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Inflation and Profitability of Commercial Banks – Evidence from Malaysian and Indonesian Banking Markets

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Abstract: Prolonged and uncontrolled inflation can significantly harm an economy, particularly the financial sector. This study seeks to examine the impact of inflation on the financial performance of the banking sectors in Malaysia and Indonesia, given that financial stability within this sector is crucial for sustained economic growth. Grounded in the quantity theory of money, this research utilizes annual secondary data sourced from the World Bank database, spanning from 2005 to 2022. For empirical analysis, the study applies both Ordinary Least Squares (OLS) regression and the Engle-Granger Cointegration (EG) test as estimation techniques. The empirical findings reveal a significant long-term positive relationship between inflation and bank profitability in Malaysia, as measured by both the capital asset ratio (CAR) and return on equity (ROE). For Indonesia, however, a long-term equilibrium is observed only when bank performance is assessed through ROE. Regarding short-term dynamics, neither country demonstrates statistically significant evidence of a short-term relationship between inflation and bank performance. These results suggest that inflation does not exert a substantial detrimental impact on the banking sector over time. The findings indicate that bank profitability in both Malaysia and Indonesia tends to increase with rising inflation. One plausible explanation is that banks may anticipate inflationary trends and adjust accordingly. Nevertheless, this does not eliminate the need for vigilant oversight. Continuous monitoring by the central bank is essential to ensure that banks remain resilient in the face of changing market conditions over the long term.

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Introduction

Economists have long grappled with understanding the intricate economic interplay between inflationary spiral and bank profitability. Hence, examining the theoretical framework surrounding inflation and bank performance can provide some new insights on their interconnectedness and potential impact on the overall economy. One prominent theory in this regard is the inflationary expectations theory. According to this theory, inflation has a direct impact on bank performance. When inflation increases, the purchasing power of money decreases, which can affect a bank's profitability and operations. Additionally, inflation can also affect interest rates, which in turn can impact a bank's ability to lend and generate revenue (Fry, 1980; Kibritçioğlu, 2002). Another theory that could explain the interplay between the two is the liquidity preference theory. This theory postulates that inflation can affect banks' liquidity preferences and strategies. Banks may adjust their liquidity preferences in response to inflationary pressures, which can affect their lending behaviour and overall performance (Kibritçioğlu, 2002). Inflation and bank profitability are two critical aspects of the economy that have been extensively studied in the literature (Fry, 1980).

Numerous studies have explored the relationship between inflation and bank profitability, aiming to understand how inflation affects banks' financial performance (Konboye & Nteegah, 2016). Their study has found that inflation can have both positive and negative impacts on bank profitability, depending on various factors such as the level of inflation, interest rates, macroeconomic stability, and the capital base of banks (Naruševičius, 2018). Furthermore, the relationship between inflation and bank profitability is not straightforward and depends on several factors. Thus, it is crucial for policymakers and financial institutions to carefully consider these factors when designing monetary policies and strategies to ensure the stability and profitability of banks in an inflationary environment (Naruševičius, 2018). Also, the relationship between the two could sometimes be quite complex. Some studies have found a positive relationship between inflation and bank profitability. Several research have pointed out that in those countries with high inflation rates, their banks could benefit from the inflationary spiral by earning higher interest income on their loans.

On the other hand, there are other studies that highlight the negative impact of inflation on bank profitability. These studies argue that inflation can lead to increased costs for banks, reducing their profitability. It is obvious that inflation can create uncertainty in the economy, which can negatively affect banks' lending and investment decisions (Radzi & Hadi, 2023). The chosen method for this investigation is Engle-Granger cointegration test, a robust tool that offers the advantages of analysing bivariate model (Granger, Huangb, & Yang, 2000). Through this methodological approach, we can explore the behaviour of our economic variables and how they change over time providing a more comprehensive understanding on the inflation-bank profitability nexus. This study aims to contribute to the ongoing discourse by examining the impact of inflation and bank profitability for Malaysian and Indonesia institutions, employing econometric time series analysis to determine the plausible theoretical relationship. By investigating these dynamics within the context of ASEAN member countries, this research seeks to add a layer of depth and specificity to the broader understanding of the interplay between bank profitability and inflation. There are five sections in this paper. Section 2 provides the literature review on the effect of inflation and bank profitability. Section 3 describes the estimation method and the tested variables. Section 4 explains the empirical results and section 5 concludes the entire paper.

Literature Review

Numerous studies have explored the relationship between inflation and bank profitability, aiming to understand how inflation affects banks' financial performance (Konboye & Nteegah, 2016; Naruševičius, 2018). In general, inflationary spiral is a situation where inflation continues to rise, leading to an increase in prices and a decrease in the purchasing power of consumers (Škare, Gavurova, & Sinković, 2023). This can have an impact on bank profitability in several ways (Jannat et al., 2020). From the literature, the interplay between spiral inflationary and bank profitability can be viewed from various perspectives such as capital base of banks, interest rates, level of inflation, as well as other macroeconomic variables (Barro, 1996). As for the bank's asset, fluctuation in the inflation rate erodes the value of a bank's assets. As the prices of goods and services increase, the value of loans and investments made by the bank may decrease in real terms. This means that the banks may not be able to generate as much income as they anticipate as inflation could negatively affect their profitability. Additionally, inflation can increase the cost of funds for banks. As interest rate increases, the bank's cost of borrowing money may also go up.

Banks may need to pay higher interest rates to attract deposits, which can squeeze their net interest margins and reduce profitability. In short, an inflationary spiral can disrupt the financial stability of the banking system. As inflation continues in the long-run, it can lead to economic instability and uncertainty (Naruševičius, 2018). This can result in increased credit risk for banks, as borrowers may struggle to repay their loans in a high inflation environment (Civelek et al., 2023). This in turn will lead to an increase in non-performing loans and credit losses for banks, further impacting their profitability. From macroeconomic standpoint, the interplay between bank profitability and macroeconomic conditions cannot be overstated. As banks navigate into the complex financial landscape, they must be ready to absorb the impact of macroeconomic conditions on their performance since it is essential for banks to make informed decisions ensuring their long-term profitability (Padmakumari & Shaik, 2023). This knowledge allows banks to mitigate risks, improve their financial performance, and contribute to long-term economic stability (Đaković, Ivetić, & Anđelić, 2021). From the past literature, economists have found that inflation could have both positive and negative impacts on bank profitability.

According to Adeleke and Awodumi (2018), an inflationary spiral actually has a positive effect on bank profitability. This is because during times of inflation, the value of assets held by banks tends to increase, leading to higher profits. However, it is important to note that this effect may not be sustained in the long term as inflation can also lead to higher operating costs and potential risks for banks. Furthermore, the positive impact of an inflationary spiral on bank profitability may vary depending on factors such as interest rates and measures taken by governments to control inflation. In the same setting, Adeleke and Awodumi (2018) find that factors such as capital base, financial deepening, and real income level have been found to contribute less to bank profitability.

Also, their study reveals that different banks have varying levels of efficiency and performance, with some banks performing better with improved capital base while others performed poorly with a high capital base. While some studies suggest a positive relationship between inflation

and bank profitability, others argue for a negative impact. Jannat et al. (2020) suggest that the inflationary spiral negatively influences on bank profitability. Their study argues that inflation can lead to increased costs for banks, reducing their profitability. Additionally, inflation can create uncertainty in the economy, which can negatively affect banks' lending and investment decisions. Overall, the findings on the relationship between inflation and bank profitability is mixed and multifaceted. Furthermore, it depends on the specific context and factors at play. Ultimately, banks should carefully analyse the overall economic conditions, including inflation, interest rates, as well as other bank-specific factors such as capital base and financial deepening in order to make informed decisions that maximize profits (Munir, 2020).

Methodology

An econometric time series modelling is used to analyse yearly macroeconomic and firm-specific data from year 2005 through 2022. All data sets on national inflation rates, capital asset ratio (CAR) and return on equity (ROE) are obtained from World Bank database. This 18-year period is chosen because this study is poised to focus on four economic cycles starting from year 2005. The inflation rate is measured by the percentage change in consumer price index (CPI), CAR and ROE are measures of financial performance extracted from company's financial reports. Ordinary Least Square (OLS) Regression and Engle-Granger 2 steps cointegration procedure (EG cointegration test) are deployed to investigate the theoretical relationship between inflation rate and these two financial ratios. The OLS regression acts as the baseline estimation method, whilst EG cointegration test is the main tool in this contemporary time series analysis. It is important to note that time series data normally have trends either in stochastic manner or in deterministic fashion. As such, the deployment EG cointegration test is deemed appropriate in modelling non-stationary time series data.

Dependent and Independent Variables

Inflation is sometimes regarded as public enemy number one since it has a great potential in posing serious threat to the economic well-being of civil society. Inflation is a general increase in the level of prices of goods and services in an economy. Hence, it is critical to look at how changes the average level of prices could effectively affect the financial performance of banking sector in Malaysia and Indonesia. As part of the modelling process, the dependent and independent variables must be clearly specified. The financial performance of the banks is designated as our variable of interest (or dependent variable) whereas inflation rate is set as a model's predictor (or independent variable).

Estimation Methods

Based upon the quantity theory of money, we employ OLS linear regression function as well as Engle-Granger Cointegration test (1987) as estimation tools. The use of Engle-Granger methodology is warranted as some of these variables might have a stochastic trend in time series. This study is an attempt to measure the strength and significance of relationship between inflation rate and the financial performance of banking sector. Here, we hypothesize that the financial performance of the banking sector in Malaysia and Indonesia is a function of national inflation rate. It is important to point out that inflationary premium is one of the key components in determining policy interest rate set by the monetary authority. Specifically, there are two estimated models in this study and they are mathematically expressed as follows:

$CAR_t = \alpha + INFLATION\ RATE_t + \varepsilon_t$ (t=1,2,…N=T) (1)

$ROE_t = \alpha + INFLATION\ RATE_t + \varepsilon_t$ (t=1,2,…N=T) (2)

Where:

α = Intercept of the regression model

CAR_t = Capital Asset Ratio at time t

ROE_t = Return on Equity at time t

$INFLATION\ RATE_t$ = National Inflation Rate at time t

ε_t = Error term (assumed to be normally distributed with constant variance)

Empirical Findings

This study employs econometric time series analysis involving 22-year observation from year 2000 until 2021. This section provides detailed explanations on the empirical findings from both OLS regression analysis and Engle-Granger Cointegration test. The diagnostics tests are also presented and elaborated in this section.

Descriptive Statistics and Pearson Correlation Analysis

Figure 1 and Figure 2 below show the historical trends of inflation rate and CAR over the observed period from 2005 until 2022 for both Malaysia and Indonesia respectively. The study finds that both variables are moving in unison and have been detrimentally affected by the global financial crisis of 2007-2008. The economic activities started picking up in 2010 and a sign of strong economic recovery was noticeable from 2012 till 2016. Looking at the erratic movements of inflation rate throughout the 18-year period, we understand how uncertain and vulnerable the financial markets have been, particularly during Covid-19 pandemic that took place between 2020 and 2022. It is very clear to us that any negative sentiments in the good and service markets would most definitely affect the degree of bank soundness in Malaysia and Thailand in particular.

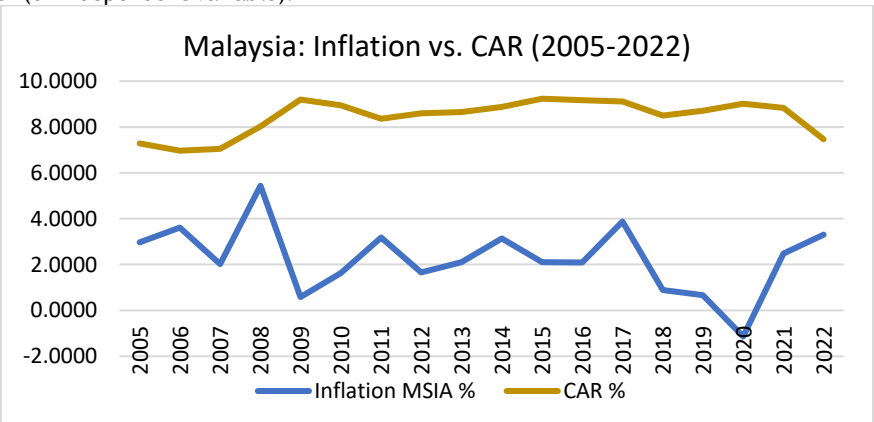

Figure 1: Movements of Inflation Rate and CAR over 18-year Period in Malaysia.

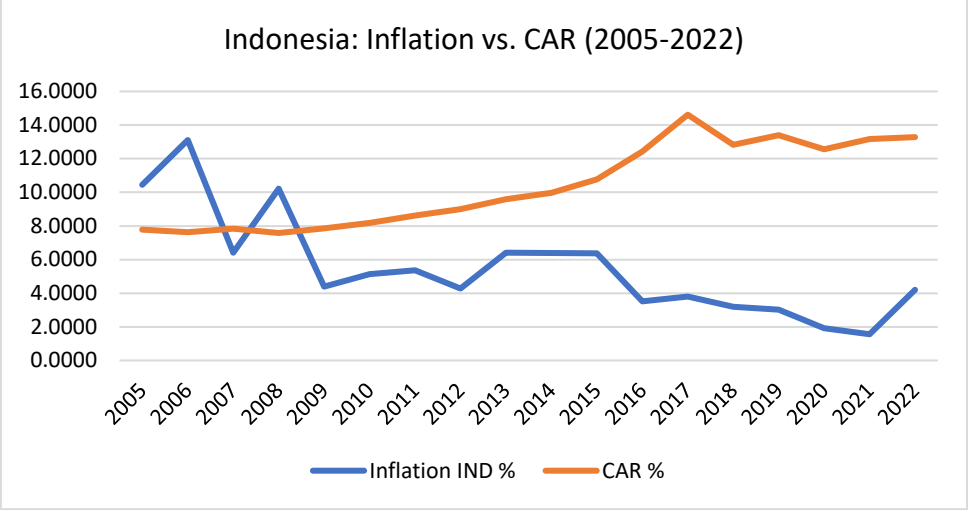

Figure 2: Movement of Inflation Rate and CAR Over 18-Year Period in Indonesia.

To further explore the effect of inflation on bank financial performance, Figure 3 and Figure 4 below demonstrate the trend lines of return of equity (ROE) in Malaysia and Indonesia respectively from year 2000 till 2021. As depicted in Figure 3, the movement of ROE appears volatile over the observed 22-year period. Although we notice a downtrend in ROE, the sign of economic recovery on the graph is clearly seen in 2021 when Covid-19 pandemic was completely under control. Similar to Malaysia, the performance of Indonesian banking sector has been volatile, but the domestic inflation rate has shown a downward trend over the past 22 years. In the beginning of year 2000 through 2008, Indonesia has been struggling to contain its raging inflation rate, but the situation changed drastically when Joko Widodo became the President of Indonesia in 2014. From 2015 onwards, the inflation rate in Indonesia has been in check hovering below 5 percent level.

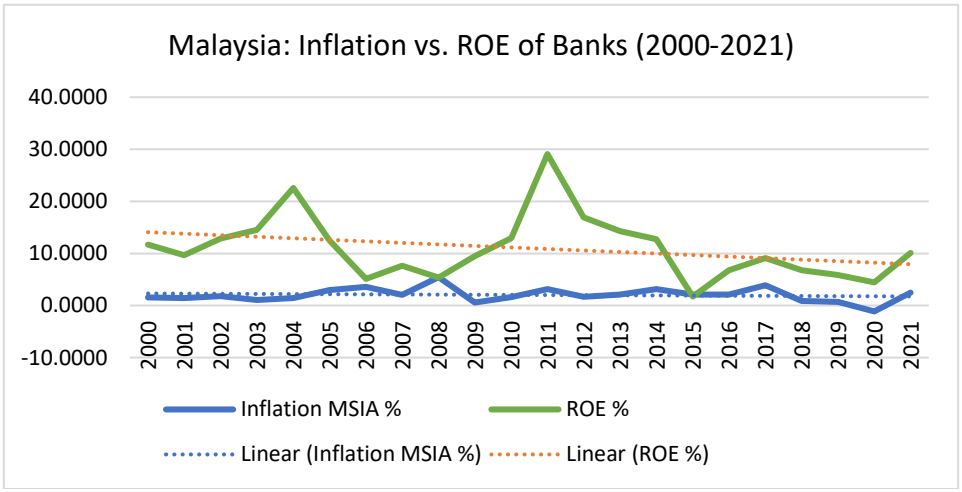

Figure 3: Inflation Rate and ROE of Malaysian Banks.

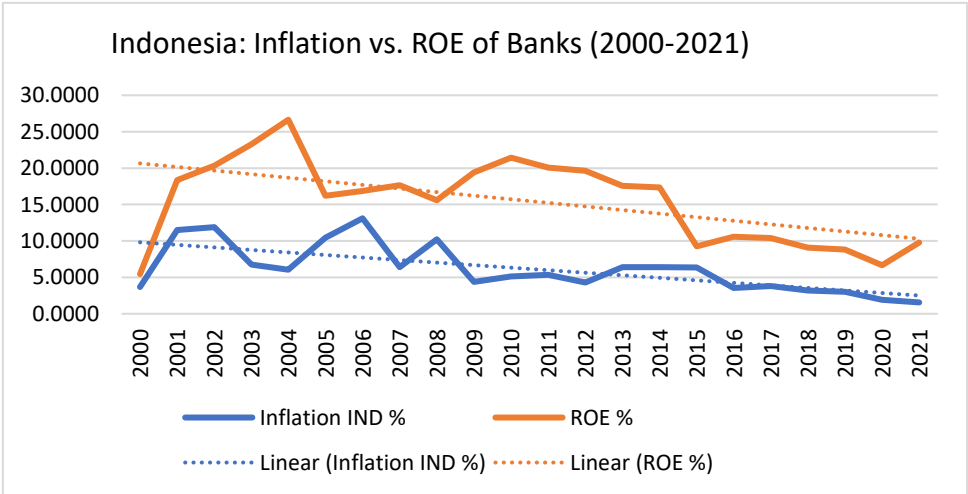

Figure 4: Inflation Rate and ROE of Indonesian Banks.

Looking at Figure 5 below, we find that Indonesia inflation rate is well above Malaysia inflation rate over the observed period from year 2000 till 2021. It is only in 2021 when Indonesia inflation rate was slightly lower than Malaysia. Inflation is measured by consumer price index, and it reflects the annual percentage change in the cost of goods and services to the average consumer. Although Indonesia inflation rate has been fluctuating substantially since year 2000, it has shown a significant downward trend during this 22-year period ending at 1.6 percent in 2021. Unlike Indonesia, Malaysia inflation rate is very much under control hovering between 2 percent and 4 percent levels. The inflation rates in both countries are on their declining trend.

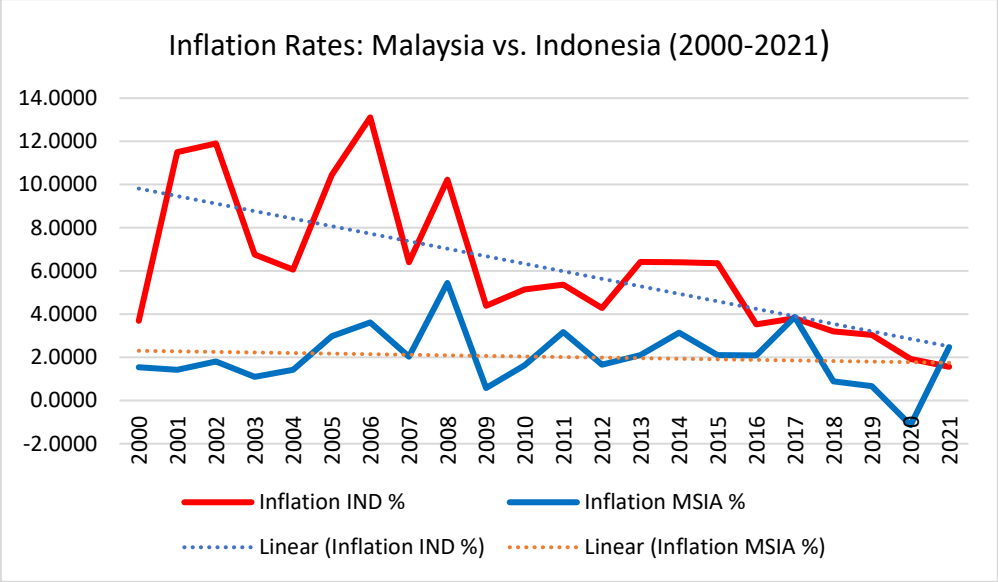

Figure 5: Malaysia Inflation Rate vs. Indonesia Inflation Rate.

Looking at the descriptive statistics summary in Table 1 below, we find that the inflation rate is consistently low in Malaysia as compared to Indonesia. On average basis, Malaysia's inflation interest rate is considerably lower than its counterpart over the 22-year period. In terms of variability, the distribution of Indonesia's inflation rate is slightly more spread out than Malaysia as indicated by their individual standard deviations. This finding provides clear evidence that Indonesia's inflation rate has been volatile, but the rate has tapered off in the last five years. Despite of its prolonged high inflation, Indonesia does have a unique feature in its local banks in which they are operating at higher profit margins. With respect to CAR and ROE, the Indonesian banks clearly demonstrate a more superior performance than Malaysia. The mean ROE for Indonesian banks is 15.47% and it is higher than the Malaysian banks. A higher ROE indicates that a bank is generating more profits from its shareholders' funds. In the case of CAR, Indonesian banks are well capitalized as the value of their assets increase. It is worthy to note that a bank's capital serves as a buffer that can absorb possible bank losses. To ensure a smooth running and resilient banking system, it is important for banks to have adequate financial buffers.

Table 1: Descriptive Statistics of Key Variables - Inflation Rate, Capital Asset Ratio (CAR) and Return on Equity (ROE).

Variable	Mean	Std. Deviation	Max	Min
Malaysia Inflation Rate (%)	2.2555	1.4849	5.4408	-1.1387
Indonesia Inflation Rate (%)	5.5431	3.0579	13.1087	1.5600
Malaysia CAR (%)	8.4438	0.7602	9.2362	6.9676
Indonesia CAR (%)	10.3967	2.4724	14.6183	7.5799
Malaysia ROE (%)	11.0037	6.2109	29.08	1.71
Indonesia ROE (%)	15.47	5.7978	26.64	5.44

Table 2 below reveals some degree of consistency on the preliminary findings for both countries. There are positive correlations between inflation and ROE for both Malaysia and Indonesia, but the correlation coefficient is only statistically significant for Indonesia. There is also a positive significant correlation between inflation and CAR, but this is only applicable to Indonesia. It is commendable to note that this positive correlation is rather strong at 0.7110. In the case of Malaysia, we find a negative correlation between inflation and CAR but it is only significant at 10 percent level.

Table 2: Pearson Correlation Coefficients Ho: Rho = 0.00 (p-value).

Variable	Inflation (Malaysia)	Inflation (Indonesia)
Inflation %	1.00	1.00
CAR	-0.4059 (0.0946)	0.7110* (0.0009)
ROE	0.0698 (0.7576)	0.4673* (0.0283)

*significant at 5% level

OLS Regression Analysis

The study employs OLS regression as a baseline analysis that examines the validity of our estimated model and its goodness of fit. Table 3 presents the statistical results and the t values from the linear regression T-test for both

Malaysia and Indonesia. With respect to Malaysia, the coefficient of determination or the adjusted R-squared is rather low at 11.20% suggesting a weak goodness-of-fit. Yet, the Indonesian model does seem to fit well due to its relatively adjusted R-squared at 47.50%. From the p-values, the anticipated significant relationship between inflation and CAR involving the two countries have been strongly established.

Table 3: Model 1 Parameter Estimates Dependent Variable: CAR.

Malaysia/Variable	DF	Parameter Estimate	Standard Error	T value	Pr > t
Intercept	1	8.9126	0.3132	28.45	<0.0001
Inflation Rate	1	-0.2078	0.1169	-1.78*	0.0946
R-Squared	0.164	Adj R-Squared	0.112		
Indonesia/Variable	DF	Parameter Estimate	Standard Error	T value	Pr > t
Intercept	1	13.5833	0.8939	15.19	<0.0001
Inflation Rate	1	-0.5748	0.1421	-4.04**	0.0009
R-Squared	0.505	Adj R-Squared	0.475		

**significant at 5% level
*significant at 10% level

Unlike CAR, we do observe some inconsistencies in the ROE models. The inflation rate variable is only statistically significant in the Indonesian model. A statistically significant variable is the one that has a strong relationship with the dependent variable and contributes significantly to the accuracy of our estimated model. The positive parameter estimate of inflation rate in the Indonesian model signifies that any increase in inflation rate in will cause ROE of Indonesian banks to increase as well. However, the adjusted R-squared are rather low for both countries staying below 20% level. We find that the statistical properties in these ROE models are rather weak and therefore a better estimation method is warranted.

Table 4: Model 2 Parameter Estimates Dependent Variable: ROE.

Malaysia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	10.3568	2.4708	4.19	0.0004
Inflation Rate	1	0.3193	1.0203	0.31	0.7576
R-Squared	0.004	Adj R-Square	-0.044		
Indonesia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	10.43	2.408	4.33	0.0003
Inflation Rate	1	0.8188	0.346	2.36**	0.0283
R-Squared	0.218	Adj R-Square	0.179		

** significant at 5% level

A sustained and raging inflation will most definitely affect the economic players unfavourably, which ultimately influence the prevailing market interest rates in the banking market. From our long-run regression models, it is obvious that there is a significant positive relationship between inflation rate and bank performance. The Malaysian model, on the other hand, is seen moderately weak as compared to its counterpart. The Indonesian model presents a credible result with high adjusted R-squared coupled with significant p-values from its linear regression T-test.

Engle-Granger Cointegration Test

As stated earlier, the OLS regression only provides the basic information on the theoretical relationships involving the observed variables in the CAR and ROE models. As such, Engle-Granger two steps procedure (EG) is employed to further investigate the stipulated hypothesis. All the basic requirements for this cointegration procedure must be satisfied before we can move to the next process. First, all data series must undergo Augmented Dickey-Fuller test (or unit root test) and these time series data are required to be integrated at first difference or I(1). The same test is applied to the residuals of the long-run regression at level and the statistical output must prove that they have no unit root. Next, a cointegrating regression analysis is deployed to estimate those two theoretical models. The detailed empirical results are presented in Table 6, Table 7 and Table 8 below.

Table 6: Model 1 Parameter Estimates Dependent Variable: CAR.

Malaysia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	0.04114	0.14051	0.29	0.7747
LdCAR	1	0.49197	0.31224	1.58	0.1411
Lr	1	-0.51241	0.23099	-2.22*	0.0466
LdInflation	1	0.02817	0.06813	0.41	0.6865
Indonesia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	0.37576	0.26325	1.43	0.1790
LdCAR	1	-0.10494	0.28824	-0.36	0.7221
Lr	1	-0.11248	0.16346	-0.69	0.5044
ldInflation	1	0.00633	0.10312	0.06	0.9520

*significant at 5%

Table 6 does provide some satisfying results as there is a presence of equilibrium relationship between inflation rate and CAR in Malaysia. However, there is an absence of long-run causality in Indonesia as indicated by its lag-one residual (denoted by Lr). The coefficient on the error-correction term in the Indonesian model is still between -1 and 0 but it is insignificant at 10 % level. The negative sign in this coefficient indicates the degree of adjustment.

The short-run causality, however, is found to be non-existence in both countries. It is interesting to note that higher speed of adjustment (51.24%) is noticeable in the Malaysia model implying that the CAR variable (i.e. dependent variable) returns to its equilibrium level after a change in inflation rate.

Table 7: Model 2 Parameter Estimates Dependent Variable: ROE.

Malaysia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	0.02961	1.41727	0.02	0.9836
ldROE	1	0.14200	0.25754	0.55	0.5890
Lr	1	-0.59329	0.26836	-2.21**	0.0420
ldInflation	1	-0.37188	0.79657	-0.47	0.6469
Indonesia/Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	-0.25894	0.77931	-0.33	0.7440
LdROE	1	0.10457	0.18764	0.56	0.5851
Lr	1	-0.36767	0.18440	-1.99*	0.0635
ldInflation	1	-0.08031	0.25086	-0.32	0.7530

**significant at 5% level
*significant at 10% level

The effect of inflation rate on the ROE of Malaysian and Indonesian banks are found to be rather stronger as compared to CAR. As shown in Table 7, we find that there is a presence of equilibrium relation in the two countries, but their short-run causality is not statistically significant. Specifically, the error correction term of both Malaysian and Indonesian models is significant and there is a high speed of adjustment towards equilibrium made by their ROE in the system. This is considered a useful insight possibly due to inflation expectations made by the market players in the banking sector. The results from the diagnostic tests are worthy as we observe no issue of heteroscedasticity and autocorrelation in all models. Those high p-values from White test in Table 8 above strongly supports our null hypothesis of homoscedasticity. Similarly, the diagnostic results from Durbin-Watson tests in Table 9 point towards the acceptance of our null hypothesis on the absence of serial correlation between the residuals.

Table 8: Test of First and Second Moment Specification (White test).

Model	Chi-Square	Prob > ChiSq
Model 1 (Malaysia)	10.78	0.2910
Model 1 (Indonesia)	9.51	0.3916
Model 2 (Malaysia)	4.08	0.9062
Model 2 (Indonesia)	7.41	0.5941

Table 9: Autocorrelation Tests.

Details	Model 1 (Malaysia)	Model 1 (Indonesia)	Model 2 (Malaysia)	Model 2 (Indonesia)
Durbin-Watson D	1.415	1.964	2.121	2.136
Pr < DW	0.0855	0.4583	0.6106	0.5343
Pr >DW	0.9145	0.5417	0.3894	0.4657
No. Observations	16	16	20	20
1st Order Autocorrelation	0.067	0.017	-0.069	-0.077

CONCLUSION

This is a comparative study which is driven by the motivation to look into the impact of inflation rate on the financial performance of the banking sectors in Malaysia and Indonesia. Employing quantity theory of money as the underpinning theory, the investigation is carried out upon yearly secondary data extracted from World Bank database over a study period of 22 years from 2000 to 2021. The empirical evidence indicates that there is a significant positive long run relationship between inflation and bank performances in Malaysia as measured by both capital asset ratio (CAR) and return on equity (ROE). In the case of Indonesia, the long run equilibrium is only observed when the bank performance is measured by ROE. Indonesia has been experiencing prolonged inflation since year 2000. This situation somewhat has made banks in Indonesia to consider charging higher inflationary premium in their product pricing. With respect to short run dynamic, both countries do not provide statistically significant evidence to support the presence of short run relation. The policy implication from this study may suggest that inflation does not have a detrimental economic impact on the banking sector over time. Nevertheless, the banking industry in Malaysia and Indonesia still needs to be constantly monitored by the central banks to ensure banks remain resilient to changing market environments over the longer-term horizon. It is also worthy for both governments to consider inflation targeting as a primary goal in order to achieve the orderly development of a viable and effective domestic banking sector coupled with sustainable long-term economic growth (Iyke & Ho, 2019; Wallace & Hussain, 1969). Our empirical findings are in line with the results from previous studies for developing countries. However, this study can be extended by incorporating more variable of interest in the model involving both bank-specific and industry-specific factors. Future research should also consider panel data analysis involving some credible estimation methods like static panel data estimation or Generalized Method of Moments (GMM) for measuring parameter estimates. Finally, it is also advisable for future researchers to include more ASEAN member countries in the sample, particularly Thailand, Philippines and Vietnam.

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