The Financial Cycle's Conditions and Their Impact
on ASEAN Macroeconomics in Covid-19

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ABSTRACT
The purpose of this study is to determine the condition of the financial cycle and their impact on macroeconomic developments such as economic growth in Indonesia and the ASEAN Region, especially in relation to the conditions of Covid-19 and post-Covid-19. The analytical method used in this study is the Panel Vector Error Correction Model (PVECM) to analyze long-term and short-term conditions and find out which variables have the most impact on the financial cycle in the ASEAN region. The variables that used in this study are variable housing credit, residential property price index, and the exchange rate as the independent variable, along with economic growth as the dependent variable. The data used is time series data with an analysis period of 2015 to 2022 with a quarterly data frequency. From these several variables, we suspect that there were stable cyclical conditions before Covid-19, and conditions that were shocked during Covid and post-Covid-19, if the credit cycle and exchange rate cycle are stable, then the financial index will be increasingly shaken. Research Stages namely, we will identify the problems in our research, then create a research design that we will test, then test the hypothesis using PVECM to prove the hypothesis, then interpret the results of the PVECM methods.
Keywords: Financial Cycle; Macroeconomics; Economic Growth; Covid-19; Credit Cycle

INTRODUCTION

Covid-19 has had a significant impact on the transformation of the economy, especially in ASEAN region. These changes have not only affected microeconomics but have also had repercussion on macroeconomics. These changes are evident from the condition of financial industry, as indicated by the shocks in financial and business cycle. The financial industry alone has a significant impact on a country's economic progress. The World Bank believes that an expanding financial sector can enhance economic growth, eliminate poverty, and reduce macroeconomic volatility. This paper, however, continues to spark discussion, both philosophically and experimentally. There are two major issues still being debated in the financial sector's development: economic growth and macroeconomic instability. A banking-centered financial system is one of the characteristics of the financial system in emerging nations, including Indonesia (Cottarelli, 2018) (Kurniawati, 2022). A stable financial system, according to Bank Indonesia, can distribute sources of funds and absorbing shocks that arise to

prevent disruptions to real sector operations and the financial system. Macroeconomic instability refers to unforeseen fluctuations or changes in various macroeconomic aspects of a country, such as inflation rates, economic growth, unemployment rates, and others. This can be caused by various factors, such as changes in aggregate demand, economic policies, changes in the global market.

Micro prudential and macroprudential policies can be used to monitor financial system stability to limit risks emerging from the impact of a crisis such as what occurred in Indonesia. When financial markets and financial institutions face impediments or shocks, the financial system's stability suffers. As occurred in 1997, 2008, and during the Covid-19 crisis. Micro prudential policy focuses on monitoring and managing risks within financial institution, while macroprudential policy aims to ensure overall financial stability by overseeing interaction among financial institution, with an emphasis on mitigating systemic risks that can impact financial stability and broader economy (Claessens et al., 2023); (Gai & Haworth, 2023). Through moderating fluctuation in credit provided by general banks, household credit, ot housing prices, macroprudential policies typically lessen the severity and likelihood of future crises and growth instability. Nevertheless, recent research also suggests tha these policies can slow down economic output growth.

As a result, maintaining the stability of a country's financial system or financial sector is critical. One method is to examine how a country's financial cycle works. (Harun, 2021) Financial cycles are defined as fluctuations in activities within the financial sector characterized by the acceleration of credit growth and banking financing (expansion phase) followed by a decline in credit growth and banking financing (contraction phase). (Miranda-Agrippino & Rey, 2021) The financial cycle, which is a combination of financing components, consisting of real credit and the credit-to-GDP ratio; and asset prices represented by real stock prices, real property prices, and the aggregate real asset price index. Credit is a key component of a country; The financial cycle is a condition in which financial sector activities go through an expansive phase marked by accelerated growth in bank credit and high financing, followed by a saturation phase (peak point), and then a contractionary phase marked by a decline in bank credit growth and financing.

CREDIT/GDP (%)

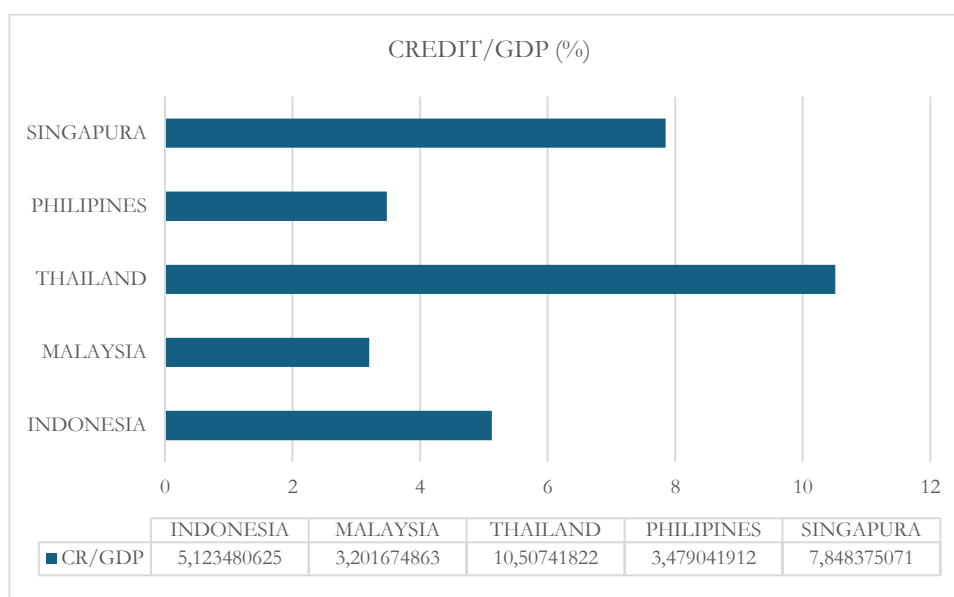|	INDONESIA	MALAYSIA	THAILAND	PHILIPINES	SINGAPURA
■ CR/GDP	5,123480625	3,201674863	10,50741822	3,479041912	7,848375071

Figure 1, Credit/ GDP ASEAN-5

The financial cycle can be defined as the combination of price, and risk perceptions, risk behavior, and financial restrictions, which results in a boom followed by a bust (Borio, 2012) (Borio, 2020). Thailand and Singapore have the highest credit-to-GDP ratios among the ASEAN-5 countries. The components of the financial cycle represent at least two elements: value and risk assessments, and funding restrictions. Asset prices, such as property and stock prices, reflect people's perceptions of value and risk. Changes in asset prices reflect economic agents' reactions to current economic and financial situations. Meanwhile, wide credit, or total financing for the private sector, is represented by broad credit, which is gained, among other things, from bank financing, money markets, and foreign debt. In Indonesia, bank credit is the most common source of financing (Svirydzenka, 2021) (Bazot et al., 2022). It is known that the financial cycle can capture increases or declines in funding that are related to financial circumstances based on these components. As a result, the financial cycle is inextricably linked to the financial system. The financial system is primarily the collection of markets, institutions, laws, and processes that govern the trading of securities, the determination of interest rates, and the production and distribution of financial services around the world. The purpose of this research is to identify the state of the financial cycle and its impact on macroeconomic developments such as economic growth in Indonesia and the ASEAN region, particularly regarding Covid-19 and post-Covid-19 conditions, as well as the threat of a recession in 2023. Credit factors, the residential property price index, the exchange rate, economic growth, and capital flow are all used in this study. Previous academics did numerous studies on the financial cycle that occurred during the 1997/1998 and 2008

crises. This study differs from prior studies in that it focuses on the financial cycle conditions during COVID-19 in ASEAN-5, as well as the use of macroeconomic indicators such as economic growth.

LITERATURE REVIEW

Various studies on the financial cycle and its impact on monetary policy have been extensively studied, particularly studies on the economic cycle and the increasing financial cycle following the 1997-1998 monetary crisis and the 2008 global crisis, whereas research on the economic and financial crisis in Covid-19 and the threat of a 2023 recession has received little attention. The financial cycle differs from the economic cycle in several ways. The financial cycle is longer, deeper, and has a significantly greater amplitude than the business cycle (Borio, 2012) (Yuksel, 2016). However, because the peak of the financial cycle is closely related to financial crises, recessions caused by falling house and equity prices tend to be deeper and longer than other recessions (Claessens et al., 2012). The financial cycle is a confluence of three distinct market groups that together form the foundation of financial intermediation. can illustrate the definition of the financial cycle in general, meaning the financial cycle is the outcome of the interaction between price and risk perceptions, risk behavior, and financial restrictions (financial constraints). According to (Borio, 2020) (Harun, 2021) , there are three (3) key cyclical characteristics of the financial cycle based on the many definitions proposed by previous studies, namely: (1) Credit and property values are the most closely related. According to (Claessens et al., 2012), credit is the main variable in financial cycle research since credit represents a link between savings and investment. Credit is also an indication of a country's finance restrictions. Meanwhile, home prices are inextricably linked to credit. Property values are assumed to have climbed during periods of credit expansion and declined during periods of credit contraction (Claessens et al., 2012) and (Borio, 2012). Property prices, as asset values, also reflect economic actors' attitudes toward financial risk. (2) The financial cycle's apex is directly tied to the financial crisis. (Smaga, 2021) credit tied to interest rates, which has the potential to be procyclical on numerous financial cycle indicators, including credit, debt ratios, home prices, and stock market indexes. Interest rate changes are often more procyclical when the financial cycle gap widens and less procyclical when the financial cycle gap narrows. On average, central banks in larger economies pursue potentially more procyclical monetary policies than central banks in smaller ones. According to research (Borio, 2012) on the financial cycles of seven nations compared to the period of the crisis, in general, crises occurred not far from the peaks in the financial cycle, especially for domestic (home grown) crises. Foreign countries (cross-border) are often to blame for crisis points that are distant from the peak. (3) It can assist in detecting the

possibility of financial stress earlier and in real time. By monitoring credit ratios and property values, the financial cycle can recognize the possibility of financial strain early in real time. This is because, during the growth phase, the credit-to-GDP ratio generally climbed, although property prices tended to rise and then fall before the crisis, one of which was triggered by a decline in financing. According to Solow's endogenous growth hypothesis, productivity characteristics drive economic growth or production. Economic development cannot be isolated from economic growth; economic development promotes economic growth, and economic growth promotes economic development. Economic growth is defined as an increase in total income and per capita income that is accompanied by fundamental changes in a country's economic structure (Bhaduri, 2006) Proposes two plausible causal linkages between financial sector expansion and economic growth: first, demand-following, in which poor financial sector growth is a symptom of a lack of demand for financial services. Second, supply-leading implies that the financial sector anticipates and promotes the expansion of the real sector. In general, income is divided into two components: permanent income and transitory revenue. In this scenario, (Miller, 2011) extended Friedman's fixed income theory, arguing that if property prices influenced their lives in the form of increasing wealth, consumers would adjust their spending patterns (Miller, 2011).

This research differs from previous studies in that earlier research did not address the impact of COVID-19 on financial cycles and its consequences for the macroeconomy. For example, in the study by (Miranda-Agrippino & Rey, 2021), they identified the impact of global financial cycles by comparing conditions in the United States, Europe, and China, but they did not include the effects of COVID-19. The research by (Chen & Svirydzenka, 2021) focused on financial cycles in developing countries, discussing the influence of housing prices on financial cycles before and after the crisis. The study conducted by (Zilin, 2023) compared financial cycles and business cycles resulting from housing prices and credit in China. Therefore, the author aims to examine financial cycles by incorporating macroeconomic variables during COVID-19 and understanding the long-term impacts of financial cycle conditions in ASEAN Region.

METHODS

Various identifications related to similar research have been carried out, including measuring the impact of the financial cycle on GDP using panel structural vector autoregression (Abrigo & Love, 2016), the Granger causality Wald test and the impulse response function (Lütkepohl & Woźniak, 2020), Based on research employing a VAR panel (PVAR) (Kare et al., 2021) and (Zilin, 2023). The Panel Vector Error Correction Model (VECM) was employed in this investigation. This study's panel data is a blend of time series data (2015-2022) and cross section data (ASEAN-5 countries).

The primary focus of this study is on the short-term, long-term, and causation relationships between the Credit variable and Real GDP, Capital Flows, Exchange Rates, and Residential Property Price Index in ASEAN-5 Countries from 2015 to 2022. In this work, the VECM Panel model equation is as follows:

$$\text{LnCR}_{it} = \beta_0 + \sum_{I=1}^{M+1} \beta_1 \text{LnCR}_{it-1} + \sum_{I=1}^{M+1} \beta_2 \text{GDP}_{it-1} +$$
$$\sum_{I=1}^{M+1} \beta_3 \text{LnER}_{it-1} + \sum_{I=1}^{M+1} \beta_4 \text{CF}_{it-1} + \sum_{I=1}^{M+1} \beta_5 \text{RPPI}_{it-1} + \varepsilon_{it}$$
$$(3.1)$$

Where: LnCr (Credit), GDP (Real GDP), LnER (Exchange Rate), CF (Capital Flow), RPPI (Residential Property Price Index)

RESULTS ANDDISCUSSION

The Levin, Lin, and Chu (LLC) approach was used in this investigation, as well as Fisher's test with the ADF (Augmented Dickey Fuller) and PP (Phillips Perron) tests. Decisions are made based on the criterion that if the probability values of the three techniques are level = 5%, then reject H0, indicating that the data is stationary at the degree level or difference. In contrast, if the probability values of the three techniques are more than level = 5%, H0 is not rejected, indicating that the data is not. The findings of the stationarity test are as follows.

Table 4.1 Stationary Test Result

Variable	Level			1st Difference			Conclusion
	LLC	ADF-Test	PP Fisher	LLC	ADF-Test	PP Fisher	
LnCR	3.67046	0.45872	0.12324	-4.88389	22.2881	36.4205	Stasionary
	(0,9999)	(1.0000)	(1.0000)	(0.0000)	(0.0000)	(0.0000)	
REALGDP	-2.45157	14.0134	19.3498	-5.77845	26.6062	69.8838	Stasionary
	(0.0071)	(0.1724)	(0.0360)	(0.0000)	(0.0000)	(0.0000)	
LnER	3.67046	0.45872	0.12324	-8.74982	47.8953	49.0188	Stasionary
	(0.9999)	(1.0000)	(1.0000)	(0.0000)	(0.0000)	(0.0000)	
CF	0.28828	5.33817	9.84352	-18.9870	47.6261	68.7559	Stasionary
	(0.6134)	(0.8675)	(0.4543)	(0.0000)	(0.0000)	(0.0000)	
RPPI	-1.84608	14.2724	41.6590	-8.65026	36.0681	47.2479	Stasionary
	(0.0324)	(0.1609)	(0.0000)	(0.0082)	(0.0000)	(0.0000)	

Table 4.1 shows that the variables LNCR, REALGDP, LNER, CF, and RPPI have unit roots of order 0 (level) or are not stationary at levels. If the statistical value of the p-value for each variable is more than = 5%, it does not reject H0, indicating that there is a unit root or that the data is not stationary. In the first difference stationarity test, all variables had a p-value of 5%, rejecting H0, indicating that there is no unit root, and the data is stationary.

1. **Determination of Optimal Lag Length**

   The value approach is used to determine the ideal lag duration, which includes the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ) (Gujarati, 2004).

   Table 4. 2 Optimal Lag Length Test Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1080.771	NA	1.88e+25	72.38473	72.61826	72.45944
1	-873.8426	331.0852	1.04e+20	60.25617	61.65737*	60.70443
2	-840.4639	42.27965*	6.95e+19*	59.69760*	62.26646	60.51940*

According to Table 4.2, the asterisk represents the optimal lag advised by LR, FPE, AIC, and HQ, which is at the second lag, while SC is at the first lag. The highest lag estimation findings, shown by an asterisk, indicate the optimal lag, which is at the second lag in this investigation.

2. **Stability Test**

The next step is to perform a stability test by calculating the roots of a polynomial function (Root of Characteristic Polynomial). When the Root and Modulus Polynomial values are less than 1 (<1) it can be stated that the VECM Panel model is stable (Gujarati, 2004). The results of the stability test are shown in Table 4.3 below.

Table 4. 3 Stability Test Result

Root	Modulus
1.219262	0.219262
0.997316	0.997316

0.958868	0.958868
0.159895 - 0.792774i	0.808738
0.159895 + 0.792774i	0.808738
-0.617281 - 0.427352i	0.750777
-0.617281 + 0.427352i	0.750777
0.566409	0.566409
0.085071 - 0.206286i	0.223139
0.085071 + 0.206286i	0.223139

Table 4.3 shows the values of the Root and Modulus Polynomial less than 1 (<1), so the VECM panel model is said to be stable.

3.   Cointegration Test

The Johansen Cointegration Test technique is used in this study to compare the value of the trace statistic with a critical value of 5%; that is, if the value of the trace statistic is greater than the critical value, cointegration exists. Furthermore, cointegration can be determined by inspecting the information on each criterion, which will state "Trace test indicates cointegrating eqn(s) at the 0.05 level" if there is cointegration. The results of the cointegration test are reported in Table 4.4 below.

Tabel 4. 4 Cointegration Test Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.873033	87.39987	69.81889	0.0011
At most 1	0.486554	35.80419	47.85613	0.4063
At most 2	0.399727	19.13892	29.79707	0.4830
At most 3	0.207078	6.379653	15.49471	0.6506
At most 4	0.022890	0.578899	3.841466	0.4467

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

The Johansen Cointegration Test technique is used in this study to compare the value of the trace statistic with a critical value of 5%; that is, if the value of the trace statistic is greater than the critical value, cointegration exists. Furthermore, cointegration can be determined by inspecting the information

on each criterion, which will state "Trace test indicates cointegrating eqn(s) at the 0.05 level" if there is cointegration. The results of the cointegration test are reported in Table 4.4 below.

4. Panel Estimation of Vector Error Correction Model (VECM)

The short- and long-term relationships between Real GDP, Capital Flows, Exchange Rates, and the Residential Property Price Index and Credit can be explained using VECM panel estimates. Estimation of a VECM panel with Credit as the endogenous variable using the second optimal lag length. Meanwhile, a significance test with t-statistics is used to examine how the variables in the model influence each other in the short and long term. The t test was performed using a t table value of 2.030 at the real level = 5%. Table 4.5 shows the results of the VECM panel estimation on the Credit equation with a lag duration of 2 (two).

Table 4. 5 Panel VECM Estimation Result

Variable	Coeficient	t-statistic	Result
Long Term			
LNCR (-1)	1.00000		
REALGDP (-1)	0.299571	13.3938	Significant
LNER (-1)	0.031536	3.96542	Significant
CF (-1)	6.322510	2.84540	Significant
RPPI (-1)	-0.007088	-8.13674	Significant
C	--26.48739		
Short Term			
LNCR (-1)	0.493354	0.86418	Not Significant
LNCR (-2)	1.098511	1.40955	Not Significant
REALGDP (-1)	0.071817	1.11074	Not Significant
REALGDP (-2)	0.037550	0.60666	Not Significant
LNER (-1)	-1.019165	-0.67530	Not Significant
LNER (-2)	0.236031	0.16069	Not Significant
CF (-1)	6.682829	0.86329	Not Significant
CF (-2)	-1.076408	-1.53671	Not Significant
RPPI (-1)	-0.000227	-0.11291	Not Significant
RPPI (-2)	0.001269	0.65552	Not Significant

C	0.098511	0.71429	
CointEq1			
LNCR	-0.251214	-1.14471	Not Significant
REALGDP	-4.510563	-0.89533	Not Significant
LNRER	0.023035	0.53800	Not Significant
CF	2.573023	3.19644	Significant
RPPI	76.18481	2.99505	Significant
R-squared	0.504396		
Adj. R-squared	0.085039		
F-statistic	1.202785		

a. Cross-Section Model Estimation Result

The coefficient value in each cross section is calculated using the findings of panel data regression estimation, which will reveal individual effects as a picture of ASEAN-5 country heterogeneity. The constant values in ASEAN-5 countries are shown in Table 4.6, which are the sum of the coefficient values of each area (Ci) plus the result of the global constant (C).

Table 4. 6 Constanta Value ASEAN-5 Country

Cross Section	Coeficient (Ci)	Constanta (C)	Ci + C
Indonesia	-19.42538	-26.48739	-45.91277
Malaysia	8.067253	-26.48739	-18.41486
Fillipina	-1.224986	-26.48739	-27.712376
Thailand	1.382669	-26.48739	-25.104721
Singapura	11.20045	-26.48739	-15.28694

In the Indonesian equation model, the constant value is 45.91277. This implies that, holding GDP, capital flows, exchange rates, and the Residential Property Price Index constant, credit is expected to decrease by 45.91277 percent. Similarly, in the Malaysian equation model, the constant value is 18.41486, indicating that with constant GDP, capital flows, exchange rates, and Residential Property Price Index, credit is projected to decrease by 18.41486 percent. Moving to the Philippine equation model, the constant number is 27.712376. This suggests that, under conditions of constant GDP, capital flows, exchange rate, and Residential Property Price Index, credit is anticipated to decrease by

27.712376 percent. In the Thai equation model, the constant value is 25.104721, indicating that if GDP, capital flows, exchange rates, and the Residential Property Price Index remain constant, credit is expected to fall by 25.104721 percent. Lastly, in the Singapore equation model, the constant value is 15.28694, suggesting that with constant GDP, capital flows, exchange rates, and Residential Property Price Index, credit is projected to decrease by 15.28694 percent.

b. Short Term Analysis

The short-term VECM panel estimation findings with a lag length of 2 can indicate how the factors Real Gross Domestic Product, Capital Flows, Exchange Rates, and Residential Property Price Index affect Credit in ASEAN-5 countries.

According to Table 4.5, the influence of each variable on short-term credit in ASEAN-5 nations, there is no short-term association, implying that both GDP, Capital Flows, Exchange Rates, and Residential Property Price Index have an impact on credit variables.

c. Long Term Analysis

The long-term findings of the VECM panel estimation can indicate how the factors Real Gross Domestic Product, Capital Flows, Exchange Rates, and Residential Property Price Index affect credit in ASEAN-5 countries.

The following is a summary of how each component effects the current account balance in long-term relationships in ASEAN-5 countries, based on Table 4.5. The Impact of Real GDP on Long-Term Relationship Credit, according to the VECM panel estimation results, the t-count value of Real GDP is 13.3938 > 2.030, indicating that Real GDP has a considerable effect on credit in long-term relationships in ASEAN-5 countries. The Real GDP coefficient value of 0.299571 indicates that a change in Real GDP of one million rupiah in the previous period will affect credit increases in ASEAN-5 countries by 0.299571 percent in the long-term current period, everything else being equal. Exchange rate impact on credit in long-term connections. According to the VECM panel's estimation results, the t-count value of the Exchange Rate is 3.96542 > 2.030, indicating that the Exchange Rate has a considerable effect on Credit in long-term partnerships in ASEAN-5 countries. The exchange rate coefficient value of 0.031536 indicates that a change in the previous period's exchange rate of one million rupiah will influence the increase in credit in ASEAN-5 countries in the long-term current period of 0.031536 percent, ceteris paribus.

The Impact of Capital Flow on Long-Term Relationship Credit. Based on the VECM panel's estimation results, the t-count value for Capital Flow is 2.84540 > 2.030, indicating that Capital Flow has a

considerable influence on Credit in long-term interactions in ASEAN-5 countries. The capital flow coefficient value of 6.32251 indicates that a change in capital flow of one million rupiah in the previous period will affect credit increases in ASEAN-5 countries by 6.32251 percent in the long-term current period, ceteris paribus.

The Long-Term Effect of the Residential Property Price Index on Credit. Based on the VECM panel's estimation results, the t-count value for the Residential Property Price Index is -8.13674 > -2.030, indicating that the Residential Property Price Index has a considerable effect on credit in long-term partnerships in ASEAN-5 countries. The coefficient value of the residential property price index of -0.007088 indicates that a change of one million rupiah in the previous period will affect credit rises in ASEAN-5 countries in the long-term current period by -0.007088 percent, ceteris paribus.

The COVID-19 pandemic has triggered changes in the financial cycles across the ASEAN region. Some countries are undergoing prolonged debt restructuring, while others face challenges in restoring economic stability. The economic impacts of the COVID-19 pandemic can vary. Some nations will strive to mitigate adverse effects and revive economic growth, while others may encounter risks of inflation or long-term fiscal issues. The increase in public and private debt has become a serious concern. This pandemic may also influence regulations and financial policies in the ASEAN region. Governments and financial authorities may enhance macroprudential oversight and strengthen capacities to address systemic risks (Anwar et al., 2023). (Borio, 2020); (Miranda-Agrippino & Rey, 2021) explains that the financial cycle has significant implications for macroprudential policies, and, consequently, the financial cycle serves as an early warning for macroeconomic conditions. Similarly, according to research by (Zilin, 2023), the financial cycle acts as an early warning signal for business cycles, and China's business and financial cycles exhibit different explanatory abilities for real estate price fluctuations. Amid the ongoing urbanization process in China, real estate plays an increasingly prominent role in the macroeconomy. Influenced by the epidemic and economic downturn, China's real estate has recently experienced significant disruptions and will face greater challenges.

This scenario could potentially unfold in the ASEAN region, given the long-term impacts post-Covid-19 and the looming threat of recession (Navik Istikomah, Indra Suhendra, 2020). Effective measures should be taken to manage and reduce the joint movements arising from the convergence of real estate cycles with business and financial cycles. Real estate macro-control policies should be considered an integral part of the macroprudential policy framework, aiming to encourage sustainable balance between supply and demand in the real estate market and ensure the development of the real estate market.

6. Causality Test

In the short term, the causality test employs the Wald Test/VEC Granger Causality Test, where if the ECT coefficient value on the endogenous variable is negative and statistically significant with a level of = 5%, then reject H0, implying that exogenous variables cause endogenous variables in the long term (Gujarati, 2004). The Granger causality test findings show whether there is a causal relationship between variables, both one-way and two-way, as observed from the probability value (p-value) as follows: In the short term, the findings of the causality test between Credit (CR) and Real Gross Domestic Product (Real GDP) reveal that Real GDP drives credit. If the p-value is 0.0207 = 5%, then reject H_0. Credit, on the other hand, does not trigger Real GPD because it has a p-value of 0.3339 > = 5%, and so H_0 is not rejected. In the short run, there is a one-way causality relationship from Real GDP to credit.

While on the variable Credit (CR) and Exchange Rate (LNER), it is known that the exchange rate does not influence credit in the short run. If the p-value is greater than or equal to 0.7961, then do not reject H_0. Credit has no effect on the exchange rate because it has a p-value greater than or equal to 5%, hence H_0 is not rejected. In the short term, there is no one-way or two-way causation relationship between exchange rate and credit factors.

In the short term, it is recognized that capital flow does not cause credit in the variable Credit (CR) and Capital Flow (CF). If the p-value is greater than or equal to 0.0762, then do not reject H_0. Credit, on the other hand, induces capital flow because it has a p-value of 0.0000 = 5%, thus reject H_0. It can be said that there is a one-way causation relationship in the short term from the credit variable to capital flow. Furthermore, the variable Credit (CR) and the Residential Property Price Index in the short term, it can be concluded that there is no causal relationship between the credit variable and the residential property price index in the short term, either one way or two ways.

Furthermore, the Error Correction Term (ECT) coefficient in the VECM panel estimate shows that when the credit variable is an endogenous variable, the ECT value is negative but not statistically significant, where the t count is -1.14471 t table -2.030. This indicates that credit does not tend to converge to its long-term equilibrium path in response to changes in real GDP, exchange rates, capital flows, and the residential property price index all at once, and that credit does not cause credit in the long run.

7.   Impulse Response Function (IRF)

The credit variable does not appear to have responded to real GDP shocks of one standard deviation in the 1st to 2nd periods. Credit began to respond negatively to shocks in the 3rd to 20th periods. In this period, the real GDP shock resulted in a fluctuating decrease in credit between -0.1 percent to -6.4 percent. The credit variable does not appear to have responded to exchange rate shocks of one standard deviation in the 1st to 4th periods. Credit began to respond negatively to shocks in the 5th to 20th periods. During this period, exchange rate shocks resulted in a fluctuating decrease in credit between -0.1 percent to -2.1 percent. The credit variable does not appear to have responded to capital flow shocks of one standard deviation in the 1st to 2nd periods. Credit began to respond negatively to shocks in the 3rd to 20th periods. In this period, capital flow shocks resulted in a fluctuating decrease in credit between -0.1 percent to -2.4 percent. The credit variable does not appear to have responded to the shock of the residential property price index by one standard deviation in the 1st to 4th periods. Credit began to respond positively to shocks in the 5th to 20th periods. During this period, shocks to the residential property price index resulted in a fluctuating increase in credit between 0.1 percent and -6.4 percent.

8.   Variace Decomposition (VD)

Table 4. 8 Variace Decomposition

Period	S.E.	LNCR	REALGDP	LNER	FDI	RPPI
1	0.199912	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.321176	98.88011	0.332283	0.209577	0.194543	0.383489
3	0.512970	91.96935	2.752252	0.989530	3.496653	0.792216
4	0.762944	84.20599	12.61323	0.447831	1.984028	0.748916
5	1.026077	89.54378	7.249380	0.896155	1.448612	0.862075
6	1.510494	79.04620	13.70301	1.462108	3.954165	1.834519
7	1.861507	79.37759	15.66892	1.069457	2.616495	1.267536
8	2.435862	83.09735	9.889040	1.870902	3.376135	1.766578
9	3.222237	80.04039	13.14811	1.595776	3.348314	1.867409
10	3.885730	79.84799	14.55667	1.537055	2.589697	1.468584
11	4.869584	81.05166	12.01120	1.807098	3.303808	1.826230

12	6.092410	81.19483	12.34186	1.669891	2.996768	1.796648
13	7.419513	79.68988	13.96937	1.835510	2.846746	1.658494
14	9.002415	80.08797	13.45437	1.832111	2.934303	1.691244
15	11.01851	81.41979	12.07140	1.853433	2.898618	1.756765
16	13.47678	79.77343	13.51943	1.943544	2.995787	1.767812
17	16.10391	79.39434	14.22596	1.885587	2.836053	1.658055
18	19.44503	80.68334	12.65282	1.955565	2.947986	1.760288
19	23.67990	79.92860	13.21467	1.987659	3.047927	1.821141
20	28.23514	79.06038	14.39682	1.961770	2.882579	1.698447

Real GDP has the greatest ability to influence credit (CR) in the 7th period of 15.66892 percent. Meanwhile, the smallest ability of real GDP to influence credit occurred in the second period of 0.332283 percent. Exchange rates have the greatest ability to influence credit (CR) in the 19th period of 1.9876569 percent. Meanwhile, the smallest ability of the exchange rate to affect credit occurred in the second period of 0.209577 percent. Capital flow has the greatest ability to influence credit (R) occurring in the 9th period of 1.867409 percent. Meanwhile, the smallest ability of capital flow to affect credit occurred in the second period of 0.383849 percent. The residential property price index has the greatest ability to influence credit (CR) in the 6th period of 3.954145 percent. Meanwhile, the smallest ability of the residential property price index to affect credit occurred in the second period of 0.194543 percent.

CONCLUSIONS

The results of the VECM panel estimation in the short-term show how the influence of Real Gross Domestic Product, Capital Flows, Exchange Rates and Residential Property Price Index variables on credit in the short-term relationship in ASEAN-5 countries, it turns out that there is no short-term relationship, meaning that both the GDP variable, Capital Flows, Exchange Rates and Residential Property Price Index to credit variables. In the long term, all variables, both Real Gross Domestic Product, Capital Flows, Exchange Rates and Residential Property Price Index, have a long-term relationship to credit. Based on impulse response function analysis, credit began to respond negatively to shocks in the 3rd to 20th periods. In this period, the real GDP shock resulted in a fluctuating decrease in credit between 0.1 percent to 6.4 percent. The credit variable does not appear to have responded to

exchange rate shocks of one standard deviation in the 1st to 4th periods. Credit began to respond negatively to shocks in the 5th to 20th periods. During this period, exchange rate shocks resulted in a fluctuating decrease in credit between 0.1 percent to 2.1 percent. Credit began to respond positively to shocks in the 5th to 20th periods. During this period, shocks to the residential property price index resulted in a fluctuating increase in credit between 0.1 percent and 6.4 percent.

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