The Contribution of The Realization of Agricultural Product Industry Investment to Gross Domestic Product of Agricultural and Employment in Indonesia

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Abstract: *The agricultural sector plays a crucial role in Indonesia's economy, contributing significantly to the Gross Domestic Product (GDP) and providing employment opportunities for a large portion of the population. Recent trends indicate an increase in investments in the agricultural product industry, which raises important questions about its potential impact on economic growth and job creation. Understanding this relationship is vital for policymakers aiming to enhance the sector's contributions to overall economic development.. This research aims to investigate the contribution of agricultural product industry investment to the Gross Domestic Product (GDP) of the agricultural sector and employment levels. To achieve this, the study employs the Error Correction Model (ECM) for data analysis, enabling a thorough examination of both short-term and long-term relationships between the variables. The results reveal that the realization of agricultural industry investment has a significant and positive impact on agricultural GDP and employment opportunities. These findings underscore the potential of agricultural investment as a vital strategy for stimulating economic growth and addressing unemployment in the sector.*
Keywords: *Investment, GDP, Employment*

INTRODUCTION

One of the key pillars of a nation's economic development is investment. The agricultural industry in Indonesia is crucial for meeting the country's food demands as well as for generating employment and raising living standards. Along with government initiatives to advance food security and solidify Indonesia's standing as one of Southeast Asia's leading food producers, there has been a recent surge in interest in agricultural investment.

A number of variables, such as agricultural land area, production index, commodity prices, and banking finance, affect the growth of agricultural industry investment in Indonesia. According to Chand, agricultural investment entails the distribution of funds to boost agricultural output capacity via R&D, infrastructure expansion, and technology advancements (Chand, 2019). He underlined the significance of this investment in achieving both sustainable economic growth and food security (Koizumi, 2018). According to Gulati, agricultural investment is the money spent on creating and enhancing agricultural technologies, infrastructure, and irrigation system rehabilitation. While Hazell and Wood define agricultural investment as spending on research and development, which aims to create new innovations

and more efficient agricultural practices, and improve food security (Jiang & Chen, 2020), he highlights the significant role that this investment plays in boosting agricultural productivity and fortifying agricultural supply networks (Wuepper et al., 2023)

To adjust and seize current opportunities, stakeholders—from farmers to investors—need to comprehend these dynamics. It is intended that by comprehending the elements that affect investment, more potent plans to boost the agricultural sector's competitiveness and productivity may be developed. The difficulties experienced by farmers and business actors are inextricably linked to the growth of investment in this area. Despite Indonesia's enormous potential for food production, many farmers are still stuck with old farming practices and find it difficult to get finance. The low quality and productivity of agricultural items produced are impacted by this. Consequently, in order to boost production capacity and efficiency, investment in the agricultural product business is crucial (Martin, 2019)

The value of domestic and foreign investments in the agriculture industry from 2014 to 2022 varies somewhat but generally tends to rise, according to data from the Investment Coordinating Board (BKPM). Primary sector investments (companies engaged in agricultural production) and secondary sector investments (processing industry) make up the majority of investments in the agricultural sector.
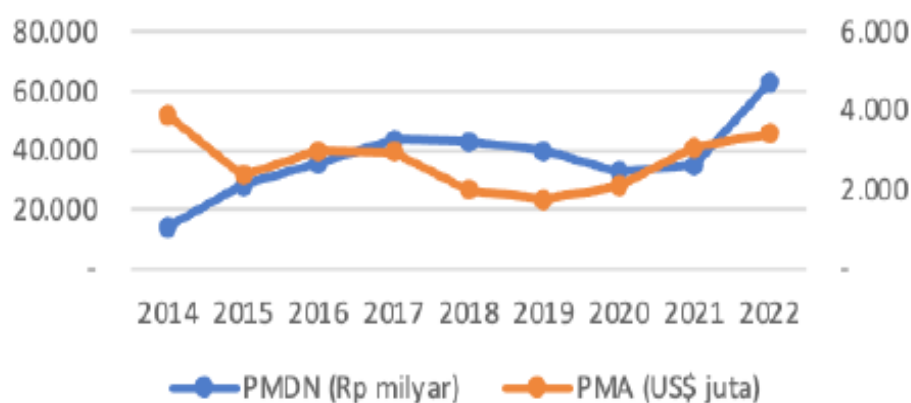

Sources : BPKM. 2023
Figure 1. Investment in Agricultural Product Industry 2014 – 2022

Additionally, the agricultural processing business follows a similar pattern of investment development. Domestic investment grew at an average of 26.10 percent year between 2014 and 2022, while overseas investment grew by 2.35 percent annually. It's interesting to note that during the Covid-19 pandemic in 2021, both international and domestic investment in the processing business actually rose. In 2022, this growth was particularly strong, with domestic investment rising by 79.29 percent over 2021. Indonesia continues to lag behind Malaysia, Vietnam, and the People's Republic of China in terms of the 2019 investment openness index. A environment that is totally closed to international investment is indicated by an index of one, whereas an index of zero denotes complete openness to foreign investment.

The employment of foreign labor and equity barriers, or the maximum percentage of foreign ownership in a corporation, are factors that are thought to prevent FDI investment in Indonesia. Law No. 13/2010 on Horticulture and Presidential Regulation No. 44/2016 on Negative Investment List made FDI in the horticulture subsector the most restricted prior to the revision through the Job Creation Law. Horticulture was included to the negative investment list a list of industries that are closed to or limited from foreign investment as a result of these laws. It severely restricts the number of foreign employees permitted in a foreign-owned

business until 2020 and only permits 30 percent foreign ownership of the horticultural industry (Pertanian, 2020)
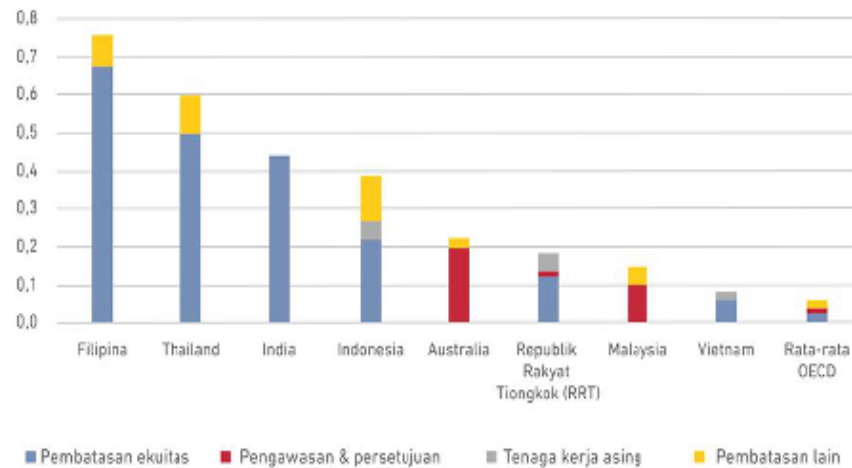
Sources : OECD (2020) dalam Center for Indonesian Policy Studies (CIPS), 2021
Figure 2. Investment Restriction Index in the Agricultural Sector

PMA's lack of investment in Indonesia's food crops, horticulture, and livestock sub-sectors is due to a number of issues. First, the Indonesian market is still too small and undeveloped to be a desirable place for comparatively substantial investments. Despite having a sizable population and middle-class populations, Indonesians have not yet begun to consume high-value agricultural products. Second, there are still a lot of land conflict issues with agricultural land availability. Investors typically suffer from land conflicts, particularly when it comes to the company's reputation, which is "impressed as bad" when there is a struggle with the local community. Third, laws and practices that do not favor investors. Restrictive rules, regulatory complexity, and legal clarity or policy consistency are the three main regulatory obstacles to investment in Indonesia, particularly in the agriculture sector. Fourth, there is still room for improvement in data accuracy and legal institutions. Investors require legal organizations that can give them legal assurance. Furthermore, precise data is a crucial prerequisite for the development of agricultural policies, particularly those pertaining to export-import permits, production goals, and the implementation of fiscal policies (Saini & Gulati, 2017)

The gross domestic product (GDP) of the agriculture sector is significantly impacted by the realization of investments in the agricultural products industry. Agricultural productivity rises as a result of higher investment flows in technology and tangible capital. Higher output growth results from this, and the agriculture sector's GDP rises as a consequence. Supporting the national economy and raising the competitiveness of Indonesian agricultural products on the international market are two significant goals of this growth (Sukirno, 2018)

The Agriculture Sector GDP is a gauge of the agriculture sector's contribution to the national economy, according to the Ministry of Agriculture. The value added produced by all of the nation's agricultural activities is used to compute this GDP (Ministry of Agriculture, 2020). In the meantime, Mankiw said that the GDP of the agricultural sector is a crucial metric for evaluating a nation's economic health, particularly in those where the agriculture sector is heavily relied upon. It demonstrates the agriculture sector's efficiency and production (Mankiw & Reis, 2018)

The broad agricultural sector GDP, which includes food crops, horticultural crops, plantation crops, livestock, agricultural services, hunting, forestry, and logging, and fisheries, is detailed based on 17 (seventeen) groups of economic sectors/business fields. Indonesia's GDP is released quarterly by BPS, beginning in 2015, using the base year of 2010. However, this study also examines the agricultural sector GDP without forestry and fisheries using the phrase "Narrow Agricultural GDP" because the Ministry of Agriculture does not include these sectors (Badan Pusat Statistik, 2023)

According to the business sector structure of the Indonesian economy in 2021, the broad agricultural sector (which includes forestry and fisheries) came in second with a 13.28 percent contribution to Indonesia's GDP, followed by narrow agriculture with a 9.85 percent contribution. However, in 2022–2023, the trade sector took the second position, making agricultural GDP the third largest with a 12.53 percent contribution in 2023 and a 9.25 percent contribution from narrow agriculture. The agriculture sector's contribution to Indonesia's GDP creation varies as a percentage if 2021–2023 is included

Additionally, worker absorption in the agriculture industry is positively impacted by greater investment. New jobs are frequently created by investment initiatives, both directly and indirectly. The welfare of individuals in rural areas will rise as more workers are engaged in the production, processing, and distribution of agricultural products. This raises people's earnings and lowers unemployment rates, both of which contribute to higher living standards (Rajput et al., 2023)

Recruitment, according to Gary Dessler, is "the process of attracting and selecting qualified candidates who meet the needs of the organization." He highlights how crucial it is to put people appropriately in order to optimize their abilities and support corporate objectives (Molina-Azorin et al., 2021). Recruitment, according to Stephen P. Robbins and Timothy A. Judge, is "the process by which organizations meet their workforce needs by recruiting individuals who have relevant competencies and are aligned with the organization's culture." According to Robbins and A. Judge (2016), effective selection must consider how well the candidate fits with the company (Robbins & A. Judge, 2016)

According to BPS data, the food crops subsector employs the greatest number of people in agriculture. 14,974,128 people worked in this subsector in 2022, making up almost 39% of the entire agricultural workforce. In contrast, other subsectors like horticulture only contributed 10%, cattle 12%, and plantations 33%. The government has given food crops a lot of attention since it believes they will contribute to preserving both domestic and even international food supplies.

The agriculture industry has a high employment rate, yet unemployment is still high, particularly for young people. Many recent graduates struggle to obtain work in the industry, and the positions that do exist don't always suit their qualifications. Due to a lack of expertise, many agricultural workers find it challenging to adopt new technologies and more productive farming methods. Innovation and productivity in the industry are hampered by inadequate education and training. The poor pay received by farmers and other agricultural workers is another issue. Workers become dissatisfied and may be encouraged to look for work in other industries as a result, which could lower the number of workers available for agriculture (Mathis & Jackson, 2019)

The study "The Impact of Agricultural Investment on Economic Growth in Indonesia" by Pramudito, A., & Rahmawati, N. (2021) is one of several earlier papers that are pertinent as research references. According to this study, investments in the agricultural sector, particularly in the agriculture business, significantly boost economic growth as indicated by their contribution to the national Gross Domestic Product (GDP) (Ilmi, 2019). The study

"Agricultural Investment and Employment: An Analysis of the Agricultural Sector in Indonesia" was then carried out by Suryani, E., & Lestari, D. (2020). According to this study, the creation of jobs is significantly impacted by the realization of investment in the agricultural sector, particularly the agricultural processing industry, and this, in turn, helps to raise the agricultural sector's GDP (Abdelgawwad & Kamal, 2023). Next, a study titled "Evaluating the Contribution of Agricultural Processing Industry to National Economic Growth in Indonesia" was carried out by Basri, I., & Hidayati, S. (2019). This study examines the agricultural processing industry's potential to generate substantial added value and demonstrates how investments in this sector support the expansion of the agricultural GDP (Li et al., 2022). The Role of Agricultural Investment in Increasing Employment and Economic Output in Rural Areas is a study by Utami, R. S., & Setyono, H. (2023). This study emphasizes how crucial investments in the agricultural sector are to raising rural employment and productivity, both of which boost the GDP of the agricultural sector.

From the research above, there are several research gaps that can be identified:

1. Regional Analysis:
   Without differentiating between investment patterns and economic growth in different regions of Indonesia, the majority of research concentrate more on national analysis. The differences in investment contributions between provinces or areas with distinct agrarian features might be investigated further.

2. Long-Term vs. Short-Term Impact:
   Many studies might simply look at how investments affect GDP and employment in the short term. Longer-term effects, such as how shifts in investment impact employment and the agricultural sector over time, require further study.

3. Decomposing The Contributions:
   Investment contributions are frequently not broken down into more specific elements like technology, operations, and human resource development in the research that is currently available. There is a chance to do a more thorough analysis of these investment spending components to determine their respective contributions to GDP and employment.

4. Sustainability and Economic Transition:
   In the context of agriculture industry investment, there is a dearth of research that integrates sustainability and economic transition elements. The effects of environmentally and socially conscious investments on farmers' long-term productivity and well-being could be the subject of future studies.

This study can provide a more profound and pertinent addition to our understanding of the relationship between agriculture sector investment and its effects on GDP and employment in Indonesia by addressing this research gap.

RESEARCH METHOD

The Error Correction Model (ECM) is the analysis method employed in this investigation. In the context of econometric models, the Error Correction Model (ECM) is a statistical analytic technique used to quantify both short-term and long-term correlations between variables. The dynamics of adjusting imbalanced variables toward long-term equilibrium are captured by ECM. ECM makes the assumption that the variables under study have a lasting relationship. There is a mechanism that returns variables to equilibrium when they shift out of it. The short-term responses of variables to departures from long-term equilibrium are also measured using this model. It gives a sense of how quickly variables can be adjusted. ECM typically has two parts: a short-term component that displays changes or

deviations and a long-term component that displays stable associations. By taking into account both short-term and long-term interactions, ECM aids in projecting future variables and offers helpful information to policymakers as they develop plans based on market dynamics (Anwar et al., 2020).

RESULTS AND DISCUSSION
Stationary Test Results

The purpose of the stationary test is to confirm that the data included in the analysis of the Error Correction Model (ECM) satisfies the fundamental presumptions. Finding out if the data's mean and variance stay constant over time is made easier with the use of the stationary test. Analysis using non-stationary data may yield false conclusions. When non-stationary data is used, it may appear that there is a strong link between variables when, in reality, there isn't. False conclusions can be avoided with the use of the stationary test. The ECM analysis can be carried out more precisely and an accurate evaluation of the short-term and long-term relationships between variables may be made by making sure the data is stationary. The outcomes of the stationary test are as follows:

Table 1. Results of the Stationarity Test

Variabel	At Level		At 1st Difference	
	ADF Prob	Explanation	ADF Prob	Explanation
Realisasi Investasi	0,9534	Not Stationary	0,0000	Stationary
GDP Agriculture	0,6371	Not Stationary	0,0000	Stationary
Employment	0,9448	Not Stationary	0,0002	Stationary
Residual short time	0,0000	Stasioner	-	-

Source: Data processed by Eviews 12

Table 1. shows the results of the ADF statistical test on the first difference which shows that the null hypothesis is rejected, in other words, the data on all variables after being derived once the data becomes stationary. With a probability value of less than 0,05. This means that all variables no longer contain unit root problems and have stationary data conditions at the first difference level and meet the requirements for using the Error Correction Model (ECM) analysis..

Cointegration Test

Cointegration test is used in Error Correction Model (ECM) analysis to identify whether non-stationary variables have a stable long-run relationship even though each variable fluctuates. Cointegration is a prerequisite for the application of ECM. If the variables are cointegrated, the ECM model can be used to analyze short-run adjustments to long-run equilibrium.

Table 2. Results of the Johansen Cointegration Test

Trace Statistic	0.05 Critical Value	Probability	Explanation
53,40922	15,49471	0,0000	Terkointegrasi

Max Eigen Statistik	0.05 Critical Value	Probability	Explanation
49,31462	14,26460	0,0000	49,31462

Source: Data processed by Eviews 12

Table 2. shows that the Trace Statistic value (53.40922) > Critical Value (15,49471) and the Probability value 0,0000 < 0,05, as well as the Max Eigen Statistic value (49,31462) > Critical Value (14,26460) and the Probability value 0,0000 < 0,05, respectively. Based on these test results, it can be inferred that the equation model shows cointegration between the realization of agricultural industry investment, gross domestic product, and long-term labor absorption.

Error Correction Model Estimation

1. The Impact of Agricultural Product Industry Investment on Gross Domestic Product of the Agricultural Sector

Since there is a long-term equilibrium, the Error Correction Model (ECM) is the analysis utilized in this model 1 based on the results of the stationarity and cointegration tests. The following are the regression results that demonstrate the causal relationship between the independent and dependent variables:

Table 3. ECM Short-term and Long-term Estimates Model 1

SHORT-TERM ESTIMATION				
Dependen Variable : GROSS DOMESTIC PRODUCT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6,084423	0,449366	13,54002	0,0000
D(Ln_INVESTMENT)	4,739167	0,601340	7,881008	0,0000
RES(-1)	-0,261866	0,101501	-2,579939	0,0147
R-squared	0,865225	**Prob(F-statistic)**	0,000000	
Adjusted R-squared	0,858705	**Durbin-Watson stat**	1,745532	
LONG TERM ESTIMATION				
Dependen Variable : GROSS DOMESTIC PRODUCT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5,462717	0,839920	6,503858	0,0000
Ln_INVESTMENT	2,913796	0,475378	6,129428	0,0000
R-squared	0,745549	**Prob(F-statistic)**	0,000000	
Adjusted R-squared	0,708130	**Durbin-Watson stat**	1,959426	

Source: Data processed by Eviews 12

With a determination coefficient with a short-term R-Squared value of 86,52 percent and a long-term R-Squared value of 74,55 percent, Table 3.3's results indicate that the agricultural industry investment variable has a significant and positive impact on the agricultural sector's gross domestic product both in the short and long term. The estimation

results table's calculation results also show statistically significant results at the probability value of agricultural industry investment is smaller = than α (0,0000 ≤ 0,05).

The study's findings indicate that:

1) Investment boosts production capacity, enabling producers and farmers to generate more agricultural goods.
2) The industry can grow markets and raise profits by introducing new items or improving the quality of current ones with investment.
3) Longer value chains are produced by investments in the agricultural industrial sector, raising the value of agricultural goods and their GDP contribution.
4) Investment frequently also include upgrades to transportation and storage facilities, which facilitate product distribution and lower post-harvest losses.
5) Over time, sustainable investment can make the agriculture industry more resilient to climate change and market swings, which supports economic stability.

These factors are interrelated and show how investment can drive significant growth in agricultural sector GDP.

2. The Impact of Agricultural Industry Investment on Employment Opportunities

Since there is a long-term equilibrium, the Error Correction Model (ECM) is the analysis utilized in this model 2 based on the results of the stationarity and cointegration tests. The following are the regression results that demonstrate the causal relationship between the independent and dependent variables:

Table 4. ECM Short-term and Long-term Estimates Model 2

SHORT-TERM ESTIMATION				
Dependen Variable : EMPLOYMENT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0,036134	0,004692	5,670146	0,0000
D(Ln_INVESTMENT)	0,895401	0,027442	32,62889	0,0000
RES(-1)	-0,455068	0,130623	-2,728255	0,0110
R-squared	0,868688	Prob(F-statistic)	0,000000	
Adjusted R-squared	0,866948	Durbin-Watson stat	1,721042	
LONG TERM ESTIMATION				
Dependen Variable : EMPLOYMENT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5,689278	1,097756	5,182643	0,0000
Ln_INVESTMENT	1,063797	0,085548	12,43516	0,0000
R-squared	0,802734	Prob(F-statistic)	0,000000	
Adjusted R-squared	0,797543	Durbin-Watson stat	1,936805	

Source: Data processed by Eviews 12

Based on the results of Table 4, it can be concluded that for the short and long term, the influence of agricultural industry investment on employment opportunities, based on the calculation results obtained in the estimation results table, statistically shows significant results at the probability value of agricultural industry investment is smaller = than α

(0,0000 ≤ 0,05), then it can be concluded that the agricultural industry investment variable has a significant and positive influence on employment opportunities, with a determination coefficient with a short-term R-Squared value of 86,86 percent, while the long-term R-Squared value is 80,27 percent.

The results of the study show that:

1) Investment leads to higher output, which necessitates additional workers to oversee and operate.
2) Businesses can increase the variety of goods they manufacture with investment, which will lead to the creation of more jobs in connected industries.
3) From manufacturing to distribution, investment lengthens the value chain, which raises the need for labor at every turn.
4) Investment frequently entails the construction of infrastructure, including transportation and storage facilities, which also generate employment.
5) Over time, sustained investment fosters steady economic expansion, which in turn fosters an atmosphere that is favorable to the development of jobs.
6) Training programs that enhance workers' abilities and better position them to fill open positions are one type of investment.

These factors are interrelated and explain how investment in the agricultural industry can significantly increase employment opportunities.

CONCLUSION

The following conclusions can be drawn from the research findings: 1) Investment in the agricultural product industry significantly and favorably affects the agriculture sector's gross domestic product over both the short and long term. This suggests that raising investment can boost productivity, add value, and stimulate economic growth in the agriculture sector. Consequently, boosting investment in this area is crucial to enhancing agriculture's economic contribution to the country. 2) According to both short- and long-term estimations, employment prospects are significantly and favorably impacted by investments in the agriculture sector. This indicates that raising investment in this industry boosts both productivity and employment creation. Thus, promoting investment in the agriculture sector is a crucial step in boosting job prospects and promoting economic expansion.

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