

# The Role of Education in Employment in Agriculture and Agriculture Performance in Vietnam

**Eny Lestari Widarni**

Affiliation: STIE Jaya Negara Tamansiswa Malang

## Abstract

This study aims to understand the direction of the relationship between employment in agriculture, education, and agriculture performance. This study uses the VAR method to see the response and encouragement between variables so that the dependent variable in this study is employment in agriculture, employment performance, and education in Vietnam. We found that education investment has a positive relationship with agricultural performance which was driven by agricultural performance in the previous period and negatively related to employment in agriculture. However, from this it can be seen that productivity which is the result of developing human resources through education mechanisms is getting bigger. Where labor productivity increases over time. However, looking at the graph of labor absorption in the agricultural sector which continues to decline very sharply, it becomes a threat in itself in the future. Because there is a decline in performance in the future due to labor shortages and it is possible that the agricultural sector will be completely destroyed when there is a shortage of labor in this sector if the interest of the Vietnamese youth in the agricultural sector is not invested. However, based on the estimation results, there is a positive relationship between agriculture performance, education, and employment in agriculture. This is good news for Vietnam because it has the potential to be a developed agrarian country. Where the interest of the Vietnamese population to work in the agricultural sector will be driven by itself through better agricultural performance.

**Keywords:** Agriculture, Employment, Vietnam

**JEL Classification :** C10, J24

## Background

Vietnamese students study for their grades, Vietnamese schools focus on achievement. Vietnamese education teaches students how to find good jobs. In 2016, the Prime Minister announced the structural framework of the national education system (Zhou et al,2019). The target of meeting the national standard for universalization of preschool education for children aged 5 years has been achieved since early 2017 with the mobilization rate of children aged 5 years reaching 99.98%. In addition, the whole country has achieved the universalization standard of basic education at level 2, of which 18/63 provinces and cities have reached this level. The whole country achieved the universalization standard of junior secondary education at level 1, of which 19/63 provinces and cities reached level 2 and level 3. At the end of 2019, the Minister of Education and Culture approved 5 sets of grade 1 textbooks, with a total of 46 books from 9 subjects and educational activities to be used in the 2020-2021 school year. The selection of textbooks is carried out by the regions seriously, publicly, and transparently. This is the first time in the history of the education sector in our country this policy has been implemented and there are encouraging early results (Vu, 2021).

The implementation of examinations, tests, and assessments of the quality of education is becoming more practical and effective. The innovation of testing, testing, and quality

assessment for primary, secondary, and higher education is carried out in the direction of capacity assessment, combining the results of the process with the results of the end of the school year. The post-secondary education level has changed the organization of training from year to year to accumulate modules or credits. Renovation of high school graduation examinations, university, and college admissions is carried out towards capacity assessment, combining process results with school year results, reducing pressure and costs for the community. The quality of public education, both mass, and spearhead, has been raised, recognized, and appreciated internationally (McGuinness et al,2021).

Vietnam Peasants' Union continues to innovate in content and way of operation, building strong associations in terms of politics, ideology, organization, and action; enhance the role of representatives, promote property rights, and protect the legitimate rights and interests of members and smallholders. Uphold the traditions of patriotism, love of socialism, revolutionary spirit, creative farmer, diligence, independence, free and united; integrate actively and proactively into the world, promote economic and social development, build culture, maintain national defense and security, contribute to the realization of the goals of a rich nation, a strong state, socialist orientation, democracy, and justice (Tovy,2010).

The agricultural sector is an important sector in Vietnam. Agriculture provides jobs for many people in Vietnam. Agriculture is a sector that plays a role in maintaining food sovereignty in Vietnam. The importance of the agricultural sector in Vietnam can be seen from the role of the agricultural sector in providing a food supply for the Vietnamese population, which of course is very important for Vietnam. Traditional agriculture in Vietnam is wet rice farming and intensive agriculture, now divided into many production sectors. Vietnamese agriculture has made important progress: agricultural production has become rich and diverse, harnessing the potential of the natural areas of the plains and the central plains. , mountainous areas, crop varieties (mainly rice and food). food crops) and modified livestock; irrigation system developed; Fertilizers and pesticides are relatively adequate. Both crop and livestock production and productivity increased sharply (Thanh et al., 2021).

## **Literature review**

Education is a way to acquire knowledge, habits, customs, and human skills that have been passed down from generation to generation through teaching, research, or training. Education can be done by everyone and learning can also be guided by others. This means that personal experiences with thoughts, actions, and feelings will be considered educational. For each person, education will be shaped through many different stages: from preschool education, primary education to secondary and university education. In short, it can be seen that the purpose of education is to equip and equip knowledge and skills. At the same time, it trains people's morality, personality, and way of life to help people integrate into their communities (Alam et al,2020 ; Afriani,2021).

For every human being, education plays a relatively important role. It is a factor that helps make the progress and evolution of humans as compared to other animals. When there is education, people not only have wisdom, knowledge, and skills but also have good character in life. For society, education also contributes to social innovation through the activities and thoughts of each individual. Thanks to that, it will help people integrate into the community through relationships and activities. Thanks to educational knowledge and skills it will help everyone live more responsibly towards themselves, their families, and in society. At the

same time, it helps people to adapt to the state of nature and society in the best way (Reis et al,2021 ; WIDARNI & BAWONO, 2021).

Agriculture is an industry with a long history of development, agricultural activities have existed for thousands of years since people stopped hunting and gathering. Because of this long history, the agricultural economy is often referred to as the traditional economy. Agriculture is a sector of the national economy, one of the main parts of material production, food production for the people, and raw materials for industry. In agriculture, the production of products is not only related to economic processes, but also to natural reproduction processes. In order to properly conduct an agricultural business, it is important to understand and skillfully use the economic laws of animal and plant development. Agriculture consists of two sectors: crop production and livestock. Crop production includes the production of cereals, cash crops, potatoes, vegetables, horticulture, grass farming, The livestock industry includes rearing large horned cattle, sheep, pigs, and poultry. In agriculture, the land is one of the main means of production. The characteristics of soil as a means of production are: if the soil is used properly, soil fertility does not decrease, but increases. Agricultural characteristics are the most important seasonality of work in terms of production and product, which is a rather large separation between production time and working period due to the characteristics of agricultural production (Widarni,E.L, Drean,2021).

### **Research Methodology**

The type of data used in this research is quantitative data, while the data source in this study is secondary data. Secondary data is data that already exists and is collected for research purposes. Population data can be defined as a collection of all possible observations. The population in this study were all employment in agriculture, rural residents, the added value of agriculture in Vietnam. The sample in this study is represented by all users of employment in agriculture, agricultural performance and education in Vietnam, which is recorded by the world bank.

This study uses the VAR method to see the response and encouragement between variables so that the dependent variable in this study is employment in agriculture,employment performance, and education in Vietnam.

The independent variable is a variable that is believed to be a predictor that causes fluctuations in the dependent variable. The independent variable of this study uses the VAR method to see the response and encouragement between variables so that the independent variables in this study are employed in agriculture, rural residents, the added value of agriculture in Vietnam.

Based on mathematical models and literature reviews, it is possible to simulate possible responses and impulses between variables with unknown future economic data. To see the responses and impulses of the main economic variables that we discuss in this journal, we use the Vector Autoregression (VAR) method to estimate the possibility that could happen in the future based on simulations or forecasting. Follows the following equation model:

$$Y_t = C + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + e_t$$

Where  $Y_t = (Y_{1t}, \dots, Y_{Kt})$  is the set of  $K$  time series variables,  $c$  is  $K \times 1$  constant vector,  $A$  is the coefficient matrix  $K \times K$  and  $e_t$  is the error term

The vector Autoregression Model (VAR) is an extension of the univariate autoregression model for multivariate time series data. The VAR model is a multi-equation system in which all variables are treated as endogenous (dependent). There is one equation for each variable as the dependent variable.

We focused on simulating pre-corona responses and impulses based on past data sets for the period 2000 to 2019 with the assumption that variables outside the key variables we studied did not change.

## Results and Discussion

The table below presents a summary of descriptive statistics of several variables used in this study during the period 2000 to 2019.

Table 6. Descriptive statistics of agricultural performance in USD value in January 2021, education (investment in education in USD value in January 2021), and employment in agriculture (total working population).

	EMPLOYMENT_IN_AGRICULTURE	EDUCATION	AGRICULTURE_PERFORMANCE
Mean	24904649	5.96E+09	2.18E+10
Median	25031238	5.53E+09	2.08E+10
Maximum	27500184	1.12E+10	3.66E+10
Minimum	21329897	1.49E+09	7.60E+09
Std. Dev.	1749498	3.52E+09	1.10E+10

Based on Table 5 above, it appears that from the period 2000 to 2019, the average agricultural performance in Vietnam is very high at around 21.8 billion USD which can be seen from the mean value in table 1. with a high level of volatility at 11 billion USD. With an average number of workers 24.9 million people with an average educational investment value of 5.96 billion USD. However, this statistical descriptive analysis table is not sufficient to provide a general description of human capital investment through educational mechanisms on agricultural performance as seen from the productivity of workers in Vietnam. If it is divided between the average performance in the study period and the average number of workers, it can be seen that the average productivity level of investment in human capital in Vietnam is 21.8 billion USD divided by 24.9 million workers, which is \$875.5 per worker. From the results of the average productivity per worker, it can be seen that the level of effectiveness of Vietnam's human capital investment in the agricultural sector is \$875.5 per worker divided by the investment per worker of 5.96 billion USD divided by 24.9 million people, which is \$239.36 per worker. So every USD invested can generate  $\$875.5 \div \$239.36 = \$3.66$  per people.

To see a more detailed and careful relationship of influence, vector analysis is carried out, namely Vector Autoregressive. Before estimating using Vector Autoregressive, there are several conditions that must be met from several observed variables, namely Stationarity Test, and Optimum Lag Test. This book will also include a cointegration test to see if there is a long-term relationship between variables and a causality test to see a reciprocal relationship between variables. Estimation using the VAR model requires all variables to be stationary at the level, if the variable is not stationary at the level, the estimation is carried out using the VECM model on the condition that all variables formed are cointegrated with each other where the results are shown in Table 7 below:

Table 7. stationarity test

Method			Statistic	Prob.*
ADF - Fisher Chi-square			37.78	0

ADF - Choi Z-stat			(4.96)	0
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.				
Intermediate ADF test results D				
Series	Prob.	Lag	Max Lag	Obs
D(EMPLOYMENT_IN_AGRICULTURE,2)	2.00E-03	1.00E+0 0	3.00	16
D(EDUCATION,2)	1.38E-02	3.00E+0 0	3.00	14
D(AGRICULTURE_PERFORMANCE,2)	0.0002	1	3.00	16

From the results of stationarity testing with Augmented Dickey-Fuller, it can be seen that at the 2nd level the difference is stationary and vector estimation uses Vector Autoregressive. It can be seen that the probability is less than 0.05 in each tested variable. After doing the stationarity test, a cointegration test was conducted to see the long-term integration between variables. If there is cointegration between variables, the estimation is made using the Panel Vector Error Correction Model (VECM) method, but if there is no cointegration, the estimation is made using the Vector Autoregressive method. Cointegration test results are shown in table 8.

Table 8. Cointegration test results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.697667	2.80E+01	29.80	0.0794
At most 1	0.301744	6.470391	15.49	0.6399
At most 2	0.000297	0.005342	3.84	0.9411
Trace test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.697667	21.53208	21.13	0.0439
At most 1	0.301744	6.46505	14.26	0.5543
At most 2	0.000297	0.005342	3.84	0.9411

From the cointegration results, the critical value is greater than the value of Trace Statistics and the value of Max-Eigen Statistics which indicates that there is no cointegration relationship in the variable equation, so the next method that can be used to determine long-term and short-term relationships is the Vector Autoregressive method.

Optimum lag test is used to determine the time period of the influence of a variable on other variables which will give optimal results. This is because changes in the movement of a variable are not directly responded to by changes in other variables, but there is still a certain grace period. Therefore it is important to know the lag length. The optimum lag test can be seen in table 9.

Table 9. Optimum lag test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1164.688	NA	4.83E+49	122.9145	123.0636	122.9397
1	-1113.08	81.48647 *	5.55e+47 *	118.4294 *	119.0259 *	118.5304 *

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic

(each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

From the results of the Optimum lag test, it can be seen that the optimum lag is found in lag 1. The results of the autoregression vector estimation are shown in table 10.

Table 10. The results of the autoregression vector estimation

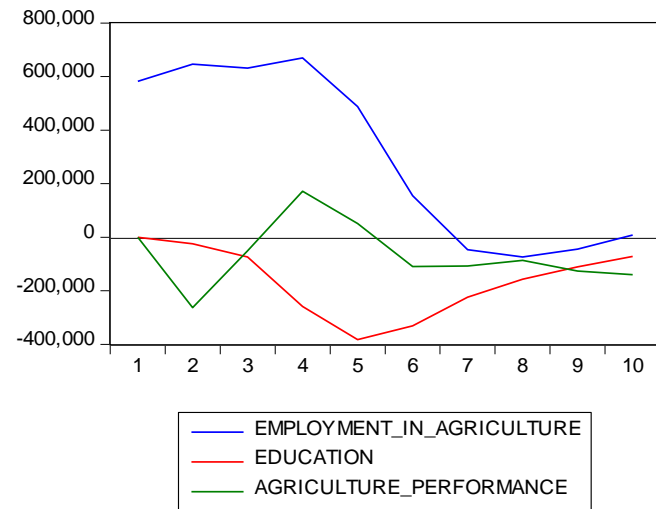
	EMPLOYMENT_IN_AGRICULTURE	EDUCATION	AGRICULTURE_PERFORMANCE
EMPLOYMENT_IN_AGRICULTURE(-1)	1.293369	1.56E+02	6.22E+02
	-0.21875	-194.688	-6.39E+02
	[ 5.91245]	[ 0.79911]	[ 0.97261]
EMPLOYMENT_IN_AGRICULTURE(-2)	-0.513446	-169.7061	-1.32E+03
	-0.24063	-214.162	-7.03E+02
	[-2.13372]	[-0.79242]	[-1.87434]
EDUCATION(-1)	0.000454	0.645948	6.63E-01
	-3.50E-04	-3.15E-01	-1.03E+00
	[ 1.28346]	[ 2.05217]	[ 0.64140]
EDUCATION(-2)	-0.000785	-0.621377	-9.02E-02
	-0.00032	-0.28418	-9.33E-01
	[-2.45787]	[-2.18658]	[-0.09667]
AGRICULTURE_PERFORMANCE(-1)	-0.000218	0.210258	7.07E-01
	-0.00012	-0.10832	-3.56E-01
	[-1.79058]	[ 1.94117]	[ 1.98877]
AGRICULTURE_PERFORMANCE(-2)	0.000298	0.094826	3.35E-02
	-0.00013	-0.11908	-3.91E-01
	[ 2.22865]	[ 0.79633]	[ 0.08581]
C	5605820	-69079663	2.16E+10
	-4276371	-3.80E+09	-1.20E+10
	[ 1.31088]	[-0.01815]	[ 1.73116]
R-squared	0.915178	0.984526	9.83E-01
Adj. R-squared	0.868912	0.976085	9.73E-01
Sum sq. resids	3.73E+12	2.96E+18	3.19E+19
S.E. equation	582612.2	5.19E+08	1.70E+09
F-statistic	19.78064	116.643	1.04E+02
Log likelihood	-260.0636	-382.3053	-4.04E+02

Akaike AIC	29.67373	43.25615	4.56E+01
Schwarz SC	30.01999	43.6024	4.60E+01
Mean dependent	24624535	6.46E+09	2.33E+10
S.D. dependent	1609155	3.35E+09	1.04E+10

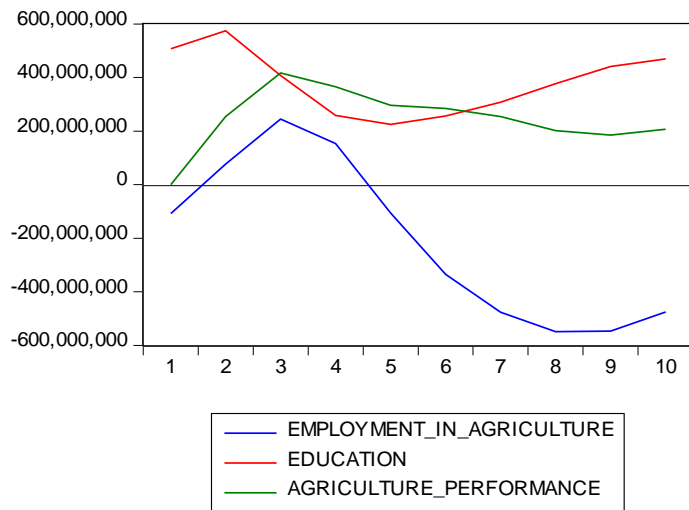
Employment in Agriculture has a significant positive relationship with Employment in Agriculture in the future or t-1 Employment in Agriculture has a significant positive relationship with t0 Employment in Agriculture with a t-table value of 5.91245 and a coefficient value of 1.29. There is no significant positive correlation with investment in human capital with an indication of investment in education with a t-table value of 0.79911 and a coefficient value of 155.58 and a significant positive correlation with agriculture performance with a t-table value of 0.97261 and a coefficient value of 621.68. However, investment in human resources in education has a significant positive effect with a t-table value of 1.28346 and a coefficient value of 0.0005. Significantly positive correlation with future education investment or education t-1 has a significant positive correlation with education t0 and with t-table value 2.05217 and coefficient value 0.65. However, it is not significantly positively related to agriculture performance with a t-table value of 0.64140 and a coefficient value of 0.66. In period one, agriculture performance has a significant negative correlation with employment in agriculture. However, in the second period or in the future, it has a significant positive relationship with employment in agriculture with a t-table value of 2.22865 and a coefficient value of 0.0003. In the future, agriculture performance is also significantly positively related to education investment with a t-table value of 0.79633 and a coefficient value of 0.009. Agriculture performance in the second period is also significantly positively related to Agriculture performance itself. This means that in Vietnam, with agriculture performance that continues to improve, it encourages the interest of the Vietnamese population to enter agriculture because farmers' incomes continue to increase, which is obtained from a descriptive analysis of productivity per worker in the agricultural sector of \$875.5 per worker per year. Because the interest of the Vietnamese population has the potential to increase as a result of better agricultural performance, it encourages the Vietnamese population to invest in education, especially in the agricultural sector, and encourage agricultural performance in the future. The value of the coefficient of determination (Adj. R-Square) shows the degree of truth of the estimate of 0.868912. This means 87% accuracy of the calculation rate of the autoregressive vector. Impulse Response Function (IRF) describes the response of an endogenous variable to shock that occurs in other variables in a dynamic VAR system. IRF can be used to see the effect of fluctuations or shocks from one variable on the value of another variable either now or in the future. The results of the Impulse Response Function (IRF) of the Infrastructure variable against other variables are shown by the following Impulse Response graph:

Response to Cholesky One S.D. (d.f. adjusted) Innovations

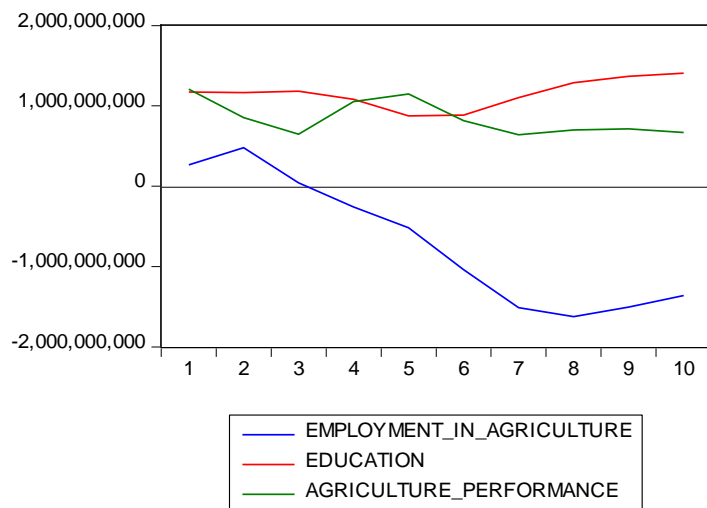
Response of EMPLOYMENT\_IN\_AGRICULTURE to Innovations



Response of EDUCATION to Innovations

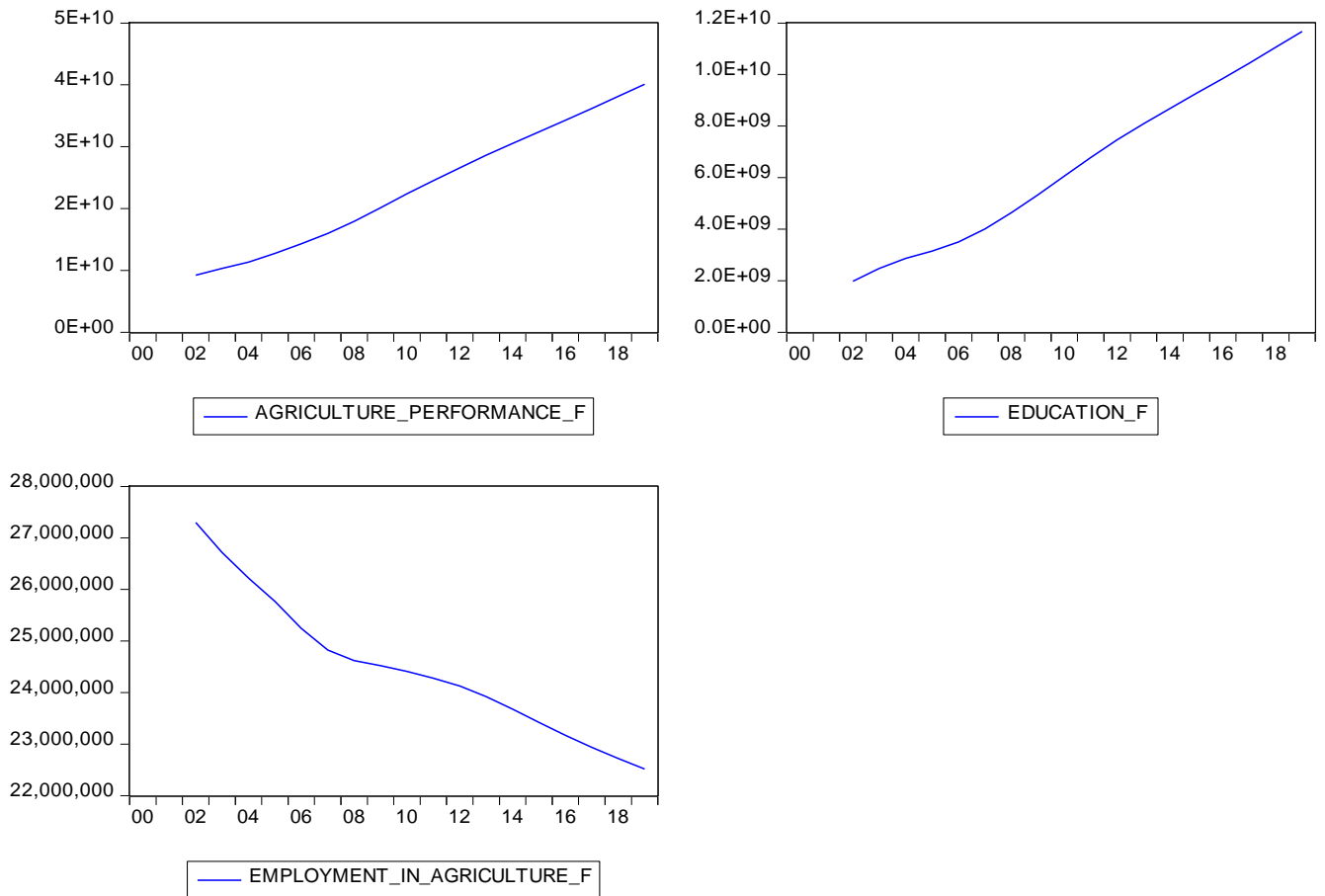


Response of AGRICULTURE\_PERFORMANCE to Innovations





Based on the response and impulse graphs, it can be seen that each variable responds to each other since the first time period with a lag of 1. This shows that in Vietnam the three variables influence each other. To see the direction of influence can be seen in the following forecasting chart:



From the forecasting results, it can be seen that education investment has a positive relationship with agricultural performance which was driven by agricultural performance in the previous period and negatively related to employment in agriculture. However, from this it can be seen that productivity which is the result of developing human resources through education mechanisms is getting bigger. Where labor productivity increases over time. However, looking at the graph of labor absorption in the agricultural sector which continues to decline very sharply, it becomes a threat in itself in the future. Because there is a decline in performance in the future due to labor shortages and it is possible that the agricultural sector will be completely destroyed when there is a shortage of labor in this sector if the interest of the Vietnamese youth in the agricultural sector is not invested. However, based on the estimation results, there is a positive relationship between agriculture performance, education, and employment in agriculture. This is good news for Vietnam because it has the potential to be a developed agrarian country. Where the interest of the Vietnamese population to work in the agricultural sector will be driven by itself through better agricultural performance.

### Conclusion

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labor productivity increases over time. However, looking at the graph of labor absorption in the agricultural sector which continues to decline very sharply, it becomes a threat in itself in the future. Because there is a decline in performance in the future due to labor shortages and it is possible that the agricultural sector will be completely destroyed when there is a shortage of labor in this sector if the interest of the Vietnamese youth in the agricultural sector is not invested. However, based on the estimation results, there is a positive relationship between agriculture performance, education, and employment in agriculture. This is good news for Vietnam because it has the potential to be a developed agrarian country. Where the interest of the Vietnamese population to work in the agricultural sector will be driven by itself through better agricultural performance.

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