

Analysis Of the Relationship of E-Commerce Transactions, Internet Users, Foreign Capital, and Labor to Indonesian Economic Growth

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ABSTRACT

Economic growth is influenced by e-commerce and several variables, the other variables are labor, internet users and foreign investment. The variables used in this study are more than one variable, so the analysis method used is Vector Autoregressive (VAR). This method is used in order to see the relationship between variables which is one of the multivariate analyzes for time series data. This research uses data on e-commerce transactions, labor, GDP, internet users and foreign investment for the period January 2019-December 2022. The results of the forecast in this study using the VAR method can be seen that the variables with the first largest contribution to GDP is GDP itself and the labor. As for the first largest contribution to e-commerce transactions are the variables themselves, economic growth, and foreign Investment.

Keywords: E-commerce transactions, economic growth, labor, internet users, foreign investment

1. Introduction

The need for technology is very necessary and everyone certainly uses information, and to date most people prefer technology to make it easier to search, create and store information very easily in today's social life. The development of communication and information technology can no longer be avoided, because people's lives are increasingly changing along with the development of information and communication technology which seems easier (Rahman, 2016). Starting from the industrial revolution 1.0 to the digitalization era 4.0, technological developments have evolved rapidly and have had a big impact on people's lives in several fields, one of which is economics and business. During the pandemic, online shopping activities have become a habit that people choose to stay at home in accordance with government directions and policies. Likewise, changes in people's habits and lifestyles are increasingly moving towards digital after Covid-19 spread in Indonesia. So the contribution of e-commerce to economic value is increasing every year. Number of e-commerce transactions almost doubled as a result of the impact COVID-19, with transaction value

increasing from 80 million in 2019 to 140 million transactions on August 2020, (Orinaldi, 2020).

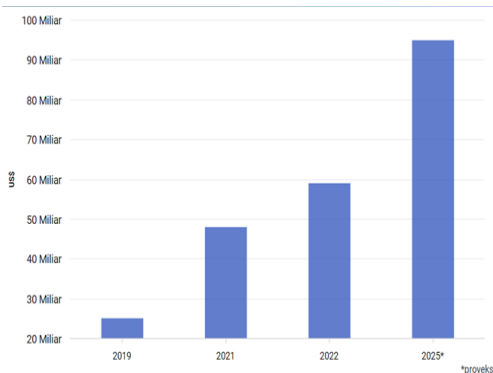


Figure 1.1 Economic Value of the Indonesian E-commerce Sector 2019-2025
(Source: databoks.katadata.co.id)

Based on the picture above we can conclude that industry e-commerce in Indonesia has experience growth in a number of year final, so that mark its economy exceed mark before pandemic. Mark economy sector e-commerce on

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year 2022 increase 22% year-on-year (YoY/YoY), remaining \$48 billion. Compared to before pandemic, mark economy e-commerce Indonesia even increase as big as 136% on year This compared to only 25 billion USD on year 2019. E-commerce is projected to have an increasing value, reaching US\$95 billion in 2025. Google Temasek, and Bain & Company stated that the digital economy in Indonesia will be the largest in Southeast Asia by 2030. Director of the Digital Economy Center of Economic and Law Studies (Celios) Nailul Huda said that currently the value of Indonesia's digital economy is very large, around 77 billion USD in 2022 and is estimated to reach 220 up to 360 USD billion in in 2030.

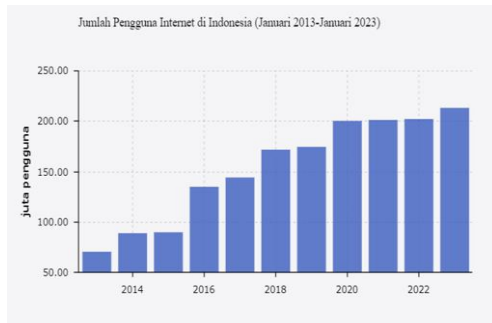


Figure 1.2 Number of Internet Users in Indonesia in 2013-2023 (Source: databoks.katadata.co.id)

It can be seen from the picture above that the rate of development of internet users is increasing every year. In 2013 there were only 50 million internet users, but in 2016-2023 this number increased many times to 100 people and 200 million people in 2022. According to the Survey of the Indonesian Internet Service Providers Association (APJII) on its official website, it recorded developments. internet in Indonesia has reached 78.19% or as many as 215,616,156 people out of a total population of 278 million people in 2023. The rise of internet use in Indonesia is in line with the development of online business or what is usually called e-commerce. The e-commerce journey began in Indonesia in 1999, where that year was the birth of e-commerce in Indonesia. It started when Andrew Darwis founded a forum called KASKUS which became a buying and selling forum in 1999. Furthermore, in the same year a site called Bhineka.com which also is place sell buy on line in Indonesia, rapidly development e-commerce Because public start the more aware will Internet. "Marketplace is an intermediary between sellers and buyers in online media", Firmansyah (2020). With exists e-commerce really helps consumers get goods/services they need quickly, easily, cheap and can minimize the risk of contracting the Covid 19 virus at that time. E-commerce is a means or tool used in sales system electronic transaction process. E-commerce is also a new system in the business world Which has moving from the traditional era to online trading. And when currently, almost all people use technology to carry out buying and selling systems via the Internet to interact with each other without restrictions or without the need to meet the seller

directly. With just a smartphone, all business people can have more freedom. Whenever and wherever, everything can be done in real time (Yulianto, et al. 2023). It's fast the growth of e-commerce in Indonesia has give rise to a number problems, especially for departments stores or retailers that still sell goods or products directly in stores, this change in public interest has had an impact on several center shopping in Indonesia is increasingly quiet, this happens because people's interests change because e-commerce offers features that make it easier for them to carry out sales transactions. The behavior of a person or group, especially people, in shopping, they choose from several available options, buy according to their needs and intended use. goods/services (Machfoedz (2013). For some who have not adapted to these conditions, the sales experience decline because of the interest of buyers who prefer to shop in stores on line. This situation requires sellers of goods and products For quick promote the product through e-commerce. Impact of users The internet is increasingly expanding along with it with the more breadth range service Internet And service connection Internet Which more fast in in country, so e-commerce This will influence And increase mark plus for regional economy through gross domestic product (GDP), (Galindo, 2009). The rapid use of the internet has significantly influenced economic growth. The biggest contributor to Indonesia's digital economy is e-commerce transactions, which are worth \$53 billion in 2021. "In 2025, this amount is expected to increase by 18% to \$104 billion," explained Coordinating Minister Airlangga. According to the Head of the Payment System Policy Department of Bank Indonesia (BI), e-commerce sales increased by 26% with new consumers amounting to 51% during the Covid-19 pandemic. In addition, economic activity in e-commerce is increasing up to 40.6 %. Based on the Big Data report, overview of the impact of Covid-19 in 2020, compiled by the Central Statistics Agency (BPS), online sales also increased sharply during the pandemic. The impact of e-commerce in various countries has a positive influence. Liu (2013) together with Qu and Chen (2014) have proven that economic development is growing very quickly with the existence of an e-commerce system in China, which can accept new transaction systems through infrastructure and other policies.

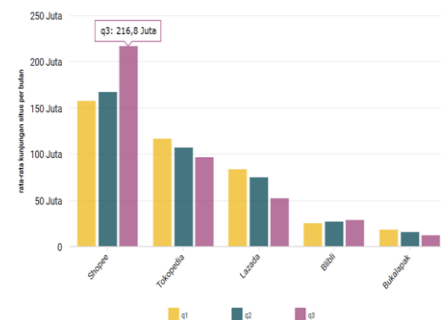


Figure 1.3 E-commerce Visitors Q1-Q4 2023 (Source: databoks.katadata.co.id)

Based on the e-commerce visitor data above, there are 5 e-commerce websites in the Marketplace category in Indonesia most visited in the third quarter of 2023, Shopee will be in first place, then Tokopedia, Lazada, Blibli and Bukalapak. The results of a survey of 30 respondents showed that as many as 63.3% of people decided to buy products online at online stores and the one most widely used was Shopee, (Fanira K and Nuslih J, 2021). From For these five sites, graphic growth only occurred on Shopee and Blibli, while competitors tended to stagnate. The Shopee site recorded an average of 216 million visits per month in the third quarter of 2023. Number the an increase of around 30% compared to the average number of visits in the second quarter of 2023 (qoq/qoq). In the same period , the average number of visits to the Blibli site increase by 5% (qoq), Tokopedia decreased by 9% (qoq), Lazada declined by 30% (qoq) and Bukalapak decreased by 21% (qoq). The majority of consumers or respondents always look for information first regarding their needs for beauty products before making purchases online via e-commerce Shopee, (Fanira K and Nuslih J, 2021). In era Internet, activity business is dominated by resident productive age and will be a momentum for the development of e-commerce in Indonesia, especially because Indonesia is a developing country with a bonus The demographic is characterized by an increasingly consumerist society, no longer based on needs but driven by lust and desire. The workforce available for use for Indonesia's development is the population of productive age . Where the number of workers can increase and be utilized if they are educated, healthy, skilled, and there are job opportunities available (Sita Dewi et al, 2018:20). If the government can manage the demographic dividend currently occurring in Indonesia, national economic growth of 15% can be achieved.

As much as 30% of economic growth comes from the demographic bonus experienced by ASEAN (Sri Murtiningsih Setyo Adioetomo, 2014). This consumption behavior means that people will increase their purchasing power, especially with it utilities that make shopping easy and seamless. With the advent of e-commerce, slow Gradually society began to change its economic behavior to direction of online shopping, starting from buying clothes, buying food, until buy household products that are widely sold on e-commerce. Online shopping gives consumers more choices, savings time, and competitive prices , as well as offer frequent promotions _ done. With just one click, consumers get obtain and find the items they want and can easily transact with anyone without being limited by limited space and face-to-face interaction face, especially with The development of smartphone technology is one of the supports market. World Online trading is also growing in popularity.

2. Literature Review

2.1 E-Commerce

According to Turban (2015) e-commerce is the use of the Internet to buy, sell, transport or exchange data, goods or services. Meanwhile, according to Laudon (2014) e-commerce refers on Internet use, web, and applications for digital business transactions between businesses and individuals. Later in the article by Savrul et al. (2011) and (OECD) 2001, defines e-commerce in two areas, a broad definition and a narrow definition. Defined broadly, e-commerce refers on the purchase or sale of goods between businesses, households, individuals, governments, and other public and private organizations over computer networks. On the contrary, the narrow definition is almost the same as the broad definition, only just tool trading is limited to Internet.

Laudon et al. (2014) states that in e-commerce technology , There are eight unique aspects or characteristics that need to be considered, namely: ubiquity, which can understood in where even, means Internet/Web technology is available anytime, anywhere, like as: at work, home and elsewhere via mobile devices. Depends on room market, its reach goes beyond the boundaries of traditional markets and is possible different in a way geographically from one location to another. Transaction sale Then can done anywhere for increasing customer convenience and reducing transaction costs. Reach global This means that this technology goes beyond national borders on earth. By Because that's, trading of sorts that can happen cross cultural and national boundaries. In matter room market, product it has the potential to reach billions of consumers and millions of businesses worldwide. There are three components or three main factors that influence a country's economic growth, namely capital accumulation, population growth, and finally technological progress (Todaro and Smith, 2004).

According to Turban et al. (2015) that there are main types of e-commerce transactions consisting of business-to-business (B2B), business-to-consumer (B2C), business-to-business-to-consumer (B2B2C), consumer -to-business (C2B), intrabusiness ec, business-to-employees (B2E), consumer-to-consumer (C2C), collaborative commerce and e-government. While Laudon et al. (2014) added three main types of e-commerce, namely Social e-commerce, Mobile e-commerce and Local e-commerce. However, deep system e-commerce at least There is 4 model business e-commerce Which most popular: B2B (business to business), B2C (business to Consumers), C2C (consumer to consumers), C2B (consumer to consumers).

2.2 Economic Growth

Economic growth is a measure of the success of an economy's development. The prosperity and progress of an economy is determined by the level of growth indicated by changes in national production. The existence of changes in

economic production is a short-term economic analysis. Economic growth refers in efforts to increase production capacity to achieve additional output, which can be measured by GDP or regional GDP in a region (Rahardjo, 2013). According to Sjafrizal (2008), following Keynesian logic, a simple economic growth model can be measured by the sum equation of consumption, investment and government spending plus exports minus imports. Todaro (2003) highlighting that a country's economic growth can be influenced by various factors factor, between other:

a. Population Growth and Labor Force Participation

Population growth is related to the number of active residents . Growth population is influenced by the ability of an economy to absorb labor .

b. Capital accumulation

Capital accumulation is new investment combinations incl land, financial equipment and human resources combined with current income This which is used for increase output in the future.

c. Technology advances

According to para economist, Technological progress is an important factor in economic growth. Technological advances have a big impact because they can provide new methods and improve ways of working long .A country can be said to be experiencing economic progress if its annual per capita income increases compared to the previous year. GDP statistics are usually used to measure a country's economic growth . There are several approaches to calculating GDP, including other:

1) Production approach

Method only calculates the added value (added value) created during the production process for avoid double counting. Using this method , the resulting number is the GDP.

2) Revenue approach

Calculation This method is to add up all income, whether employee income, entrepreneur income, investor income or capital owner income. By using the method This numbers will be obtained as Income National (NI).

3) Spend approach

Consumer household expenditures And producer amount from various purchasing activities on public . With this approach, then product numbers are obtained national gross (GNP).

3. Research Methodology

3.1 Research Metodology

a. Vector Autoregressive (VAR) Method

The VAR method was first discovered by Sims in 1980, where this method was created

as a solution where the relationship between economic variables can still be estimated without needing to focus on exogeneity problems. The approach to this method is that all variables are considered endogenous variables and estimation can be done simultaneously or sequentially. The following is the conceptual framework for VAR in this research:

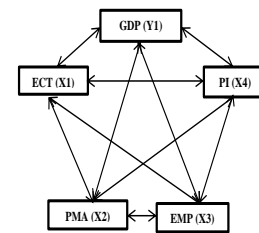


Figure 3.1 Conceptual Framework of VAR 1980 (Source: Sims)

Based on the conceptual VAR that is built, the model equation that can be formed is as follows:

$$GDP_t = \beta_{10} ECT_{tp} + \beta_{11} PMA_{tp} + \beta_{12} EMP_{tp} + \beta_{13} PI_{tp} + \epsilon_{t1}$$

$$ECT_t = \beta_{20} GDP_{tp} + \beta_{21} FDI_{tp} + \beta_{22} EMP_{tp} + \beta_{23} PI_{tp} + \epsilon_{t2}$$

$$FDI_t = \beta_{30} GDP_{tp} + \beta_{31} ECT_{tp} + \beta_{32} EMP_{tp} + \beta_{33} PI_{tp} + \epsilon_{t3}$$

$$EMP_t = \beta_{40} GDP_{tp} + \beta_{41} ECT_{tp} + \beta_{42} FDI_{tp} + \beta_{43} PI_{tp} + \epsilon_{t4}$$

$$PI_t = \beta_{50} GDP_{tp} + \beta_{51} ECT_{tp} + \beta_{52} FDI_{tp} + \beta_{53} EMP_{tp} + \epsilon_{t4} \quad (1)$$

Where:

GDP = Gross Domestic Product

ECT = E-commerce Transaction/E-commerce Transaction

PMA = Foreign Direct Investment

EMP = Employment/ Labor

PI = Internet User

B = n*n matrix containing structural parameters of endogenous variables.

Vector of endogenous variables GDP, ECT, PMA, EMP intercept matrix or finite order matrix with lag operator 1

y t-1 = autoregressive vector with operator lag¹

ε t = white-noise vector

The data analysis model used is VAR, which is supported by Impulse Response Function (IRF) and Forecast Error Variance Desomposition (FEVD) Meanwhile, the assumption tests used are the Stationarity Test, Granger causality test, Johansen Cointegration Test, Structural Lag Stability Test, Lag Length Test and VAR Test.

4. Result

4.1 Data Stationarity Test Stage

The first classic assumption test carried out in VAR mode I analysis is the stationarity test. A dataset is said to be stationary if the mean and variance of the time series data do not change systematically over time, or if the variance is constant (Nachrowi, Nachrowi J, and Usman Hardius, 2006).

Table 4.1 Stationary Test Results

Variable	Prob. ADF Test Stat			Conclusion
	Levels	1st Difference	2nd Difference	
ECT	0.9881	0.0463		Stationary (at 5% level)
EMP	0.2503	0.2382	0.0000	Stationary (at 5% level)
GDP	0.1292	0.442	0.0001	Stationary (at 5% level)
PI	0.0000			Stationary (at 5% level)
PMA	0.0397			Stationary (at 5% level)

Source: Data Processed 2024

The results of the stationarity test at level showed that some data were not stationary at level, so we continued by carrying out the stationarity test at 1st difference. The unit root test results show that all variables are significant with a significance level of 5%.

4.2 Optimal Lag Testing Stage

The delay length test is used to find out and determine the optimal delay. This test is carried out by comparing the AIC value (also called the information criterion) of VAR analysis at lag 1, 2, and lag 3. A lower AIC value indicates that the delay is optimal for use in VAR analysis.

Table 4.2 Akaike Information Criterion Values

Lag	AIC	S.C
1	33.93770	35.11865
2	32.46695	34.65337
3	32.9957	36.20754

Source: Data Processed 2024

The lag test results above show that the AIC value at lag 2 is smaller than the AIC value at lag 1 and lag 3. Thus, it can be concluded that the use of VAR is more optimal if using lag 2 compared to VAR at lag 1 and lag 3. So, this research was continued using lag 2.

4.3 Johansen Cointegration Test

With use equality cointegration, test cointegration Johansen done to find out whether there is a long-term relationship between the variables studied. Results of the Johansen cointegration test carried out using the eviews 10 program is:

Table 4.3 Johansen Cointegration Test Result

Hypothesized No. of CE(s)	Eigenvalues	Trace Statistics	0.05 Critical Value	Prob.**
None *	0.670364	120.1566	69.81889	0.0000
At most 1*	0.457824	70.21711	47.85613	0.0001
At most 2*	0.377388	42.66967	29.79707	0.0010
At most 3*	0.266925	21.34727	15.49471	0.0058
At most 4*	0.151154	7.374462	3.841466	0.0066

Source: Data Processed 2024

It can be seen from the cointegration test above that all equations are cointegrated (as stated at the bottom of the table) at the 5% level, which means that the assumption of a long-term relationship between variables is proven.

4.4 VAR Estimation Result

Once all classic acceptance tests are performed and all test requirements are met, the VAR test is performed. This test was carried out to see how the simultaneous relationship between the variables studied as exogenous variables and endogenous variables, including elements of lag and time, are interconnected and influence each other. Through this VAR analysis we can see which variables have the largest 1st and 2nd contributions for each variable studied.

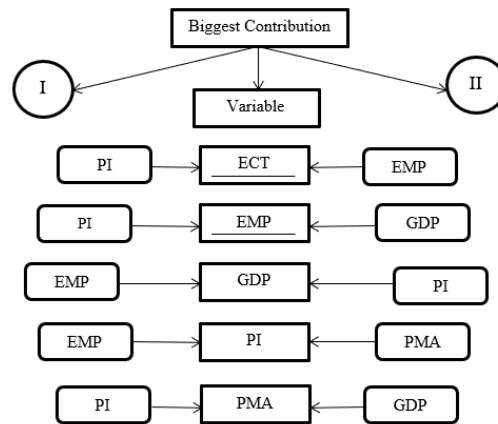


Figure 4.1 Summary of VAR Estimation Results (Source: Data Processed)

The VAR estimation results above explain the contribution of each variable to other variables. Based on the framework image above, the first largest contribution to ECT is PI, while the second largest contribution is EMP. For the ECT variable, the variable with the first largest contribution is PI and the second largest contribution is GDP. Meanwhile, the first largest contribution to GDP is EMP and the second largest contribution is PI. The positive impact of workforce growth on economic growth is supported by research such as that conducted by Soebagiyo (2007). For the PI variable, the first largest contribution is EMP while the second largest contribution is PMA. Finally, for the PMA variable, the variable with the first largest contribution is PI, and the second largest contribution is GDP.

4.5 Impulse Response Forecast

By using the IRF, it is possible to measure how a variable reacts to changes in other variables in the short, medium or long term. The following is a summary of the IRF results:

Table 4.4 Summary of IRF Results

Variable	Period	ECT	EMP	GDP	PI	PMA
	Short	(+)				
ECT	Medium	(+)	(-)	(+)	(-)	(+)
	Long	(-)	(+)	(+)	(+)	(-)
	Short	(+)	(+)			
EMP	Medium	(-)	(-)	(+)	(+)	(-)
	Long	(+)	(+)	(-)	(+)	(-)
	Short	(-)	(+)	(+)		
GDP	Medium	(+)	(+)	(+)	(-)	(+)
	Long	(+)	(+)	(+)	(-)	(+)
	Short	(-)	(-)	(+)	(+)	
PI	Medium	(-)	(+)	(-)	(+)	(-)
	Long	(-)	(+)	(-)	(+)	(-)
	Short	(-)	(+)	(-)	(-)	(+)
PMA	Medium	(+)	(+)	(+)	(-)	(+)
	Long	(+)	(+)	(+)	(-)	(+)

Source: Data Processed 2024

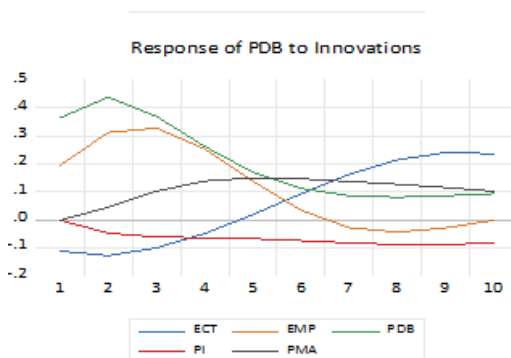


Figure 4.2 IRF GDP Combined Graphs 2024 (Source: Data Processed)

Based on the results of the response of one standard deviation from the variables ECT, EMP, GDP, PI, PMA, it can be concluded that there is a change in the influence of each standard deviation of each variable which was originally positive to negative and vice versa, the negative becomes positive in the short, medium and long term. long-term. These results explain that there are different responses from monetary variables and digital variables, both positive and negative responses. However, it can be seen the influence of E-commerce transactions on GDP, which in the short term has a negative effect, then in the medium and long term it has a positive effect. This research is in line with Rr. Getha Fety Dianari (2018) who stated that in the long term the development of the number of e-commerce business sites has a positive effect on GDP at a significant level of 10%. Then research by Ni Made Yulia Dewati (2023) stated that in the long term the variable value of e-commerce transactions and internet users have a positive influence.

4.6 FEVD Test

The purpose of Forecast Error Variance Decomposition (FEVD) is to determine the

influence and contribution between transfer variables. FEVD analysis is used to estimate the variance contribution of each variable due to changes in a particular variable in the VAR system.

Table 4.5 Summary of FEVD Results

Variable	Biggest Contribution	Policy Recommendations (Leading Indicator)		
		Short-term	Medium-term	Long-term
ECT	I	ECT	ECT	ECT
	II	(-) PMA	PMA	GDP
EMP	I	EMP	EMP	EMP
	II	ECT	ECT	ECT
GDP	I	GDP	GDP	GDP
	II	EMP	EMP	EMP
PI	I	PI	PI	PI
	II	GDP	ECT	ECT
PMA	I	PMA	EMP	ECT
	II	GDP	ECT	PMA

Source: Data Processed 2024

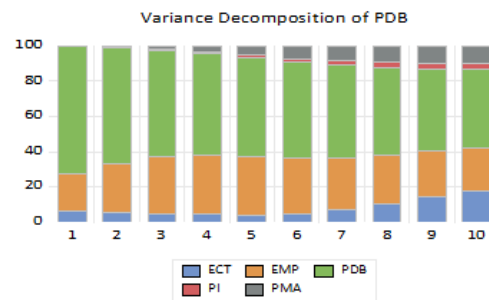


Figure 3.3 FEVD GDP Stacked Graphs (Source: Data Processed)

The biggest contributions to ECT apart from the variables themselves are FDI and GDP in the medium and long term. Then the biggest contribution to the EMP variable other than EMP is ECT. Then the biggest contribution to the GDP variable is the EMP variable, and the biggest contribution to the PI variable is the GDP and ECT variables, both medium and long term. As well as the largest contribution in the PMA variable for the short and medium term PMA variable itself, for the medium term GDP, and the long term ECT variable. Labor has a negative and significant impact on economic growth (Rendy Alvaro, 2021). Likewise, research conducted by Alisman (2018) found that the workforce has a significant negative impact on economic growth. Meanwhile, the third biggest recommendation for increasing GDP value is Ecommerce Transactions. This result is in accordance with the results of research conducted by Yolanda (2023) that e-commerce transactions have a significant influence on gross domestic product. E-commerce has a significant and profitable impact on gross domestic product (Widia et al, 2020). Economic growth has not been greatly affected by the rise of e-commerce, although there are benefits (Aini, 2020). E-commerce plays a role in international trade in the development of the Indonesian economy (Yasmin et al, 2023). Foreign investment, number of workers, and quantity of internet users have a significant positive impact in the long term. However, e-commerce has no impact on Indonesia's gross domestic product (Aula, 2019).

Foreign investment does not have a significant impact on the economic growth of Lampung Province (Johan and Azhari, 2022).

5. Conclusion

Based on the results of the response of one standard deviation from the variables studied above, it can be concluded that there is a change in the influence of each standard deviation of each variable which was originally positive to negative and vice versa, which was initially negative to positive in the medium term and in the long term. long. These results explain that there are different responses, both positive responses and negative responses. This condition shows that all the variables studied are correlated with each other in the medium and long term, where the stability of the response of all variables is formed in the medium and long term, where the response of other variables to changes in one variable shows different variations, either positive or negative. from negative and vice versa, there is a positive response variable or remains negative from the short term to the long term.

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