.4500	0.1480	- 0.0014	0.0093

* P<0.10, ** P<0.05, *** P<0.01

Table 9 shows the impact of lagged values on DLIRL. The first lag of DLIRL (L1) had a negative and statistically significant coefficient (-0.2435, p = 0.008), suggesting a negative influence of past values on current DLIRL. The second lag (L2) was positive but not statistically significant (0.1405, p = 0.118), indicating a weaker impact. DLCBL (D1) had a significant and negative coefficient (-0.7290, p < 0.001), implying a strong inverse relationship with DLIRL. The DLCBL's first lag (L1) is also negative and significant, reinforcing this effect, while its second lag (L2) is positive but marginally significant. DLVEM had a negative effect on DLIRL, although its significance was moderate (p = 0.031).

The residual test shows that the null hypothesis of no autocorrelation cannot be rejected. This revealed significant evidence of heteroscedasticity and skewness in the residuals of the model. Figure 4 shows the cumulative sums of recursive residuals used to assess the stability of the model over time. In this plot, the trajectory remains within the critical bounds, suggesting that the ARDL model remains stable throughout the sample period. Figure 5 shows the actual and predicted values and Table 10 compares the results of each model.

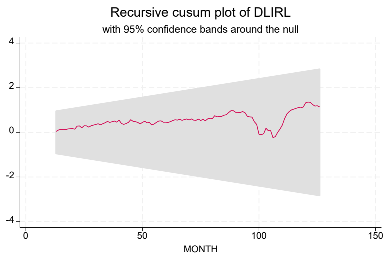

Figure 4 Recursive cusum plot of DLIRL

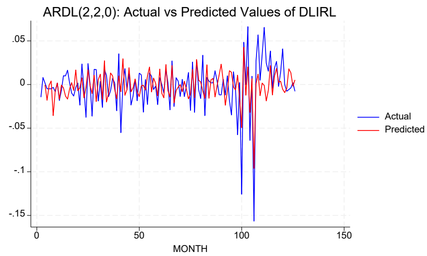

Figure 5 ARDL (2,2,0) actual and predicted values

7

Table 10 : Model comparison

Aspect	ARIMA	ARIMAX	ARDL
Model Fit	Moderate (focus on autoregressive lags)	Weak in the full model; improved in reduced model	Stronger due to integration of external variables
Key Predictors	Lagged values of DLIRL	DLCBL (negative), DLVEM (marginal)	DLCBL (negative), DLVEM (negative), lagged DLIRL
Residual Issues	Non-normality, heteroskedasticity	Non-normality, heteroskedasticity	Non-normality, heteroskedasticity
Autocorrelation	No significant autocorrelation	No significant autocorrelation	No significant autocorrelation

Discussion

The ARIMA model confirms that the DLIRL is influenced by its historical values, as evidenced by the significant positive impact of the second-order autoregressive term. This autoregressive relationship highlights the importance of past interest rates on current rates, reinforcing empirical approaches to time-series analysis that are widely applied in economic forecasting. Similarly, the ARDL model captures both short- and long-term effects, effectively reflecting the temporal dynamics in economic data and aligning with models that emphasize time-dependent relationships. Additionally, the ARIMAX model, which incorporates external variables, provides insights into factors beyond past values. In particular, commercial bank loans (DLCBL) show a significant inverse relationship with DLIRL, suggesting that an increase in loan availability corresponds to a decrease in interest rates. This finding is consistent with Loanable Funds Theory, which posits that interest rates adjust according to the supply and demand for loanable funds (Bertocco, 2013). According to this theory, increased availability of credit, as represented by DLCBL, results in greater loanable funds and, consequently, lowers borrowing costs.

However, empirical data indicate that other variables, such as electronic money transactions (DLVEM) and average wages (DLAWP), display weaker and often inconsistent correlations with the DLIRL. This suggests that while the Loanable Funds Theory offers foundational insights into the relationship between loan supply and interest rates, this interest rate does not fully account for the influence of modern financial factors. These findings contradict recent empirical studies that demonstrate how factors such as policy measures and technological advancements in payment methods can affect lending rates (Jakab and Kumhof, 2018). Although the influence of electronic transactions (DLVEM) is weaker than that of DLCBL, it underscores the role of emerging technologies in shaping financial markets and loan conditions.

Additionally, the negative impact of DLCBL on DLIRL suggests that effective monetary policy transmission, as central bank interventions (e.g., liquidity adjustments) influence lending rates. This finding supports the theory that policy tools directly impact market rates and borrowing costs.

Managerial and Government Policy Implication

Given the inverse relationship between commercial bank loans (DLCBL) and interest rates on new business loans (DLIRL), banks can leverage loan volume as a tool for strategically managing interest rates. Increasing the availability of loans supported by the central bank could enable banks to offer more attractive rates, thereby attracting broader investors who will support bank activities.

The central bank can widen the bank loan supply by, for example, offering a below-market refinancing window tied specifically to business lending. A concurrent investment in financial transaction technology would further this effort by slashing payment and underwriting costs, ultimately contributing to lower interest rates and thus economic growth. Additionally, recognizing the influence of electronic transactions (DLVEM) on DLIRL, although not significant in this study, highlights the importance of digital finance integration. Government and financial managers should invest in digital payment infrastructure and promote digital financial services as these can shape loan accessibility and rate structures.

Future research

Building on this analysis, future research should examine how evolving digital finance technologies and macroeconomic variables affect interest rates in different financial environments. While this study included electronic money transactions as a factor, further exploration of specific digital finance metrics, such as mobile banking penetration, may yield deeper insights. Additionally, analyzing more longitudinal data and the impacts of economic policy changes, such as regulatory adjustments and fiscal interventions, on loan interest rates would enhance our understanding of broader economic influences.

Conclusion

Interest rates play a central role in financial decision making, impacting individual borrowers, businesses, and national economic stability. This study sought to provide models for examining a range of variables that influence business interest rates, including commercial bank loans (DLCBL), net traded value (DLNTV), electronic money transactions (DLVEM), and average wages (DLAWP). This study employed ARIMA, ARIMAX, and ARDL models to capture both autoregressive patterns and the influence of external variables on DLIRL. Monthly data from January 2012 to April 2024 were obtained from the Bank of Thailand for the model estimation. The results reveal that the past values of DLIRL significantly impact its current level, affirming that historical trends influence contemporary interest rates. Among the external factors, DLCBL displayed a significant inverse relationship with DLIRL. However, other variables, such as DLVEM and DLAWP, showed weaker or inconsistent effects on the DLIRL. These findings have practical implications for financial managers and policymakers. Bank of Thailand may consider expanding loan volumes through monetary policy to create attractive interest rates that will benefit both commercial bank operations and economic growth.

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References

Ali, M., Naqi, S., & Habib, M. (2023). The study “Unravelling the Impact: Assessing the Impacts of Rising Rates of Interest and Inflation on Individual Finances.” *Sjesr, 6*(2), 56–62.

Bashir, S. (2023). *The impact of exchange rate changes and their repercussions on inflation rates in the Libyan economy*. In 91st International Scientific Conference on Economic and Social Development (pp. 133-140).

Bertocco, G. (2013). On Keynes's criticism of the loanable funds theory. *Review of Political Economy, 25*(2), 309–326.

Bibow, J. (2001). The loanable funds fallacy: Exercises in the analysis of disequilibrium. *Cambridge Journal of Economics, 25*(5), 591–616.

Cho, J. S., Shin, Y., & Greenwood Nimmo, M. (2021). Recent developments of the autoregressive distributed lag modelling framework. *Journal of Economic Surveys, 37*(1), 7–32.

Chun, S. H., & Ardaaragchaa, N. (2024). Analysis of factors affecting the loan growth of banks with a focus on non-performing loans. *Journal of Risk and Financial Management, 17*(5), 203.

Cogley, T. (2020). *Monetary policy and long-term real interest rates*. routledge.

Cochrane, J. H. (2024). Expectations and the neutrality of interest rates. *Review of Economic Dynamics, 53*(2024), 194–223.

Duskobilov, U. (2017). Impact of economic regulation through monetary policy: Impact analysis of monetary policy tools on economic stability in Uzbekistan. *International Journal of Innovation and Economic Development, 3*(1), 65–69.

Ezeibekwe, O. F. (2020). Monetary policy and domestic investment in Nigeria: The role of the inflation rate. *Economics and Business, 34*(1), 139–155.

Fattah, J., Ezzine, L., Aman, Z., El Moussami, H., & Lachhab, A. (2018). Forecasting of demand using ARIMA model. *International Journal of Engineering Business Management, 10*(2018), 1–9.

Feldkircher, M., & Tondl, G. (2020). Global factors driving inflation and monetary policy: A Global VAR assessment. *International Advances in Economic Research, 26*(3), 225–247.

Guo, J., Liu, X., Cui, C., & Gu, F. (2021). Influence of nonspecific factors on the interest rate of online peer-to-peer microloans in China. *Finance Research Letters, 41*(2021), 101839.

Hardi, I., Mardayanti, U., Devi, N. C., Ali, N., Idroes, G. M., & Duwal, N. (2024). Business confidence in Indonesia: Which macroeconomic factors have long-term impact?. *Indatu Journal of Management and Accounting, 2*(1), 40– 54.

Hossain, M. S., Ahmed, S., & Uddin, M. J. (2021). Impact of weather on COVID-19 transmission in South Asian countries: An application of the ARIMAX model. *Science of the Total Environment, 761*(2021), 143315.

Jakab, Z., & Kumhof, M. (2018, November 1). *Banks are not intermediaries of loanable funds—Facts*. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3274706.

7

Jeng, J., Wang, N.-J., Niu, W.-F., & Lin, S.-S. (2009). *Canonical dynamics mechanism of monetary policy and interest rate*. In Springer Berlin Heidelberg.

Kripfganz, S., & Schneider, D. C. (2023). ardl: Estimating autoregressive distributed lag and equilibrium correction models. *The Stata Journal: Promoting Communications on Statistics and Stata, 23*(4), 983–1019.

Kuncoro, H. (2021). Central bank communication and policy interest rate. *International Journal of Financial Research, 12*(1), 76-91.

Lü, Z., Xu, J., & Liu, L. (2024). The interest rate transmission mechanism and transmission efficiency of monetary policy in China: Empirical analysis based on TVP-SV-VAR model. *Journal of the Asia Pacific Economy, 29(*4), 1960-1994.

Ratti, R. A., & Vespignani, J. L. (2015). *What drives the global interest rate*. Federal Reserve Bank of Dallas.

Yıldız, M. (2020). The effects of macroeconomic factors on bank loan interest rates in Turkey. *Journal of Corporate Governance, Insurance, and Risk Management, 7*(2), 70–86.