

## Which Sector-Based Bank Lending Facilities can Contribute to Long-Term Economic Growth? : Indonesian Study



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**ABSTRACT:** Knowing which sector credit facilities can contribute to increasing economic growth in the long term in Indonesia, is the main objective of the research. This research uses secondary data as quarterly data from 2010Q1 to 2019Q4. Using the VECM approach to identify long-term effects, equipped with structural analysis to determine the response to shocks as well as the resulting contribution. Overall sectoral bank credit facilities have a significant long-term impact on GDP, it was found, though of a different nature. The positive nature of credit facilities for the agricultural sector, wholesale and retail trade sector, and the transport, warehousing and communications sectors, while credit for manufacturing, construction, and financial intermediaries had the opposite impact. A credit shock for construction and financial intermediary sector loans responded positively in the long and short term, while credit for the manufacturing sector received the largest negative response. The largest contribution to economic growth came from manufacturing sector credit, financial intermediary sector credit, agricultural sector credit, and lastly, construction sector credit. Researchers suggest increasing credit allocations to agribusiness, discount and retail exchange, and the transport and communications sectors to meet long-term goals, while in the short term, maximizing the allocation of credit between the manufacturing sector, the financial intermediaries sector, and the transport and communications sector.

**KEYWORDS:** Economic Growth, Sectoral Bank Credit, Short-Term Causality, VECM

### I. INTRODUCTION

Measuring the success of economic development in a country, especially developing countries, is often seen from the level of economic growth. Economic growth is seen as important because it is linked to a community's standard of living (Joseph, 2020) which shows an increase in income, the breadth of business fields to the high job opportunities provided by business actors in various economic sectors. According to (BPS Indonesia, 2021), economic growth comes from how much-added value is created by all sectors in a particular country or the absolute value of the labor force and the conclusive products supplied by all economic units.

Several studies assessed that to implement the development targets, credit must be involved. Credit cannot be ignored, especially in developing countries which are often trapped in a poverty network (Amoo et al., 2017). The existence of credit will stimulate demand for labor which results in high incomes and a reduction in poverty (Sipahutar et al., 2016). The credit is used as an enterprise capital provider, ensuring the production process runs regularly and continuously. Credit is felt to be able to encourage economic activity (Awad & Al Karaki, 2019) because it can achieve growth target for more advanced economic development (Alzyadat, 2021; Ubesie et al., 2019), especially in developing countries (Majeed & Iftikhar, 2020).

Researchers in various countries, not a few are interested in the topic of the influence of credit and economic growth. The finding detained by several researchers stated a positive significance between the two. If economic growth to reaches a high value, the bank's credit allocation to the economic sector must be increased. The progress of the economic sector can produce more abundant output so that the positive impact is the expansion of job opportunities and the high demand for goods/services. Some researchers have a positive influence such as (Abusharbeh, 2017; Alzyadat, 2021; Ananzeh, 2016; Korkmaz, 2015; Oni et al., 2014; Timsina & Pradhan, 2016) although the title of causality has not been determined (Perera, 2017).

Two types of causality directions are created, namely one-way and two-way. One-way causality is felt in the case of Nigeria. Through Granger's VAR causality test, (Okafor et al., 2016) found that the direction of causality does not run from GDP to credit, but from credit to economic growth. Cameroon found the same thing with the VECM testing method (Thierry et al.,

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2016). Of course, there is no other relationship that can be created considering the causality found is one-way, namely bank credit accelerates the economic growth often two countries. in Cameroon through testing the Vector Error Correction Model (VECM). Of course, there is no other relationship that can be created considering the causality found is one-way, namely bank credit accelerates economic growth in the two countries.

This is in contrast to research conducted (Sipahutar et al., 2016) in Indonesia and (Pham & Nguyen, 2020) in Vietnam, where bidirectional causality was found in credit and economic growth. That is, there is a relationship between the two and influence each other. Of course, this is in stark contrast to the case of Tanzania, (Joseph, 2020) using causality test analysis and ECM, between bank credit and economic growth there is no causal relationship. Therefore, hints about the direction of causality between countries are not the same because each country certainly has different economic conditions and policies.

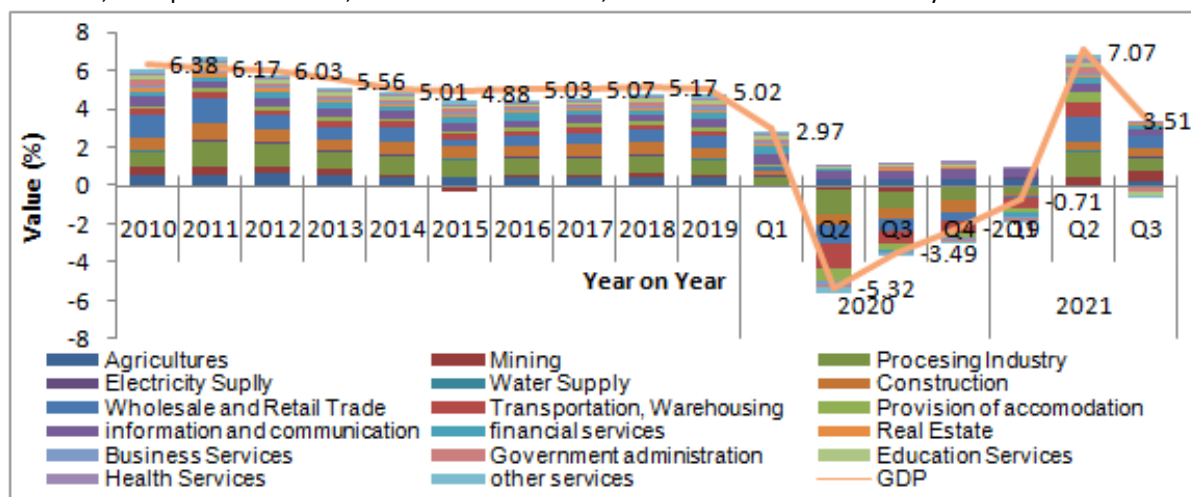
Although many positive responses were generated by researchers regarding the effect of bank credit and GDP growth. There is still some empirical literature that does not show that credit can encourage economic growth as found (Awad & Al Karaki, 2019; Ubesie et al., 2019) in Nigeria and Palestine. In Romania, credit is one of the triggers of the economic crisis in developed countries (Banu, 2013; Swamy & Dharani, 2019) due to excess lending in the community. A different reason, but still rejects the positive effect, is found by (Okafor et al., 2016) who stated that Nigerian bank credit does no effect on economic growth due to misuse of loan funds to inappropriate sectors. Therefore, to obtain a positive influence on economic growth, it is necessary to pay attention to the accuracy of the target and the amount of credit distribution allocation for the economic sector.

There is no problem with accepting that there is a substantial relationship between the two topics. When credit grows, from the consumer side there will be a process of borrowing and spending more on loans, and companies will invest in higher amounts (Banu, 2013). This increase in consumption and investment can encourage job creation it leads to an increase in aggregate income and output (Oni et al., 2014). This is the justification for credit as a trigger for increasing economic growth.

Based on the explanation above, it can be said that the resulting relationship or influence between credit and economic growth in each country is different. In addition, the placement of the amount of credit will determine the nature of the relationship and influence economic growth. The contradictions created in previous research and the lack of research conducted in the Indonesian context prompted this research to be conducted.

### Development of credit in the business sector and economic growth in Indonesia's

In Indonesia, as the owner of 17 economic sectors based on business fields, they certainly have different levels of contribution in generating added value for economic growth. Seen in (Fig.1), each segment has its possess development rate, but it is evident that there are a few potential segments that have a high and steady commitment rate to economic development from 2010 to 2019 including the agricultural sector; processing industry sector; construction sector; wholesale and retail trade sector; transportation sector; communication sector; and the financial intermediary sector.



**Fig. 1. Graph of economic growth sources by business field in 2010-2021q3**

*The value on the vertical line shows the magnitude of the growth value in the percent*

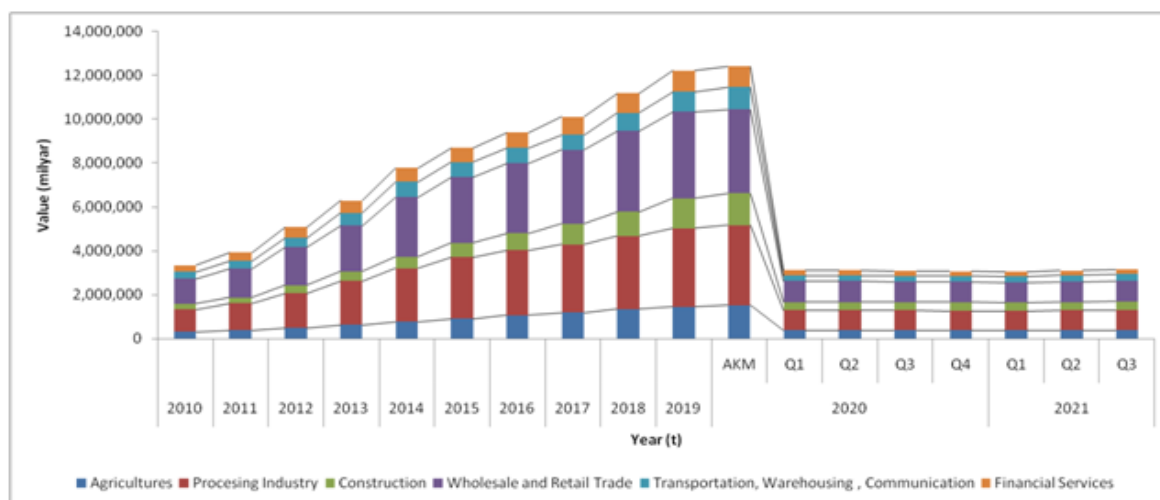
*Values in the horizontal line indicate the period of the data*

**Source:** (BPS Indonesia, 2021)

However, when compared to the data on credit distribution in these sectors, the number of which continues to increase from year to year (Fig. 2), in reality, the value-added generated as a contribution to GDP tends to decrease (Fig. 1). In 2010, the total credit disbursement for the agricultural sector reached Rp. 319.624 billion and generated an added value for GDP of 0.51%.

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The number of credit disbursements continued to increase until 2019 to 1,448.480 billion, but its contribution to GDP continued to decline to 0.45% in that year. Similar conditions also occurred in lending to the manufacturing sector. In 2010, loans disbursed amounted to 1,023,934 billion which resulted in a contribution rate of 0.86% to GDP. The number of lending continues to increase but the contribution obtained tends to decrease to 0.8% in 2019. In addition, the wholesale and retail trade sector has the largest credit facilities among other loans, but the contribution rate generated is smaller than the manufacturing sector. It can be said that the allocation of the number of credit facilities has not been appropriate for several sectors in terms of the development and contribution of value-added to Indonesia's GDP.



**Fig. 2. Graph of the Distribution of Credit Funds to the Economic Sector and Indonesia's Economic Growth in 2010-2021Q3**

*The value on the vertical line shows the magnitude of the growth value in the percent*

*Values on the horizontal line indicate the time of the data, AKM= Annual Accumulation, Q=Quarterly*

**Source:** (OJK, 2021)

Related to this problem, namely the mismatch of conditions between the increase in the amount of credit and the level of sector contribution generated for GDP, one of the main objectives of this research is to build a long-term and short-term model to find out which sector credit facilities can contribute to increased growth economy in Indonesia. Therefore, to answer the research objectives, the researcher uses VECM estimates for the long-term model and Granger Wald statistics for short-term estimates, as well as structural analysis and long-term forecasting, which were carried out in the 2010Q1-2019Q4 period due to the stability of the data before the shock occurred. in 2020.

The follow-up effect of this review is expected to be taken into consideration by the monetary authorities in determining the amount of credit fund allocation to economic segments that have a tall commitment to Indonesia's economic growth. Because in essence, it is important to consider certain sectoral characteristics to determine the amount of bank credit/financing allocation so that the level of effectiveness can be ascertained to support better economic growth.

## II. MATERIAL AND METHODS

### A. Data Sources and Selection of Variables

The research uses secondary data because it is obtained from third-party publications, namely BPS Indonesia and OJK (Financial Services Authority). All data is in the form of a time series every quarter from 2010q1 to 2019q4. The independent variable only uses 6 types of sectoral credit facilities due to limited data in the SPI-OJK publication, while the dependent variable is played by GDP at constant prices representing economic growth obtained from BPS Indonesia. Table 1 describes the detail of the variables used in the study.

**Table 1. Database and Research Variables**

NO.	Variable	Definition and unit of variable value
1.	GDP is based on Constant Prices (GDP)	GDP is an indicator for determining economic conditions. The use of the current price aims to see the development of each year based on the previous year. (Unit in billions)
2.	Agricultural Sector Credit Facility	Credit is disbursed by commercial banks as financing for the

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	(AGR)	Agriculture, Hunting, and Forestry sectors. (Unit in billions)
3.	Processing Industry Sector Credit Facilities (INDS)	Loans are distributed by commercial banks as financing for the Manufacturing Industry sector. (Unit in billions)
4.	Construction Sector Credit Facility (KONS)	Loans are disbursed by commercial banks as financing for the construction sector. (Unit in billions)
5.	Credit Facility for Wholesale and Retail Sector (TRDE)	Loans are disbursed by commercial banks as financing for the Wholesale and Retail sectors. (Unit in billions)
6.	Credit Facility for Transportation, Warehousing, and Communications Sector (TPK)	Loans are disbursed by commercial banks as financing for the transportation, warehousing, and communication sectors. (Unit in billions)
7.	Financial Intermediary Sector Credit Facility (FINC)	Loans disbursed by commercial banks as financing for the Financial Intermediary sector. (Unit in Billion)

### B. Research Analysis Techniques

E-views 10 is used as an analytical tool in reviewing various analytical techniques such as:

#### 1) Estimation specifications

##### a) stationarity test data

The Stationarity test is important in research that uses *time series* to see the presence of the unit root. The detected data contains a unit root, it can be said that the data is not stationary, resulting in a mismatch of conclusions that will be generated.

##### b) Selection of the best lag and VAR stability test

The selection of the best lag can be known through the Ideal (optimum) lag test. The Ideal lag test will produce a suitable lag length for use in VAR/VECM estimation. Optimum lag selection is very useful in eliminating autocorrelation problems in VAR systems to determine VAR stability.

##### c) Johansen cointegration

Cointegration test is a guarantee whereby the review uses the assessed VAR test or the VECM test gauge. The co-integration test will show the possibility of a protracted (long-term) effect between the variables in this review.

#### 2) VECM Estimation and Model Examination

The existence of co-integration detained shows that between variables there is a detectable long-term effect so that the estimation proceeds to the VECM stage. The suitability of the VECM model can be checked through a white noise process, which means that the residuals must be independent and normally distributed. The model fit test can be seen from the serial correlation produced by the Portmanteau test statistic.

#### 3) Causality Analysis/Block Exogeneity Wald Test

A causal relationship can be known by analysis of the Granger causality test. If a short-term relationship is desired, then it is continued using the Granger Wald causality test on the VECM equation.

#### 4) Structural Analysis and Forecasting

Impulse Response Function (IRF) and Predicted Error Variance Decomposition (FEVD) were used in the structural analysis, both of which show long-term measurements of the shock side and the resulting contribution. The accuracy of the formulated model will provide data forecasting that is in line with the actual data. Forecasting can use the mean absolute percentage error (MAPE) indicator.

## III. RESULT AND DISCUSSIONS

### A. Empirical Results

#### 1) Estimation specifications

##### a) stationarity test of data

Using ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) statistics to test the stationary of the data. Table 2 shows the result of unit roots. It can be seen that all data contain unit roots at the level, so the test is carried out again on the first difference. As a result, the data is stationary at first different.

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**Table 2. Stationarity test results of data**

Variable	ADF Unit Root Test				PP Unit Root Test			
	Level		First Difference		Level		First Difference	
	T-stat.	Prob.	T-stat.	Prob.	T-stat.	Prob.	T-stat.	Prob.
GDP	-0.62	0.85	-9.34	0.00*	-4.38	0.00*	-6.34	0.00*
AGR	1.25	1.00	-5.20	0.00*	1.24	1.00	-5.12	0.00*
INDS	-0.73	0.83	-5.02	0.00*	-.69	0.84	-4.99	0.00*
CONS	2.63	1.00	-5.11	0.00*	7.10	1.00	-5.09	0.00*
TRDE	-0.40	0.90	-9.61	0.00*	-0.39	0.90	-11.05	0.00*
TPK	0.19	0.97	-4.36	0.00*	-0.03	0.95	-4.37	0.00*
FINC	-0.12	0.94	-7.33	0.00*	0.12	0.96	-7.39	0.00*

Note: by using a critical value of 5% in the (ADF & PP) unit root test, the Adj. t-Stat at the level and the first difference is 2.94. The sign (\*) in the table indicates a significant indication, meaning that the stationary conditions for the data are met, namely prob. < .05 and T-stat > 2.94.

Source: Estimation of E-views 10 (processed)

b) selection of the best lag and VAR stability test

Table 3 will explain the selection of the best lag based on five criteria, namely LR, FPE, AIC, SC, and HQ. The optimum lag determination will be determined based on the AIC (Akaike Information Criterion) criteria with the smallest value. So the research will be continued with testing using lag 2.

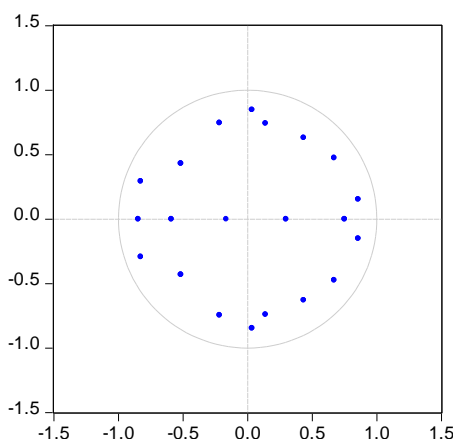
**Table 3. The results of determining the optimal lag**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3048.758	NA	5.34e+57	152.7879	153.0835*	152.8948*
1	-2998.422	80.53778*	5.19e+57*	152.7211	155.0855	153.5760
2	-2953.746	55.84499	8.12e+57	152.9373	157.3706	154.5402
3	-2889.275	58.02402	7.45e+57	152.1637*	158.6659	154.5147

Note: the sign (\*) is the ideal lag value because it is significant at the 5% level

Source: Estimation of E-views 10 (processed)

In ensuring the accuracy of IRF and FEVD forecasts, stability tests are used. In this study, using the roots of characteristic polynomials, the result is shown in figure 3. It can be seen that the estimated stability of the VAR reaches stability because the root point is inside the circle, meaning the modulus < 1, which is from 0.163582 to 0.876180.



**Fig. 3. Examination of VAR stability through the root distribution of characteristic polynomial**

The values on the vertical and horizontal lines define the value of the root

The value of the modulus spread over the circle means that the modulus < 1, VAR satisfies the stability condition

Source: Estimation of E-views 10 (processed)

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### c) Johansen cointegration test

To identify the existence of long-term effect in research, a cointegration test needs to be used. Table 4 shows the result of the test, which shows 2 cointegrations at a significant level of 5% meaning that there is 1 (number of cointegrations - 1) VECM equation that can be formed to identify movements in GDP, AGR, INDS, KONS, TPK, TRDE, and FINC in terms of stability/balance and long-term equality of movement.

**Table 4. Result of trace and maximum Eigen tests**

Hypothesis: $r$	Statistik Trace	Nilai Kritis $\alpha = 5\%$	P-value	Hypothesis: $r$	Statistik Max-Eigen	Nilai Kritis $\alpha = 5\%$	P-value
None *	199.4459	150.5585	0.0000	None *	78.68697	50.59985	0.0000
At Most 1 *	120.7590	117.7082	0.0316	At Most 1 *	48.82618	44.49720	0.0159
At Most 2	71.93277	88.80380	0.4327	At Most 2	29.26003	38.33101	0.3718
At Most 3	42.67274	63.87610	0.7497	At Most 3	21.40664	32.11832	0.5400

Note: the trace and maximum Eigen tests show 2 cointegration equations that can be formed at the .05 level which are marked with a sign (\*) in the table, meaning that there is a rejection of the hypothesis. Cointegration test is carried out using lag 2 (ideal lag - 1) with the deterministic trend assumption 4th criterion

Source: Estimation of E-views 10 (processed)

### 2) VECM Estimation and Model Examination

The next stage will examine the long-term effects of VECM estimation. The VECM estimation results are presented in (table 5), the long-term effect occurs on all independent variables (AGR, INDS, CONS, TRDE, TPK, and FINC) significantly on GDP. Variables AGR, TRDE, and TPK have a positive influence on GDP. This means that if GDP increases by 1 billion, each variable will increase by 3.59 billion, 0.58 billion, and 1.05 billion. Meanwhile, the INDS, CONS, and FINC variables have a negative relationship to GDP. This means that if there is an increase of 1 billion, there will be a decrease in the three variables, respectively 1.32 billion, 2.15 billion, and 2.15 billion.

The accuracy of the VECM estimation can be seen based on the R-square and Adj values. R-square. They are 98.40% and 97.40%, respectively.

**Table 5. Long-term parameter VECM estimation**

Cointegrating Eq:	Coefficient	t-Statistic
GDP(-1)	1.000000	
AGR(-1)	3.592100	[ 4.70503]*
INDS(-1)	-1.316866	[-5.85948]*
CONS(-1)	-2.152453	[-7.89498]*
TRDE(-1)	0.577882	[ 2.87524]*
TPK(-1)	1.047359	[ 2.18400]*
FINC(-1)	-2.151075	[-3.76311]*
C	-1422195.	
Nilai Koefisien Penyesuaian (ECT)		
D(GDP)	-0.897884	[-26.3789]

Note: with a total of 40 observations, a T-table value of 2.03 was found. The long-term effect is indicated by the criteria of T-statistics > T-table. The sign (\*) indicates the significance of the long-term effect on the variable.

Source: Estimation of E-views 10 (processed)

### VECM Model Feasibility Check Test

The VECM model formed can be said to be feasible if it meets the assumption of residual freedom. In this test, we will use the Portmanteau Autocorrelation test which can see the residual autocorrelation in the model. The results of the Portmanteau Autocorrelation test (Table 6) show the acceptance of H0 because the probability value generated is more than .05 from lag 3 to lag 12, meaning that there is no residual autocorrelation in the model used. So it can be said that the VECM model used in this study is feasible and can be continued to the forecasting stage.

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Table 6. Portmanteau Auto-correlation Test

Lag	Q-Stat	Prob.*
1	17.56631	---
2	44.47166	---
3	87.47657	0.6140
4	140.2760	0.5014
5	204.7594	0.2199
6	241.1499	0.4489
7	289.0311	0.4718
8	319.1348	0.7501
9	373.2953	0.6694
10	412.1250	0.7784

Note: testing using probability > significant .05% indicates that there is no residual autocorrelation in the VECM equation.

Source: Estimation of E-views 10 (processed)

### 3) Causality Analysis/Block Exogeneity Wald Test

In identifying the short-term causality between variables, the Granger causality test can be done using Wald statistics. The focus of the Granger test will follow the distribution of chi-square with the following criteria:

Null H0: There is no causality in the short term

Alt H1: there is short-term causality

Acceptance H0 if the probability value is > 0.05, and if the probability value is < 0.05, then H0 is reject. Table 7 shows the result of the Granger causality test with the Wald statistic.

3 short-term causalities move from exogenous variables to endogenous variables, see table 7. The INDS, CONS, and TPK variables have a short-term causality to the GDP variable. This means that there is a causal relationship that exists where INDS, CONS, and TPK affect the level of GDP in the short term, although there is no opposite direction. In addition, causality was found between independent variables in the short-term, namely from INDS to CONS and FINC, from TRDE to FINC, and from TPK TO INDS., meaning that a causal relationship exists for these variables.



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Table 7. Wald test results / short-term causality

Independen Variabel	Dependen Variabel						
	D(GDP)	D(AGR)	D(INDS)	D(CONS)	D(TRDE)	D(TPK)	D(FINC)
D(GDP)		Chi-sq = 2.017 Prob. = 0.36 No short term causality	Chi-sq = 3.83 Prob. = 0.15 No short term causality	Chi-sq = 2.78 Prob. = 0.25 No short term causality	Chi-sq = 1.43 Prob. = 0.49 No short term causality	Chi-sq = 5.27 Prob. = 0.07 No short term causality	Chi-sq = 1.86 Prob. = 0.39 No short term causality
D(AGR)	Chi-sq = 1.80 Prob. = 0.41 No short term causality		Chi-sq = 2.87 Prob. = 0.24 No short term causality	Chi-sq = 0.34 Prob. = 0.84 No short term causality	Chi-sq = 1.11 Prob. = 0.57 No short term causality	Chi-sq = 0.37 Prob. = 0.83 No short term causality	Chi-sq = 3.47 Prob. = 0.18 No short term causality
D(INDS)	Chi-sq = 33.64 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 2.89 Prob. = 0.24 No short term causality		Chi-sq = 14.16 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 2.15 Prob. = 0.34 No short term causality	Chi-sq = 1.92 Prob. = 0.38 No short term causality	Chi-sq = 9.69 Prob. = 0.01 <b>Short term causality</b>
D(CONS)	Chi-sq = 25.59 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 0.085 Prob. = 0.96 No short term causality	Chi-sq = 0.18 Prob. = 0.92 No short term causality		Chi-sq = 5.54 Prob. = 0.06 No short term causality	Chi-sq = 1.55 Prob. = 0.46 No short term causality	Chi-sq = 1.02 Prob. = 0.60 No short term causality
D(TRDE)	Chi-sq = 2.00 Prob. = 0.37 No short term causality	Chi-sq = 2.31 Prob. = 0.31 No short term causality	Chi-sq = 3.34 Prob. = 0.19 No short term causality	Chi-sq = 0.78 Prob. = 0.68 No short term causality		Chi-sq = 5.51 Prob. = 0.06 No short term causality	Chi-sq = 6.33 Prob. = 0.04 <b>Short term causality</b>
D(TPK)	Chi-sq = 10.74 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 1.93 Prob. = 0.38 No short term causality	Chi-sq = 9.26 Prob. = 0.01 <b>Short term causality</b>	Chi-sq = 3.17 Prob. = 0.21 No short term causality	Chi-sq = 5.08 Prob. = 0.08 No short term causality		Chi-sq = 2.74 Prob. = 0.25 No short term causality
D(FINC)	Chi-sq = 0.88 Prob. = 0.65 No short term causality	Chi-sq = 1.44 Prob. = 0.49 No short term causality	Chi-sq = 5.10 Prob. = 0.09 No short term causality	Chi-sq = 2.92 Prob. = 0.23 No short term causality	Chi-sq = 0.65 Prob. = 0.72 No short term causality	Chi-sq = 2.10 Prob. = 0.35 No short term causality	
<b>ALL</b>	Chi-sq = 86.64 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 14.84 Prob. = 0.25 No short term causality	Chi-sq = 22.78 Prob. = 0.03 <b>Short term causality</b>	Chi-sq = 30.03 Prob. = 0.00 <b>Short term causality</b>	Chi-sq = 19.53 Prob. = 0.08 No short term causality	Chi-sq = 23.06 Prob. = 0.03 <b>Short term causality</b>	Chi-sq = 24.28 Prob. = 0.02 <b>Short term causality</b>

Note: conditions for causality are indicated by p-value < .05 significance. The sign (\*) in the table indicates the existence of short-term causality.

Source: Estimation of E-views 10 (processed)



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## 4) Structural Analysis

### a) Impulse Response Function

The results of the IRF display a tabulated and visual description of the GDP response that arises due to the shock generated by itself or independent variables in the short, medium, and long term. By using an analysis period of 40 quarters, table 8 shows the results of the analysis obtained.

In the short term, GDP responds positively to the shocks presented by itself, CONS, and FINC. Meanwhile, AGR, INDS, TRDE, and TPK receive a negative response from GDP if they experience a shock. In the medium term INDS, AGR, TRDE, and TPK tend to get a negative response from GDP even in the long term. Meanwhile, GDP continues to provide a positive response in the long term for itself, CONS, and FINC. A positive response indicates that if the independent variable experiences a shock of 1 standard deviation, it tends to increase GDP, while a negative response will tend to decrease GDP.

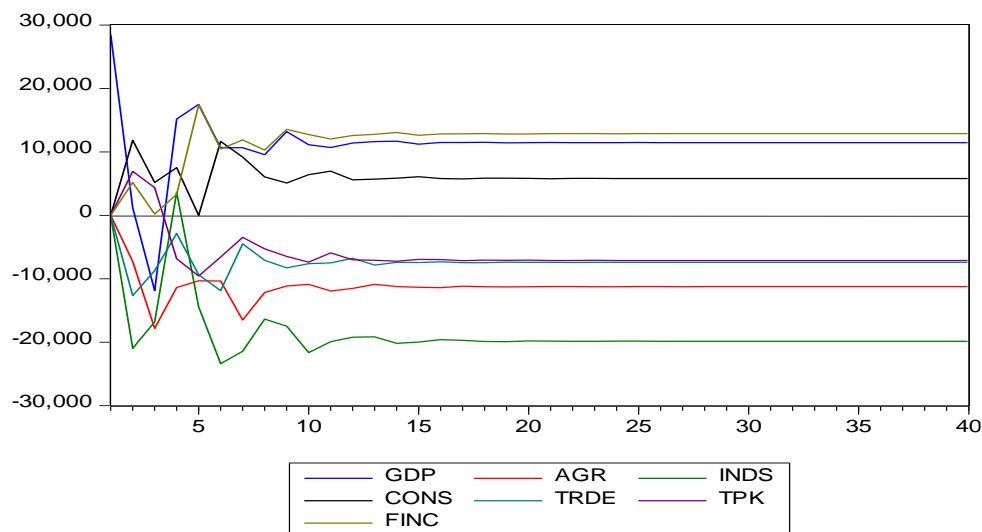
**Table 8. IRF Test Results**

Period	GDP	AGR	INDS	CONS	TRDE	TPK	FINC
Term Short	9534.923	-12163.03	-16379.38	6057.502	-7092.089	-5294.762	10279.39
Term Medium	11429.75	-11279.56	-19796.82	5807.715	-7426.265	-7068.398	12827.68
Term Long	11453.54	-11251.52	-19862.33	5790.595	-7425.770	-7119.967	12866.02

Note: based on the parameters of the 8th quarter, the medium-term parameters of the 20th quarter, and the long-term parameters of the 40th quarter.

Source: Estimation of E-views 10 (processed)

As Seen in (Fig. 4), GDP response to all independent variables tends to fluctuate from the second to the tenth quarter and shows that it tends to be stable as it enters the 15th quarter. On the average of all shocks generated by the independent variables when entering the 20th quarter, the GDP response moved to a point of balance, except for AGR, which remained relatively small shocks until the 28th quarter.



**Fig. 4. IRF Graph: Responses of GDP to GDP, AGR, INDS, CONS, TRDE, TPK, and FINC together**

The value on the vertical line is the period and the horizontal defines the magnitude of the response

Source: Estimation of E-views 10 (processed)

### b) Variance Decomposition Test

FEVD test predicts the magnitude of the contribution or composition of the influence of each variable on the dependent variable. The FEVD test was conducted 40 quarters. In the test results presented in table 9, in the long run, the shocks generated against themselves lead to weaker fluctuations in the level of GDP, just as the shocks generated by AGR, CONS, and TRDE make

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the GDP level decrease. Meanwhile, the shocks generated by INDS, TPK, and FINC resulted in strengthening fluctuations in the GDP level in the long term.

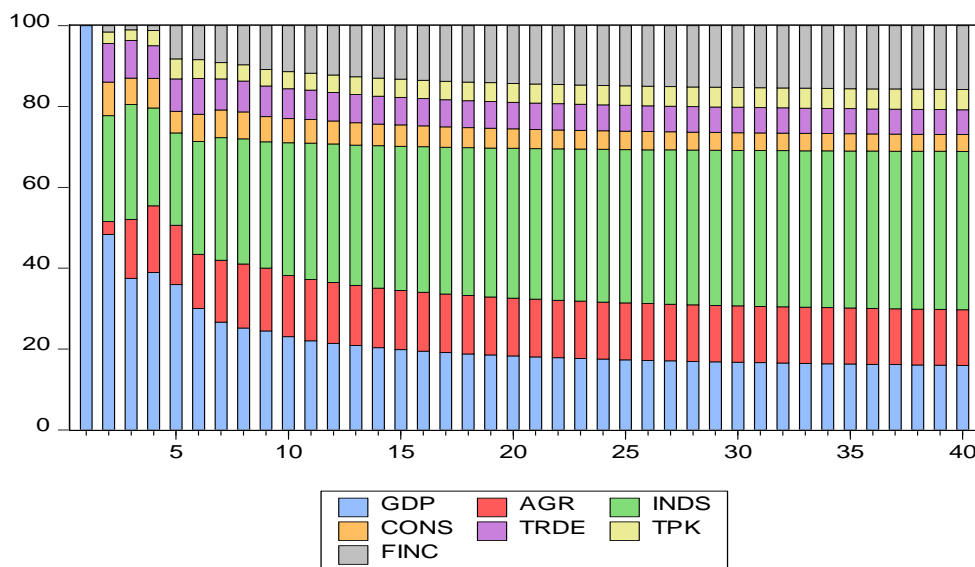
**Table 9. FEVD Test Results**

Period	S.E	GDP	AGR	INDS	CONS	TRDE	TPK	FINC
Term Short	84688.03	25.19807	15.83752	30.96153	6.671219	7.592340	4.033970	9.705352
Term Medium	136422.0	18.27302	14.31993	37.05066	4.818945	6.560761	4.684428	14.29226
Term Long	194303.0	15.95805	13.76538	39.16085	4.152046	6.155525	4.994351	15.81379

Note: medium-term parameters of the 20th quarter, and long-term parameters of the 40th quarter.

Source: Estimation of E-views 10 (processed)

To find out the trend of the development of the contribution of the independent variable to the dependent variable can be seen in fig. 5. The biggest contribution is given by the INDS, FINC, and itself variables to increase GDP in the long run.



**Fig. 5. Graph of FEVD: Contribution of GDP, AGR, INDS, CONS, TRDE, TPK, and FINC to GDP**

### B. Discussion of Findings

From the various estimates that have been made, it is known that in Indonesia, economic growth is influenced by all sectoral credit facilities in the long term. There are 3 sectoral credits each with a different effect. Agricultural sector loans, wholesale and retail trade sector loans, and transportation, warehousing and communication sector loans have a significant positive effect. Meanwhile, credit in the manufacturing sector, construction sector, and the financial intermediary sector have a significant negative character in the long term on economic growth.

If associated with fig. 1 and fig. 2, the results obtained show alignment. The existence of a positive relationship between agricultural sector credit, wholesale and retail trade sector credit, and transportation, warehousing and communication sector credit, is also supported by several researchers in various countries. Something was found in a study in Nigeria by (Ayeomoni & Aladejana, 2016; Paul, 2018) finding a significant positive relationship in the long term from agricultural sector credit to economic growth. The Nigerian economy regards the agricultural sector as the main driver of growth as it is the supplier engine for the economic sector. Like Indonesia, Nigeria also has a very large agricultural land, so the contribution of economic growth also lies in the added value of the agricultural sector. Human labor dominates the production system of the agricultural sector so that if there is an increase in demand for production value, it creates more jobs. However, conditions in countries that have desert land tend to have a negative value in the long run due to the absence of adequate infrastructure in the agricultural sector. The findings (Alzyadat, 2021; Ananzeh, 2016) in Saudi Arabia and Jordan in the long term, credit to the agricultural sector hurts economic growth.

Loans for wholesale and retail sectors as well as loans for the transportation, warehousing and communication sectors have a significant positive effect in the long term on Indonesia's economic growth. These results were in Saudi Arabia based on research (Alzyadat, 2021). Saudi Arabia depends on the country's economy on the trade or trade system so that it is closely related to the transportation, warehousing and communication sectors. If there is an increase in the amount of financing in

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these two sectors, it will provide more job opportunities for the community. People will start to become resellers and even open their shops. This positive effect is the result of sector adjustments in investing credit funds to provide maximum added value/aggregate output.

Loans extended to the manufacturing sector have a significant negative impact on Indonesia's economic growth in the long term. However, in Sri Lanka (Muthusamy et al., 2018), Saudi Arabia (Alzyadat, 2021), and Nigeria (Paul, 2018) credit in the manufacturing sector tends to increase growth in these three countries. The manufacturing sector is considered to play an important role in terms of the level of aggregate output because it does not have a productivity, so it is not surprising that the coefficient of influence is positive. The provision of credit can have a significant positive effect on increasing the output of the manufacturing industry in the long term (Ume et al., 2017). However, under the conditions of Indonesia, the flexibility of employment in the industrial sector is not as high as in other sectors, due to a large number of outsourcing activities. In addition, the level of production is also influenced by market demand so that there will be no additional output which results in the absorption of labor in the manufacturing sector which is seen as unresponsive to the growth in production value.

This condition is in line with lending to the financial intermediary sector. If there is no control over the level of allocation of credit funds that can be channeled by financial intermediary institutions to the public, will cause inflation because the money supply continues to increase in society. Unlike the case with credit to the construction sector. The reason for the negative effect is that the rate of return is relatively long and at the same time prone to credit congestion (high NPL).

From the Granger causality analysis, in the short term, credit for the manufacturing sector, credit for the construction sector, and credit for the transportation and communications sector can influence Indonesia's economic growth. In addition, causality was also found between independent variables, which showed that credit in the financial intermediary sector was influenced by the level of lending to the wholesale and retail sector as well as credit to the manufacturing sector. This means that indirectly the real sector which includes wholesale and retail trade as well as the manufacturing industry has a financing dependence on the existence of the financial intermediary sector. This is also created from credit in the manufacturing sector, which is influenced by the existence of credit in the transportation and communication sector. It can be seen that, in the real sector for the manufacturing sector, its operational activities, especially distribution, will be greatly influenced by the transportation and communication sector within it. Therefore, there needs to be an alignment where, if one is improved, the others will follow in the short term as well.

Meanwhile, judging from the level of economic growth response to shocks generated by the independent variables described in table 8, it shows that in the short term economic growth responds positively to shocks given by itself, construction sector credit, and financial intermediary sector credit, each of which - amounted to 9534,923 billion, 6057,502 billion, and 10279.39 billion, respectively. Meanwhile, bank loans disbursed to the agricultural sector, manufacturing industry sector, wholesale and retail trade sector as well as the transportation and communication sector gave a negative change in the event of a shock of one standard deviation for GDP of 12163.03 billion, 16379.38 billion, 7092,089 billion, and 5294,762 billion.

The changes resulting from the shocks provided by economic growth and credit of the financial intermediary sector have increased in the long term, which is equivalent to the next 10 years for Indonesia's GDP, while construction has decreased in value in the long term to reach 5790,595 billion. Likewise, credit extended to the agricultural sector in the long term has decreased in value, although it remains in a negative response. Meanwhile, credit for the manufacturing industry sector, wholesale and retail trade sector as well as the transportation and communication sector, creates negative changes and increases in value for Indonesia's economic growth in the long term. These findings show that the financial intermediary sector credit and construction sector credit can increase economic growth in the short to long term. On the other hand, credit for the manufacturing sector and credit for the transportation and communication sector, in the event of a shock in the long to short term, will have the effect of reducing the value of economic growth for Indonesia.

From the results of monitoring the FEVD estimation in table 9 and figure 3, the most significant contribution to Indonesia's economic growth in the short to long term is generated by the manufacturing industry sector by 39.16%, credit to the financial intermediary sector by 15.81% and transportation and communication credit by 4.20%. Loans disbursed to the agriculture sector, construction sector, and wholesale and retail trade sectors have a steadily decreasing contribution to the long-term at 13.77%, 4.15%, and 6.16%, respectively.

## IV. CONCLUSION

The conclusion that can be drawn from this research is that economic growth is significantly influenced by long-term sectoral credit facilities. Agricultural sector loans, wholesale and retail trade sector loans, and transportation, warehousing and communication sector loans have a significant positive effect, while credit for the manufacturing sector, construction sector, and

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the financial intermediary sector has a significant negative effect on economic growth in the long term. Meanwhile, in the short term, there is causality between credit for the manufacturing sector, credit for the construction sector, and credit for the transportation and communications sector, which can affect economic growth.

Construction sector loans and financial intermediary sector loans provide shocks with a positive response in the long and short term. Meanwhile, credit for the manufacturing sector will provide the greatest response but will be negative for economic growth in the event of a credit shock in the sector. In terms of contribution, the manufacturing sector plays the highest role, followed by credit for the financial intermediary sector, then credit for the agricultural sector, credit for the wholesale and retail sector, credit for the transportation and communications sector, and last for credit for the construction sector.

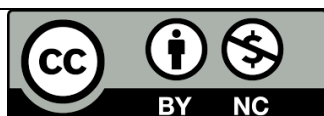
From these conclusions, this study will suggest several parties, namely bankers, policymakers, monetary authorities, as well as future researchers. For bankers, it is possible to develop lending policies following the contribution to the results of lending in each sector. Policymakers and governments can formulate policies and strategies according to these findings. For example, if economic growth targets are expected to increase in the long term, then they should focus on increasing the allocation of credit funds to be channeled to the agricultural sector, wholesale and retail trade and transportation and communication sectors, whereas if the focus is on the short term, they must maximize allocations. credit for the manufacturing sector, the financial intermediary sector, and the transportation and communications sector. Because basically, credit for the manufacturing sector can maximize its contribution if it is accompanied by an increase in credit for transportation and communication.

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